

Kahuku Wind Project Tier 2 Implementation Work Plan

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1.0 Background

Kahuku Wind Power, LLC (KAH) is working to fulfill mitigation obligations under its approved **Habitat Conservation Plan (HCP)** to improve ‘ōpe‘ape‘a/Hawaiian hoary bat (*Lasiurus semotus*) habitat at the Helemano Mitigation Area (HMA) within the state-owned Helemano Section of the ‘Ewa Forest Reserve (Forest Reserve) as part of KAH’s Tier 2 mitigation for the ‘ōpe‘ape‘a. The HMA consists of four fenced parcels totaling 176 acres of land zoned agricultural that is currently managed for cattle grazing under a land license agreement (DOFAW 2021) and is characterized as a combination of grazed pasture and forested ranch land.

As a first step in the planning process, KAH developed the *Kahuku Wind Project Hawaiian Hoary Bat Tier 2 Mitigation Plan* (Mitigation Plan; Tetra Tech 2024), which was approved by the U. S. Fish and Wildlife Service (USFWS) and Hawai‘i Department of Land and Natural Resources, Division of Forestry and Wildlife (DOFAW) as of May 1, 2024. Implementation of the Mitigation Plan is expected to commence in 2024 once a memorandum of understanding between KAH and DOFAW (landowner) is mutually developed, and mitigation actions will be carried out as KAH secures required permits for each action item as necessary. The biological goal for the Mitigation Plan is to fully offset the incidental take of eight ‘ōpe‘ape‘a required for Tier 2 mitigation and provide a net benefit to the species.

The Mitigation Plan proposes various management activities for the HMA designed to restore, enhance, and manage habitat features for bats, thereby increasing the concentration of resources beneficial to bats, and removing known threats to bats (i.e., barbed wire). To identify specific mitigation actions, KAH has leveraged results of the research, restoration, and management efforts from applicable studies (e.g., Jacobs 1999, Jantzen 2012, Gorresen et al. 2013, Ancillotto et al. 2017, Gorresen et al. 2018, Davidson 2020, Montoya-Aiona et al. 2020), approved Hawaiian hoary bat mitigation guidance (DOFAW 2015), updates in the Endangered Species Recovery Committee (ESRC) and DOFAW revised draft guidance (2021), and USFWS, DOFAW, and ESRC input to identify appropriate Tier 2 mitigation actions that meet the biological goal of the Mitigation Plan.

KAH will achieve its mitigation goal by implementing the following mitigation actions during the 5-year term of the Mitigation Plan:

1. Removing barbed wire fencing within the mitigation area.
2. Replacing removed barbed wire fencing from grazed parcels with an appropriate alternative.
3. Creating additional bat foraging corridors which will also serve to improve access to existing adjacent roosting habitat.
4. Maintaining the existing bat foraging corridors previously created by DOFAW.
5. Promoting additional bat prey resource through cattle grazing and management activities within corridors (supplemented by mechanical clearing, as necessary).

6. Adding a water resource to protect bat habitat in the HMA by supporting wildfire suppression activities, with a potential secondary benefit to bats as a water resource.

KAH continues to coordinate with DOFAW O'ahu throughout the development of the Forest Reserve's management plan to ensure that KAH's mitigation actions are compatible with suitable management actions identified by DOFAW O'ahu for the Helemano Section.

2.0 Purpose

The purpose of this document is to describe implementation of the Mitigation Plan at the HMA. Implementation tasks include the following.

- Permitting;
- Barbed Wire Removal and Replacement;
- Bat Foraging Corridor Creation and Management;
- Ranch Land Management;
- Invasive Species Management;
- Water Feature Installation and Management;
- Monitoring;
- Analysis and Reporting; and
- Adaptive Management.

These actions are described in detail in the following sections. Table 1 provides a general summary of actions for each year of the intended duration of mitigation; a more detailed timeline is referenced in Section 10.0 and Appendix A.

Table 1. Mitigation Actions by Year

Implementation Period (Year)	Years (Calendar)	Mitigation Actions
Habitat Improvement Actions	2024–2025	<ul style="list-style-type: none"> • Permitting activities • Remove and replace barbed wire fence • Create bat foraging corridors, remove vegetation regrowth from existing corridors • Baseline monitoring report

Implementation Period (Year)	Years (Calendar)	Mitigation Actions
1	2025–2026	<ul style="list-style-type: none"> • Year 1 acoustic and insect monitoring • Monthly visits for bat foraging corridor and invasive and incipient plant monitoring/management needs • Bat foraging corridor maintenance actions (as needed) • Install and maintain water feature (monthly monitoring and water level top off as needed) • Data analysis • Annual reporting
2	2026–2027	<ul style="list-style-type: none"> • Monthly visits for bat foraging corridor and invasive and incipient plant monitoring/management needs • Bat foraging corridor maintenance actions (as needed) • Maintain water feature (monthly monitoring and water level top off as needed) • Install water pump on and connect water tank to ditch water source • Annual reporting • Adaptive management oversight (as required)
3	2027–2028	<ul style="list-style-type: none"> • Year 3 acoustic and insect monitoring • Monthly visits for bat foraging corridor and invasive and incipient plant monitoring/management needs • Bat foraging corridor maintenance actions (as needed) • Maintain water feature (monthly monitoring and water level top off as needed) • Data analysis • Annual reporting • Adaptive management oversight (as required)
4	2028–2029	<ul style="list-style-type: none"> • Monthly visits for bat foraging corridor and invasive and incipient plant monitoring/management needs • Bat foraging corridor maintenance actions (as needed) • Maintain water feature (monthly monitoring and water level top off as needed) • Annual reporting • Adaptive management oversight (as required)
5	2029–2030	<ul style="list-style-type: none"> • Year 5 acoustic and insect monitoring • Monthly visits for bat foraging corridor and invasive and incipient plant monitoring/management needs • Bat foraging corridor maintenance actions (as needed) • Maintain water feature (monthly monitoring and water level top off as needed) • Data analysis • Annual reporting • Adaptive management oversight (as required)

3.0 Permits

There are several permits that may need to be acquired or renewed to allow for implementation of the Mitigation Plan. These may include the following:

- Special Use Permit (DOFAW);
- Water permit to draw water from an on-site ditch to maintain water levels in the water feature (State Commission on Water Resource Management and potentially U.S. Army Corps of Engineers based on final design);
- Native Invertebrate Research Permit (DOFAW);
- Grading permit (City and County of Honolulu).

Further on-site evaluation and consultation with the relevant regulatory agency may be needed to determine the need for, and type of, waters and grading permits or other to be determined permits.

4.0 Barbed Wire Removal and Replacement

Barbed wire fences pose a risk to bats in the form of injury and mortality (ESRC and DOFAW 2021). Barbed wire fence is present within the HMA on the exterior and interior fences of the cattle grazing areas (Parcels 1 – 4) (Figure 1, Figure 2.1, Figure 2.2). KAH will remove 100 percent of barbed wire fencing material from these fences during Year 1 of the Mitigation Plan's implementation. An interior fence between Parcel 1 and Parcel 2 comprised of hog-wire with a single top strand of barbed wire totaling 0.1 miles (640 feet) of fence line requires removal only of the single barbed-wire strand (i.e., no replacement) (Table 2) (Figure 2.1). For all other sections of fence line in the HMA, barbed-wire strands will be removed and replaced with twisted barbless wire for the strands. Replacement of barbed wire totals 4.8 miles (24,988 feet) of fence line (Table 2; Figure 2.1, Figure 2.2). Where barbed wire will be replaced, the existing fence posts will be reused where possible given their extreme durability, or otherwise replaced with 3-inch by 8-foot-long posts with caps, and 1.75-inch diagonal braces. The order of barbed wire fence replacement will begin with replacing the internal barbed wire fences within the HMA, followed by replacement of external fences, per the request of the land licensee to allow for adequate containment of cattle herds throughout the process.

In addition, just outside the HMA is a now-obsolete four-strand fence that parallels a portion of the HMA access road (Plantation Road). The four-strand barbed wire fence totaling 2.1 miles (10,930 feet) that parallels Plantation Road on the south side of the HMA will be completely removed pending DOFAW-O'ahu approval (Figure 1, Figure 2.2).

Table 2. Fence Line Categories and Lengths

Fence Line Category Numbers and Descriptions ¹	Length (Feet)	Length (Miles)
1. Heavily encased in vegetation	19,871	3.8
2. Somewhat encased in vegetation with low or open portions	3,723	0.7
3. Mostly exposed fence	533	0.1
4. Remove fence	10,930	2.1
5. Unknown condition; fence replacement	861	0.2
6. Remove one strand of barbed wire only	640	0.1
¹ Figure 1		

KAH conducted a site visit with potential fencing contractors in June 2024 to request cost estimates including any vegetation management actions along the existing fence lines that will be necessary in conjunction with barbed wire fence removal and replacement. KAH will provide DOFAW O'ahu with the name of hired contractors and schedule of work prior to starting mitigation actions and will coordinate mitigation actions with the land licensee in advance to minimize impacts to cattle grazing operations.

5.0 Bat Foraging Corridor Creation and Management

Management opportunities to benefit bat foraging in the HMA include creating bat foraging corridors within the existing dense stands of invasive tree species in the forested ranch land. KAH will create bat foraging corridors in Mitigation Parcel 1 and Parcel 3 and will maintain the bat foraging corridors created by DOFAW O'ahu in 2022 in Mitigation Parcel 2 and Parcel 4 (Figure 3).

To create the new corridors, KAH will follow the same methods used by DOFAW O'ahu in Parcel 2 and Parcel 4 (Figure 3). Methods will include mechanically removing swaths of dense Moluccan albizia (*Falcataria moluccana*; size dependent), shoebutton ardisia (*Ardisia elliptica*), Christmas berry (*Schinus terebinthifolius*) populations, and other non-native tree species that have not been documented as supporting bat roosting nor provide a direct benefit to cattle. The specific method of mechanical clearing may involve the use of a mulching head attachment or similar means and will be determined in consultation with the contractor. KAH's preferred approach employs mechanical clearing combined with the use of a pre-emergent herbicide to suppress seed bank growth within the corridors, with mechanical maintenance thereafter. KAH may incorporate spot treatment herbicide applications after the initial clearing, as dictated by the most effective longer term

management of woody vegetation regrowth. Herbicides used may include but are not limited to products with the active ingredient glyphosate, triclopyr, and imazapyr.

Bat foraging corridors will be created and maintained according to the following specifications:

- Corridors will be approximately 60 feet wide;
- All woody materials with a diameter at breast height of 12 inches or less will be cleared within the corridors;
- Tree stumps within the corridors will be flush cut to the ground, all remaining material will be left on the ground after trees have been cut (i.e., limbs and the tops of trees, also known as “slash”), and material 6 inches and under will be chipped or mulched. As reasonably possible and necessary, slash will be chipped. The resulting material will be left on-site to decompose;
- Tree stumps will be spot treated with herbicide to prevent re-sprouting;
- Vegetation stature within the corridors will be maintained so as not to exceed a maximum height of 36 inches using mechanical and chemical (herbicide, including pre-emergent) treatment methodologies;
- Application of herbicide will follow best management practices adhering to label instructions, application limits, and all other applicable regulations. Resident cattle herds will be excluded from any treated areas according to label recommendations and in coordination with the land licensee;
- Removal of known ‘ōpe‘ape‘a roost tree species of individuals 15 feet or greater in height will be avoided; and
- No trees over 15 feet tall will be removed during bat pupping season (June 1 – September 15) of each year.

All standing trees and brush within the designated corridors will be mechanically cleared according to the specifications described above, with the exception of individual trees identified as bat roost tree species. It is important to note that bat roost tree species known to occur within the HMA and immediate vicinity are non-native species. Individuals having a minimum overall height of 15 feet will be retained within the bat foraging corridors (Table 3). Trees that have been designated to be retained will be recorded using geographic information systems (GIS) and made visible on the ground to the contractor through flagging by KAH prior to vegetation clearing. The total estimated acreage to be cleared of vegetation within each parcel is summarized in Table 4.

Table 3.
Known Bat Roost Tree Species in the Helemano Mitigation Area and Immediate Vicinity

Common Name	Scientific Name
African tulip	<i>Spathodea campanulata</i>
Chinese banyan	<i>Ficus macrocarpa</i>
Eucalyptus	<i>Eucalyptus</i> spp.
Ironwood	<i>Casuarina equisetifolia</i>

Common Name	Scientific Name
Kukui	<i>Aleurites moluccana</i>
Lychee	<i>Litchi chinensis</i>
Mango	<i>Mangifera indica</i>
Paperbark	<i>Melaleuca quinquenervia</i>

Table 4. Total Length and Acreage of Bat Foraging Corridors for Vegetation Clearing

Parcel Number	Total Length of Corridors (Feet)	Estimated Total Area (Acres)
1	7,954	10.95
2	10,209	14.06
3	8,793	12.11
4	2,215	3.05
TOTAL	29,171 Feet	40.17 Acres

Based on the current density of the invasive vegetation, and to maximize the foraging opportunity for bats offered by edge habitat, bat foraging corridors in Parcel 1 and Parcel 3 will be developed in a grid pattern similar to the pattern employed by DOFAW O’ahu in Parcel 2 and Parcel 4 (Figure 3). Hawaiian hoary bats have been documented foraging in forest gaps, tunneled roadways, open spaces, and between windrows within orchard settings (Bonaccorso et al. 2015), the physiognomy of which the grid pattern mimics. Removal of swaths of invasive tree species in a grid configuration provides opportunity for less restricted movement by bats through otherwise densely vegetated areas and opens cluttered forest habitat to create more foraging surface area in an otherwise closed forest environment. This management action also creates better quality ranch lands for grazing, which in turn is expected to increase insect diversity and biomass and further improve the quality of foraging habitat for bats. Foraging corridors in Parcels 1 and 2 that are oriented south to north will be opened to the adjacent gulch (Heleman Stream) on the north side of the HMA in an effort to further facilitate access to the foraging corridors by bats that are likely currently using the gulch.

Throughout the Mitigation Plan’s implementation, vegetation within the corridors (both existing and newly created) will be monitored monthly and maintained at a maximum of 36 inches in height as described above so that approximately 75 percent of the upper, vertical portion of the corridor interior remains open for foraging by bats (Chris Todd, Tetra Tech, pers. comm, August 23, 2023).

A site visit with vendors was conducted by KAH in June 2024 to request cost estimates for this management action.

6.0 Ranch Land Management

In conjunction with Helemano's land licensee, current grazing management practices for cattle will be designed, as feasible for cattle operations, to maintain invasive vegetation as open and at low stature within bat foraging corridors, and to increase bat prey abundance and diversity; see Section 4.2.3 of the Mitigation Plan (Tetra Tech 2024).

Targeted grazing is intended to include, but not be limited to:

- Focusing the distribution of cattle in the HMA through the use of temporary fencing or herding;
- Maintaining an appropriate stocking density to manage vegetation within corridors; and
- Rotational grazing within and between parcels to achieve more even dung distribution across the parcels.

KAH may seed shade-tolerant non-native grasses within the bat foraging corridors that are suitable for cattle foraging to encourage grazing within the corridors if deemed necessary. Seed selection will be agreed upon in consultation with DOFAW O'ahu (Ryan Peralta, DOFAW O'ahu, pers. comm., August 15, 2023). While KAH recognizes that native grass species are important to overall habitat, they are not adapted to and would succumb under grazing pressure, resulting in exposed soil vulnerable to erosion, decreased grazing area available to the land licensee, and reduced capacity to maintain and provide beneficial inputs to the bat foraging corridors through cattle grazing. If pursued, KAH's seeding plan will consider the following four factors:

- Expected selection by cattle of palatable plants in the HMA corridors;
- Expected grazing intensity (based on aforementioned selectivity);
- Season; and
- Required frequency of repeated grazing based on monitoring of vegetation regrowth within the corridors (Thorne et al. 2007).

Implementation of the Mitigation Plan will include regular check-in calls with DOFAW O'ahu and the land licensee to confirm or adjust the grazing approach as needed based on cattle needs and HMA monitoring results by KAH. KAH will work with land licensee on fence condition to ensure cattle herds are contained within the HMA. Regular communication between KAH and the land licensee will also be used to address any grazing-related issues.

7.0 Invasive Species Management

KAH will conduct early detection and mechanical removal and/or herbicide treatment of specific invasive plant species within the HMA. Invasive plant species management actions will involve preventing the expansion of existing populations of invasive species (i.e., Moluccan albizia,

shoebutton ardisia, and Christmas berry) into areas of pastureland that are open at the time mitigation actions commence, or removal of new invasive species prior to firm establishment (i.e., incipient invasive species). Invasive species management (i.e. preventing expansion) and incipient invasive species detection and removal efforts will occur after the bat foraging corridors have been created and for the duration of the Mitigation Plan as part of monthly spot monitoring and management of vegetation within the bat foraging corridors to maintenance specifications.

Incipient weed species identified as of highest concern to DOFAW O'ahu and which will be targeted for detection and removal by KAH include devil weed (*Chromolaena odorata*), mānuka (*Leptospermum scoparium*), and *Arthrostemma ciliatum* (DOFAW 2021). If identified within the HMA, KAH will manage these invasive species of highest concern to minimize the risk of spread, as practicable, and in coordination with the O'ahu Invasive Species Committee (devil weed) and DOFAW O'ahu (mānuka and *Arthrostemma ciliatum*).

Invasive species monitoring will occur monthly to document any expansion of Moluccan albizia, shoebutton ardisia, and Christmas berry and for the early detection of incipient weed species of highest concern. KAH will pay particular attention to the bat foraging corridor edges where expansion of existing invasive species is most likely to begin. Monthly monitoring will involve walk throughs of and around the edges of the bat foraging corridors (performed in tandem with monthly monitoring of bat foraging corridors [see Section 5.0] or acoustic monitoring work [see Section 9.0]) to detect and record evidence of population expansion and the locations of incipient invasive species. Incipient invasive species found during monitoring efforts will be controlled with herbicide shortly thereafter by KAH's selected vendor.

Utilization of herbicide to control the expansion of existing invasive species and to manage incipient invasive species will follow best management practices adhering to label instructions, application limits, and all applicable regulations. Resident cattle herds will be excluded from any treated areas according to label recommendations and in coordination with the land licensee.

8.0 Water Feature Installation and Management

Within the HMA, KAH will add and maintain a water feature for the primary purpose of protecting bat habitat by providing a water resource available to DOFAW O'ahu for wildfire suppression activities in the Heleman Section. KAH has reached agreement with DOFAW O'ahu and the land licensee to install an above-ground, circular, galvanized steel water tank with a height and diameter of 7 feet, 3 inches by 21 feet, 7 inches, respectively, and an approximate 20,000-gallon capacity. The above-ground water tank will feature an open top for use in wildfire suppression, a wildlife egress, and draw-down capabilities for use by the land licensee for cattle watering. Water will be drawn from a nearby ditch via an inlet pump. A water truck will supply water to the tank during the dry season when water flow in the ditch is intermittent.

The location in the HMA has been identified by DOFAW for siting the water feature near the existing water feature (small trough) which would allow unobstructed access for potential use by bats

(Figure 3). The source of the water used to supply the water feature and the exact location of installation will be determined in conjunction with DOFAW O'ahu and will depend on permitting, possible access limitations, and road conditions.

The water tank will be sourced from WaterWorks on the Hawai'i Island and installed on site by a local vendor. Installation will involve the construction of a 1-foot wide and 4-inch deep foundation ringwall with the inner fill comprised of a combination of sand and gravel, onto which the tank will be centered during installation. The 1-foot wide ring will project 6 inches inside and outside the water tank shell after tank placement. Soil will be graded to a 4-inch depth to accommodate the foundation. The vendor will plumb the water tank with inlet and outlet pipes. A separate vendor will connect the water tank inlet pipe to the water source at the ditch via a connecting pipe and will install a solar-powered water pump (or similar) to pump water from the ditch to the tank to refill the tank as needed. The exact route of the connecting pipe from the water tank location to the ditch will be determined in consultation with DOFAW O'ahu to avoid impacts to natural resource management and public user activities in the forest reserve. If permits are necessary, they will be secured before water tank installation and water draws from the ditch. A separate vendor will also be contracted to provide the initial fill of the water tank and reoccurring fills during the dry season or as needed based on monitoring of water levels in the tank for the five-year term of the Mitigation Plan (Table 1).

9.0 Monitoring and Analysis

Five types of monitoring described below will occur throughout the duration of the Mitigation Plan.

9.1 Acoustic monitoring

Acoustic monitoring for bat activity will be conducted at 36 sites within the bat foraging corridors in each of the four Mitigation Parcels and in the control site (180 total sites) during Years 1, 3, and 5 (Table 1). Nightly acoustic monitoring, beginning one hour prior to sunset and ending one hour after sunrise, will be conducted for a 12-month period during each monitoring year. Monitoring locations that were established during the baseline monitoring year (2023–2024) will remain consistent throughout all sampling years.

Data analysis will occur after each of the full year sampling periods (Years 1, 3, and 5).

9.2 Insect Monitoring

Sampling of arthropods will be conducted quarterly in Years 1, 3 and 5. Timing of quarterly sampling will be consistent across all sampling years and align with bat reproductive periods as defined by Gorresen et al. (2013): lactation (mid-June to August), post-lactation (September to mid-December), pre-pregnancy (mid-December to March), and pregnancy (April to mid-June). Insect sampling methods are described below:

- Three malaise traps with two collection reservoirs each, deployed within each parcel and the control site at randomly selected locations at least 400 meters apart (15 traps total). Monitoring locations will remain consistent throughout all sampling years.
- One UV Light trap deployed within each parcel and the control site (five traps total) for a duration of 1 to 2 hours per nighttime sampling period over the course of 3 consecutive sampling nights. Light trap locations will remain consistent throughout all sampling years.
- Random sampling of cattle dung in each Mitigation Parcel will be conducted to identify dung beetles and any other insects that are potential bat prey.

Data analysis will occur after each of the full year sampling periods (Years 1, 3, and 5).

9.3 Bat Foraging Corridor Management

After clearing regrowth of vegetation in the existing bat foraging corridors created by DOFAW O'ahu in Parcels 2 and 4 and the creation of new bat foraging corridors in Parcels 1 and 3, monitoring will involve conducting monthly checks of bat foraging corridors in each parcel to ensure that vegetation conditions are maintained to standard. Strategic representative photo point locations will be established within the corridors of each parcel and photos will be taken on a monthly basis to monitor the condition and stature of vegetation relative to the maintenance standard (i.e. not to exceed 36 inches in height). Photo point locations within the bat corridors will remain consistent once established to allow for reoccurring documentation and tracking change over time to trigger vegetation maintenance action when vegetation is observed nearing the maximum threshold height of 36 inches.

9.4 Invasive Species Management

Invasive species monitoring will occur to document any expansion of the existing populations of Moluccan albizia, shoebuttan ardisia, and Christmas berry, and for the early detection of incipient weed species of highest concern to DOFAW O'ahu as identified in Section 7.0. Monitoring actions are described below.

9.4.1 Existing Populations of Invasive Species

To identify the potential expansion of existing stands of invasive species into the open pasture (i.e., Moluccan albizia, shoebuttan ardisia, and Christmas berry), strategic photo point locations will be established at representative sites within each parcel along the edges of open pasture areas and the interface with bat foraging corridors. Photo point locations will be monitored quarterly in tandem with one of the monthly monitoring visits for the bat foraging corridors (see Section 9.3).

9.4.2 Incipient Invasive Species

Monitoring for the detection of incipient invasive species will involve monthly walk throughs in and around the edges of the bat foraging corridors to detect and record locations of any incipient invasive species present. Monitoring will be performed in tandem with monthly monitoring of bat foraging corridors (see Section 9.3).

9.5 Water Tank Levels

Water levels will be checked in the water tank on a monthly basis after installment and the initial fill. Water level monitoring will occur in tandem with other monthly monitoring visits described above. Water levels will be topped up as necessary using a water truck, primarily during the dry season when water flow in the ditch is intermittent.

9.6 Acoustic Monitoring (Water Feature)

Separate from the primary acoustic monitoring effort, a single acoustic monitor deployed in 2023 at the water feature location will continue to be maintained throughout the term of the Mitigation Plan. The purpose of this acoustic monitor is to capture bat activity for the area prior to installation of the water tank (baseline monitoring) and post-installation. Monitoring of the water feature may provide insight on the use of non-natural water features by bats in the HMA.

10.0 Timeline

The anticipated Mitigation Plan implementation timeline is detailed in Appendix A. KAH anticipates initiating the implementation of the Mitigation Plan with habitat improvement actions starting in September 2024 as shown in Appendix A. However, this timeline is subject to change based on the timing of the fully executed Memorandum of Understanding (MOU) between KAH and DOFAW, issuance of the Special Use Permit, vendor availability, unanticipated challenges in weather which may impact vegetation removal schedule, and other circumstances which are beyond the control of KAH.

11.0 Adaptive Management

Adaptive management actions will be responsive to the needs observed through monitoring and compatible with the intent of DOFAW O'ahu to maintain and renew the grazing license for the agriculture-zoned HMA lands into the future. If the success criteria are not met, KAH will work with DOFAW O'ahu to get approval to modify the mitigation actions in conjunction with seeking approval from DOFAW HCP staff. Once KAH has reached agreement with DOFAW O'ahu and the land licensee, KAH will consult with the USFWS and DOFAW HCP teams to receive approval on the adaptive management actions. The list of potential adaptive management actions is identified in Table 4 of the Mitigation Plan (Tetra Tech 2024).

Adaptive management will occur following Years 1 and 3 if bat acoustic activity and insect prey are not increasing by a statistically significant level as compared to the baseline monitoring results. Additionally, in Year 5 if the success criteria are not met, additional adaptive management actions will be identified and implemented in consultation with USFWS and DOFAW, and monitoring activities will continue until the Year 5 success criteria are met. The success criteria identified in the Mitigation Plan will be evaluated in each relevant annual report. Adaptive management will be triggered when a required success criteria is not met.

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






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Figures

**Kahuku Wind
Power LLC**

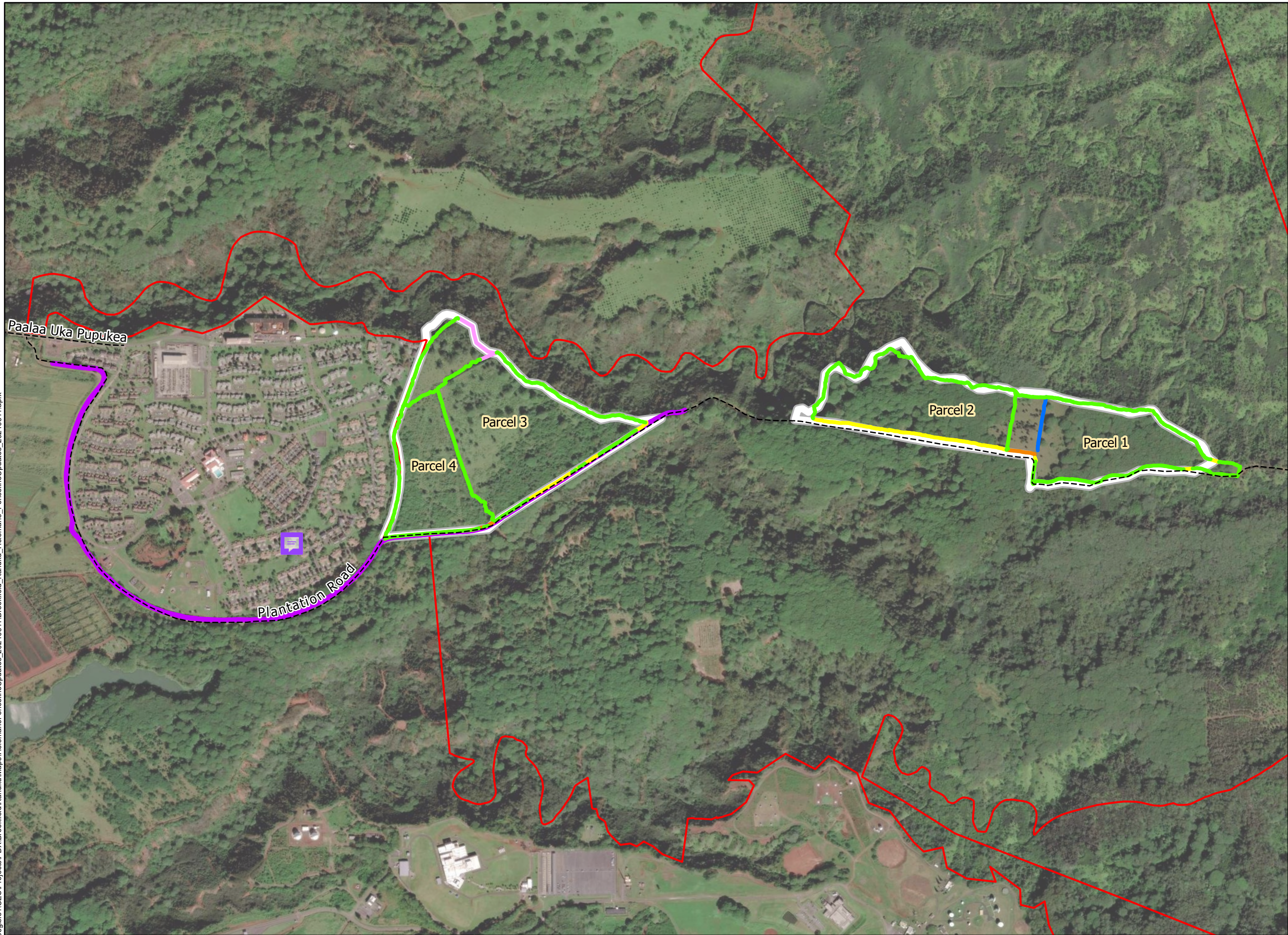
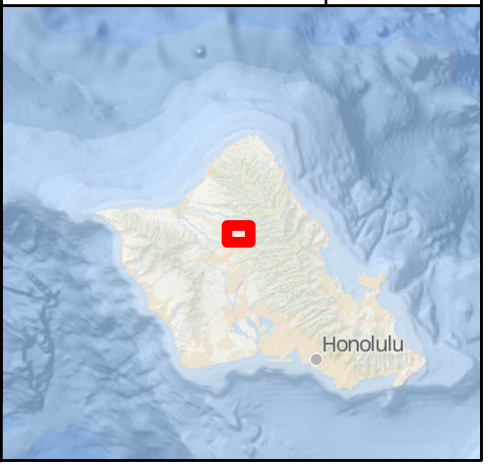
**Figure 1
Helemano Mitigation Area
Fence Line Categories**

HONOLULU COUNTY, HI

-  Helemano Section
-  Helemano Mitigation Area (HMA)
-  Access Road
- Fenceline Categories**
 -  1 - Heavily Encased In Vegetation
 -  2 - Somewhat Encased In Vegetation with Low or Open Portions
 -  3 - Mostly Exposed Fence
 -  4 - Remove Fence
 -  5 - Unknown Condition; Fence Replacement
 -  6 - Remove One Strand of Barbed Wire Only



Reference Map

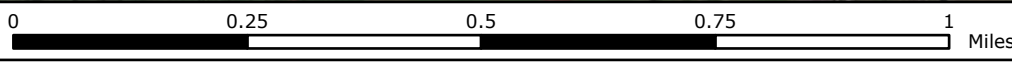


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WGS 1984 UTM Zone 4N



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Kahuku Wind Power LLC

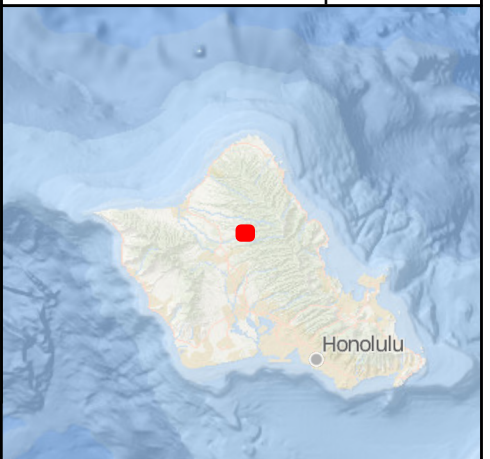
Figure 2.1
Fence Line Categories,
Parcels 1 and 2

HONOLULU COUNTY, HI

- Helemano Section
- Helemano Mitigation Area (HMA)
- Access Road
- Fenceline Categories
 - 1 - Heavily Encased In Vegetation
 - 2 - Somewhat Encased In Vegetation with Low or Open Portions
 - 3 - Mostly Exposed Fence
 - 6 - Remove One Strand of Barbed Wire Only

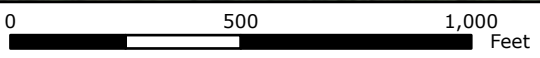


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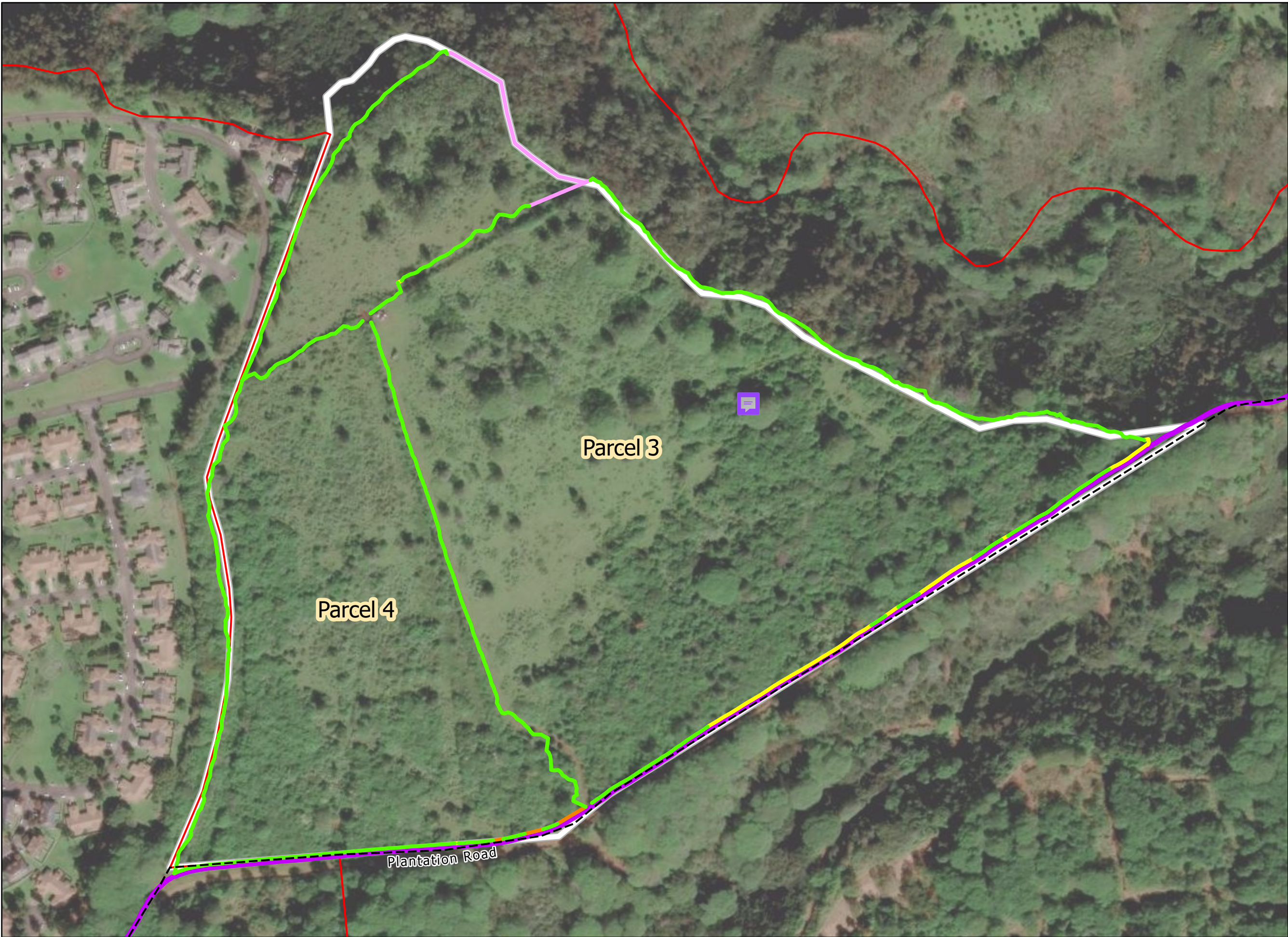
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**Kahuku Wind
Power LLC**

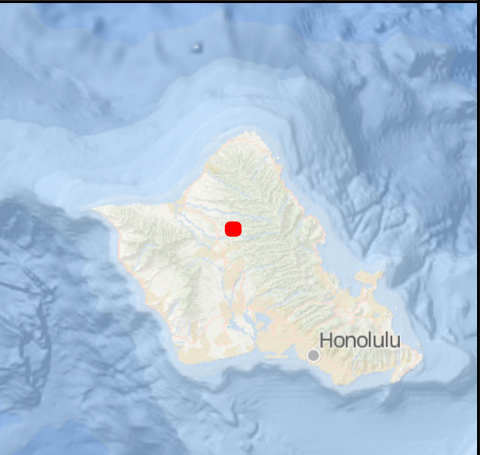
**Figure 2.2
Fence Line Categories
Parcels 3 and 4**

HONOLULU COUNTY, HI

- Helemano Section
- Helemano Mitigation Area (HMA)
- Access Road
- Fenceline Categories
 - 1 - Heavily Encased In Vegetation
 - 2 - Somewhat Encased In Vegetation with Low or Open Portions
 - 3 - Mostly Exposed Fence
 - 4 - Remove Fence
 - 5 - Unknown Condition; Fence Replacement

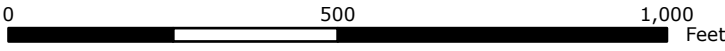


Reference Map



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WGS 1984 UTM Zone 4N



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**Kahuku Wind
Power LLC**

**Figure 3
Helemano Mitigation
Area Bat Foraging
Corridors**

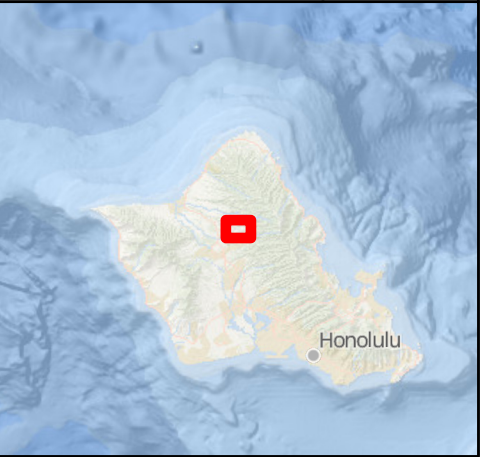
HONOLULU COUNTY, HI

- Helemano Section
- Helemano Mitigation Area (HMA)
- Control Area
- KAH-proposed Corridors (2023)
- DOFAW-created Corridors (2022; Actual): To Be Maintained by KAH
- Water Feature Installation
- Access Road



Date:
06/19/2024

Reference Map



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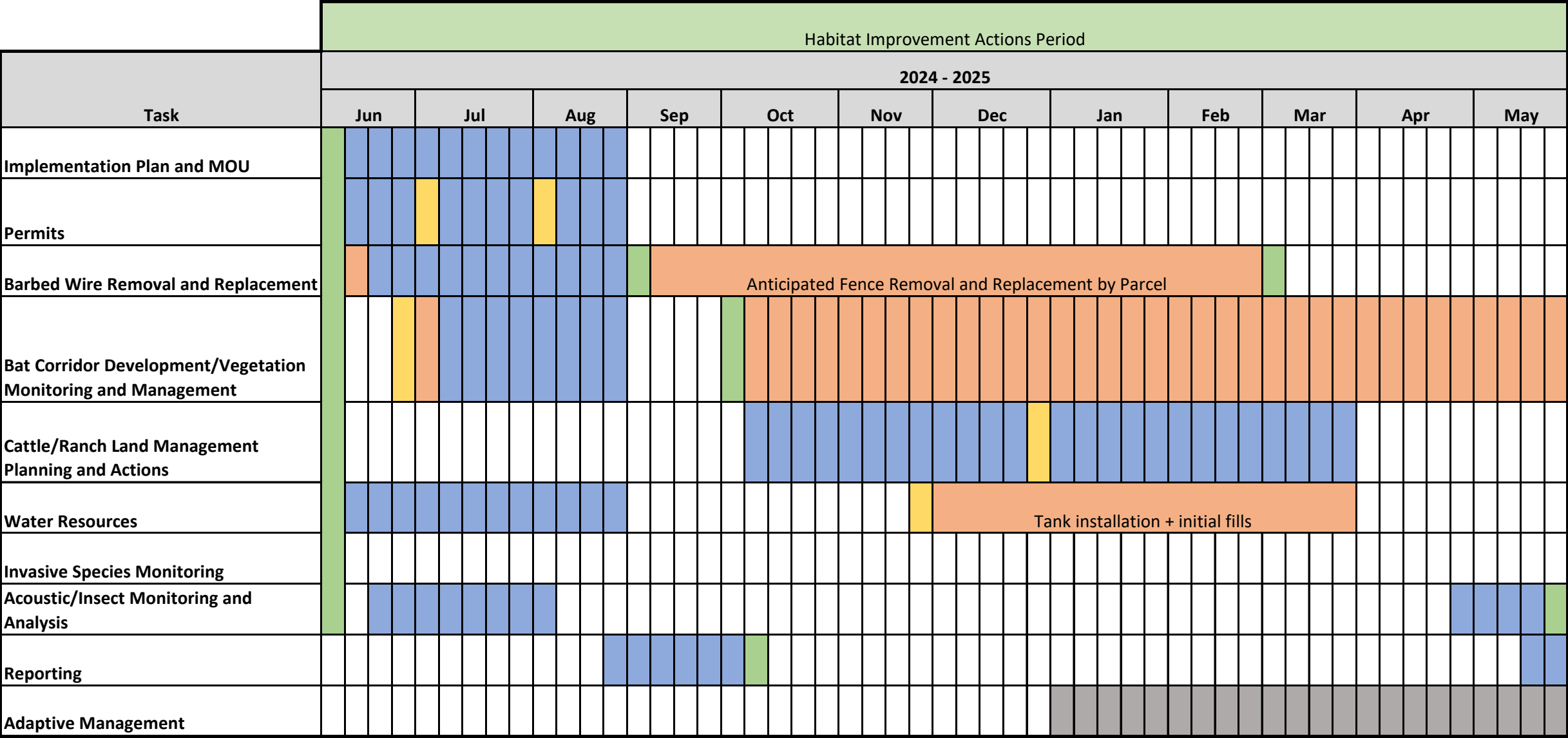
WGS 1984 UTM Zone 4N

0 0.25 0.5 0.75 1 Miles

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Appendix A. Helemano Bat Mitigation Actions Estimated Timeline

Table 1. Helemano Bat Mitigation
Actions Estimated Timeline¹



1 This timeline is intended for concept -
all timelines are dependent upon
factors not identified here and are
subject to change.

Planning/Coordination/Work Period

Agency Interface including DOFAW O'ahu

OnSite Action

DOFAW O'ahu Interface

TBD



Table 1. Helemano Bat Mitigation
Actions Estimated Timeline¹

	Year 1																																				
Task	2025 - 2026																																				
	Jun			Jul			Aug			Sep			Oct			Nov			Dec			Jan			Feb			Mar			Apr			May			
Implementation Plan and MOU																																					
Permits																																					
Barbed Wire Removal and Replacement																																					
Bat Corridor Development/Vegetation Monitoring and Management																																					
Cattle/Ranch Land Management Planning and Actions																																					
Water Resources																																					
Invasive Species Monitoring																																					
Acoustic/Insect Monitoring and Analysis																																					
Reporting																																					
Adaptive Management																																					

1 This timeline is intended for concept - all timelines are dependent upon factors not identified here and are subject to change.

Planning/Coordination/Work Period
Agency Interface including DOFAW O'ahu
OnSite Action
DOFAW O'ahu Interface
TBD

Table 1. Heleman Bat Mitigation Actions Estimated Timeline¹

[illegible]

1 This timeline is intended for concept - all timelines are dependent upon factors not identified here and are subject to change.

Planning/Coordination/Work Period
Agency Interface including DOFAW O'ahu
OnSite Action
DOFAW O'ahu Interface
TBD

Table 1. Heleman Bat Mitigation Actions Estimated Timeline¹

[illegible]

1 This timeline is intended for concept - all timelines are dependent upon factors not identified here and are subject to change.

Planning/Coordination/Work Period
Agency Interface including DOFAW O'ahu
OnSite Action
DOFAW O'ahu Interface
TBD

Table 1. Helemano Bat Mitigation
Actions Estimated Timeline¹

	Year 4																																
Task	2028 - 2029																																
	Jun		Jul		Aug		Sep		Oct		Nov		Dec		Jan		Feb		Mar		Apr		May										
Implementation Plan and MOU																																	
Permits																																	
Barbed Wire Removal and Replacement																																	
Bat Corridor Development/Vegetation Monitoring and Management																																	
Cattle/Ranch Land Management Planning and Actions																																	
Water Resources																																	
Invasive Species Monitoring																																	
Acoustic/Insect Monitoring and Analysis																																	
Reporting																																	
Adaptive Management																																	

1 This timeline is intended for concept - all timelines are dependent upon factors not identified here and are subject to change.

Planning/Coordination/Work Period
Agency Interface including DOFAW O'ahu
OnSite Action
DOFAW O'ahu Interface
TBD

Table 1. Helemano Bat Mitigation
Actions Estimated Timeline¹

	Year 5																																					
Task	2029 - 2030																																					
	Jun		Jul		Aug		Sep		Oct		Nov		Dec		Jan		Feb		Mar		Apr		May															
Implementation Plan and MOU																																						
Permits																																						
Barbed Wire Removal and Replacement																																						
Bat Corridor Development/Vegetation Monitoring and Management																																						
Cattle/Ranch Land Management Planning and Actions																																						
Water Resources																																						
Invasive Species Monitoring																																						
Acoustic/Insect Monitoring and Analysis																																						
Reporting																																						
Adaptive Management																																						

1 This timeline is intended for concept - all timelines are dependent upon factors not identified here and are subject to change.

Planning/Coordination/Work Period
Agency Interface including DOFAW O'ahu
OnSite Action
DOFAW O'ahu Interface
TBD

Table 1. Helemano Bat Mitigation
Actions Estimated Timeline¹

	Post-Mitigation Actions Period																										
Task	2030																										
	Jun				Jul				Aug				Sep				Oct				Nov				Dec		
Implementation Plan and MOU																											
Permits																											
Barbed Wire Removal and Replacement																											
Bat Corridor Development/Vegetation Monitoring and Management																											
Cattle/Ranch Land Management Planning and Actions																											
Water Resources																											
Invasive Species Monitoring																											
Acoustic/Insect Monitoring and Analysis																											
Reporting																											
Adaptive Management																											

1 This timeline is intended for concept - all timelines are dependent upon factors not identified here and are subject to change.

Planning/Coordination/Work Period
Agency Interface including DOFAW O'ahu
OnSite Action
DOFAW O'ahu Interface
TBD

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