# HO'ALA LOKO I'A APPLICATION

**FISHPOND NAME:** Alekoko

**APPLICANT NAME:** Mālama Hulēʻia



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Pond location: Southeast Kauai, south of Hulemalu Road, on the Hulēʻia River

Nearest Tax Map Key(s): 3-2-01:1

Ahupua`a: Hulēʻia

District: Puna

Island: Kauai

Commencement Date: September 5, 2017

Completion Date: September 1, 2020

Wall length: 2,120 +/-

Pond surface area: approximately 40-acres

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## WORK SUMMARY

☐ Operations only

☒ Construction of accessory structures

☐ Minor repair and restoration of pond walls, ʻauwai, mākāhā, etc.

☐ Moderate repair and restoration (10% to 50% damage)

☐ Major repair and restoration (greater than 50% damage)

Linear feet of wall to be repaired (rocks on site):

Linear feet of wall to be restored (new rock):

Source of new rock:

Amount of "fill" (expansion beyond original footprint):

☐ Dredging using mechanized equipment

Estimated volume of dredging:

☒ Vegetation removal using mechanized equipment

Estimated acreage: 26

☐ Emergency repair

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## REQUIRED SIGNATURES

**Applicant**

Name / Hui: Mālama Hulē'ia
Street Address: PO Box

Contact Person & Title: Sara Bowen, Executive Director
Phone: 360-820-0979
Email: sara.ed@malamahuleia.org
Interest in Property: non-profit with the mission to eradicate mangrove and restore ecosystem in the Hule`ia watershed.

**Signature:** Sara Bowen **Date: 7/28/2017**
*Signed by an authorized officer if for a Corporation, Partnership, Agency or Organization*

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**Landowner (if different than the applicant)**

Name: Okada Trucking Co Ltd. – Jourdan Okada, ~~Owner~~/General Manager
Mailing Address: 818 Moowaa Street, Honolulu, Oahu, Hawaii 96817
Phone: (808)479-7537
Email: jokada@okadatrucking.com

**Signature:** **Date:** 7/31/17
*For State-owned ponds, the government entity with management control over the parcel shall sign as landowner.*

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**Agent**

Agency: N/A
Contact Person & Title:
Mailing Address:

Phone:
Email:

**Signature:** **Date:**

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**For DLNR Managed Lands**

**State of Hawai`i**
Chairperson, Board of Land and Natural Resources
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809-0621

**Signature:** **Date:**

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## DESCRIPTION OF THE LOKO I'A

**Please discuss the current physical and environmental conditions of the loko i'a. Please also note if any endangered or threatened species are found in the pond.**

Physical characteristics:

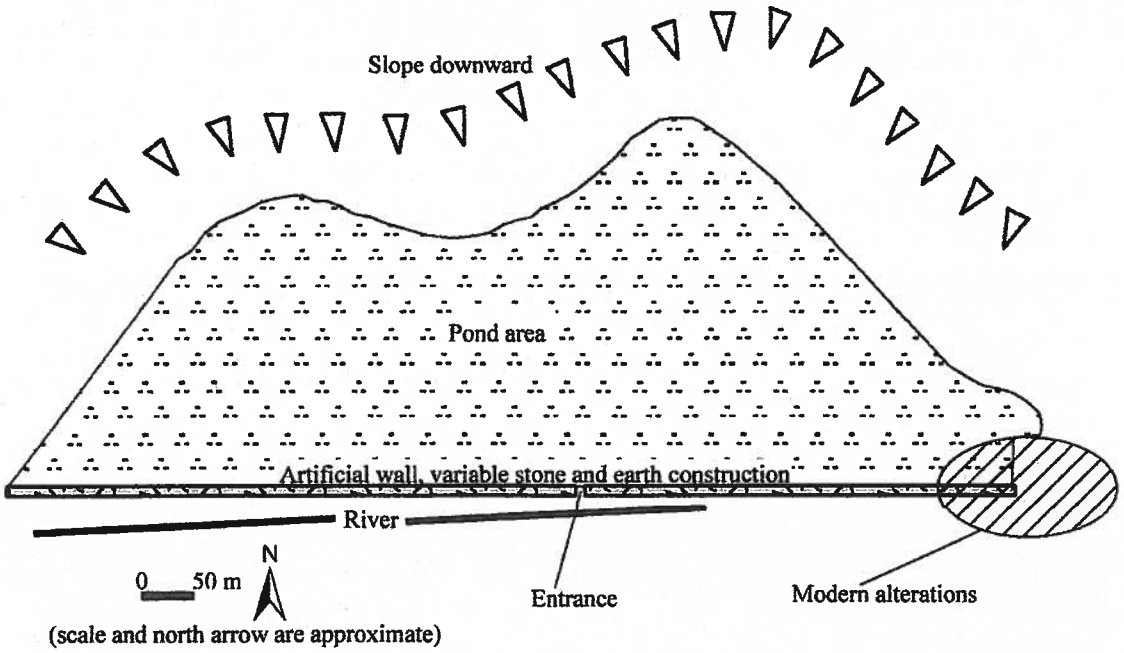
Alekoko fishpond is loko wai, on Hulē'ia River, approximately 1,000 meters upstream from the mouth of the river where Nawiliwili Small Boat Harbor is in Nawiliwili Bay watershed, Lihue, Kauai. The loko i`a once measured approximately 40 acres of open water, it currently is approximately 23-acres and measures approximately 550-meters by 215-meters at its widest cross sections. The reduced size is due to overgrowth of invasive mangrove. We have estimated 26-acres of mangrove to remove that are surrounding the pond and destroying the historic Hawaiian fishpond walls.

The National Register of Historic Places Nomination Form, dated March 14, 1973, describes the physical characteristics as consisting of:

> ...primarily of a stone faced dirt wall that runs for over 900 yards and cuts off a large bend in the river for use as a fishpond. There is 50 yards of shallow swamp land between the west end of the wall and the shore. A dirt wall runs for 145 yards whereupon the stone facing starts on the river side of the wall. The dirt wall is 5 feet above the water level, 4 feet wide on top and the dirt slants up on both sides. The facing wall begins with a single row of stones and then becomes of double thickness as it gets further out into the river and the current starts to become effective. The stones also become larger until the double layer is 2 feet thick. The stone facing on the outside is five feet high in most places and is quite perpendicular. The stones are very carefully fitted together; the stone facing runs for about two-thirds of the total length of the wall.
>
> In the 1940's, after a tidal wave, the wall was repaired by the man who had the lease at the time. He put bags of cement in the weak spots and now longish "rocks" are visible where the bags deteriorated and the cement hardened.

The image below, extracted from Na Mea Kahiko I Kaua'i: Archaeological Studies in Kaua'i, SHA Special Publication No. 2, edited by Mike T. Carson and Michael W. Graves, shows the plan map sketch of 'Alekoko Fishpond, based on Bennett 1931:125-126, with minor alterations from observations in 1999. This paper also notes that there is variability in the wall construction. From west to east, at least four construction techniques are noted, as follows:

1) About 180 meter of a linear earthen pile, mounded in section view; 2) stone wall of single-stone width for the next ca. 120 m; 3) stone wall of two-stone width for the next 550 m, interrupted by entrance gate; 4) perhaps an additional 20 m of earthen berm at the east end, although this area has been affected by historic and modern alterations.



(scale and north arrow are approximate)

**What is the condition of the walls, mākāhā, 'auwai, fish pens, & other associated structures?**

Condition of the walls: The condition of the walls has deteriorated since the listing on the National Register. The fishpond walls are currently covered with mangrove. From what we can see it appears that the roots are damaging the wall structure. We won't know the true condition of the wall until the mangrove has been removed.

A 1989 Environmental Assessment of Restoration of Menehune Fishpond prepared by Kodani & Associates, Inc. and Wilson Okamoto & Associates, Inc. describes the wall:

> Menehune Fishpond consists of a stone-faced dirt wall of over 2,700 lineal feet which cuts off a large bend in Hulē'ia River. Cement walls and wooden gates (makaha) have obscured original methods used to control water level and fish. The dirt wall is about 5 feet above the water level and about 4 feet width at the top. Beginning upstream, the Menehune Fishpond wall is unfaced with stones for approximately 435 feet. Thereafter, the southern perimeter of the wall is stone-faced. The facing begins with a single row of stones, becoming a double layer wall further downstream where the current affects the wall. Stones also increase in size until the double layer is about 2 feet think. The rocks are not dressed, however, some stones have flattened faces. The stones are not uniform is size, but are considered to be fitted together well. The stone facing extends for 1,164 feet and the dirt wall continues thereafter.
>
> The northern perimeter of the Menehune Fishpond wall is braced with iron roofing and wooden stakes. Bags of concrete are stacked as wall stones in some areas.
>
> There are two gates (makaha) to the Menehune Fishpond: 1) near the midpoint of the pond wall; 2) at the seaward end of the two small easternmost ponds, opening into an off-shoot of the Huleia River. During periods of high tide, portions of the stone face of the wall are submerged.
>
> The Menehune Fishpond varies in depth from 2 to 5 feet. The bottom of the pond is covered by silt.

Mālama Hulē'ia has not confirmed all of the above information due to impenetrable overgrowth of

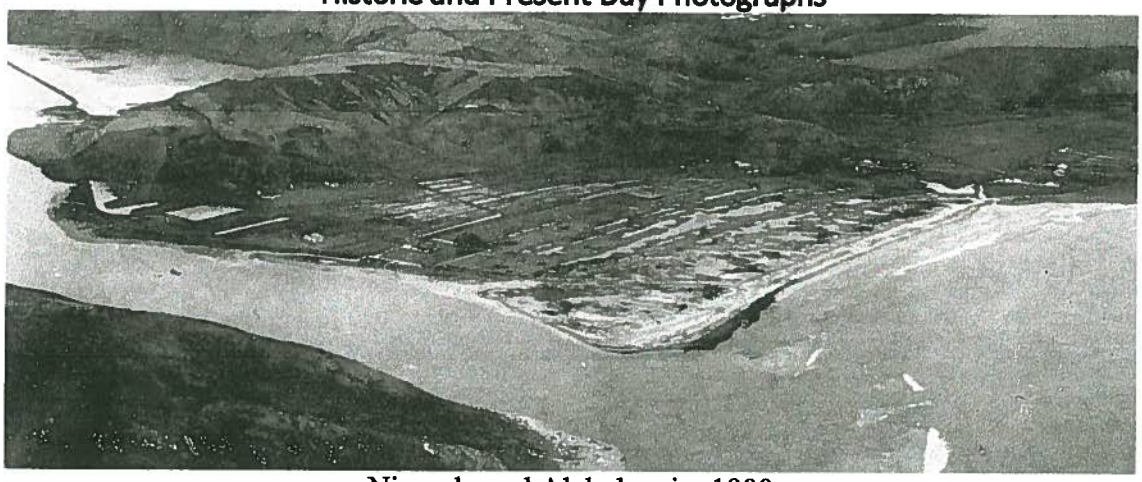
mangrove, however the depth measurements by Mālama Hulē'ia are consistent with the 1989 report, with measurements of 2 to 6 feet, from top of water to silt bottom (measured at high tide).

Makaha, Auwai and Fish Pens: There are two openings in the rock wall; a smaller one at the downstream end of the wall that is mostly over grown with mangrove, the other appears larger and is located at the mid-point of the wall.

As the description from the 1989 report states, the smaller seaward makaha is connected to two small ponds and an "off-shoot" of the Hulē'ia River makes sense that it is connected to the historic fish pen(s) structure and auwai outlet from the pond. We have tried to investigate these areas but the mangrove is too dense to penetrate at this point. We plan to have an archaeologist do a pre clearing survey of the area, provide us with BMPS in clearing the area and then a post clearing survey.

To better visualize the potential for Alekoko, we have included historic and present day photos below. These will help to see the extent of the current mangrove invasion, and the potential for restoration of the site once the mangrove has been removed.

**Historic and Present Day Photographs**



Niumalu and Alekoko cira 1900

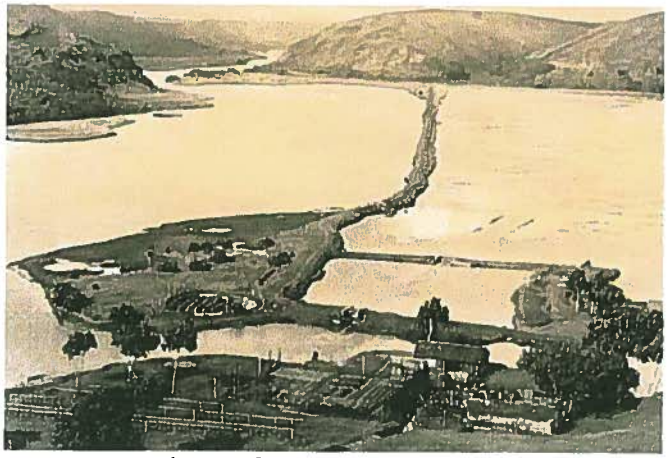


Photo of Alekoko circa 1912

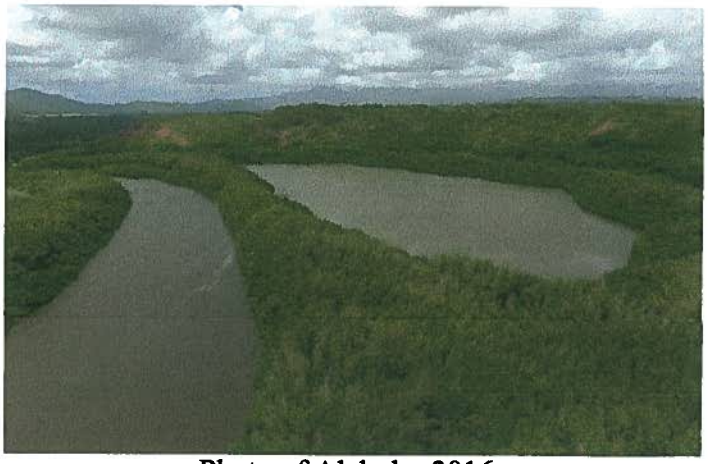


Photo of Alekoko 2016

Environmental conditions: The fishpond sits in a historic geomorphic bend in the Hulē'ia River, with an ancient Hawaiian rock wall creating the pond. The pond surrounded by estuarine intertidal

wetlands, the water level is tidally influenced and water is brackish with a salinity average of approximately 14-ppt. It is likely that there are fresh water springs feeding into the pond. We hope to identify these potential inputs with water quality monitoring over time. There is an unmapped intermittent stream contributing fresh water inputs to a wetland complex just upstream, on USFWS Hulēʻia Wildlife Refuge pond, and adjacent to the fishpond. Those waters are likely connected to the fishpond by subsurface flows. At the downstream end of the fishpond there is a side channel that flows out of the fishpond along a side channel of the Hulēʻia River approximately 600-1,250-feet until it converges with Hulēʻia River. The side channel is also overgrown with mangrove and is part of the proposed mangrove removal area.

Vegetation: The primary vegetation in the area is mangrove. There is a swath of hau bush running behind (landward) of the mangrove that will also be removed. Other vegetation found in the area is mostly non-native scrub with some canoe plants interspersed. Table 1, below lists what has been seen on our field visits. Vegetation images are shown below the table.

**Table 1 – On-site Vegetation**

| Invasive/Non-Native | Others (Ornamental, Canoe Plants, etc.) |
|---|---|
| Guinea grass, Haole koa, Flea bane, Ivy, Iron wood, Cattail, mixed scrub shrubs | Hau, Mango, Noni, Kī, Niu, Maiʻa, Ahuʻawa, Plumeria |

**Vegetation Images:**

Mixed vegetation to be cleared for stockpile/staging area

Measuring and flagging stockpile area

Looking West at end of driveway toward fishpond/mangrove

Mālama Hulē'ia has recently applied for a U.S. Fish and Wildlife Service (USFWS) Coastal Wetlands Restoration grant for which we compiled lists of bird and fish species that are known in the area. This list was developed based on species found at the adjacent Hulē'ia National Wildlife Refuge (NWR), as well as those found by the State through annual bird counts and those found at the restored pilot sites. We believe these species are likely to utilize the pond and wetland perimeter if restored. Tables 2 and 3, below, provide the lists of species provided in our grant application.

**Table 2 - Fish and Invertebrates Documented at Hulē'ia NWR and Nearby Waters**

| Scientific Name | Common Name | Hawaiian Name | Status |
|---|---|---|---|
| **Fish** | | | |
| *Eleotris sandwicensis* | Hawaiian sleeper | O'opu akupa | Endemic |
| *Awaous stamineus* | Stream goby | 'O'opu nākea | Endemic |
| *Stenogobius hawaiiensis* | Freshwater goby, naniha goby | O'opu naniha | Endemic |
| *Kuhlia xenura* | Hawaiian flagtail | 'āholehole | Endemic |
| *Kuhlia sandvicensis* | Reticulated flagtail | 'āholehole | Endemic |
| *Mugil cephalus* | Flathead mullet | 'Ama'ama | Indigenous |
| *Chanos chanos* | Milkfish | Awa | Indigenous |
| *Sphyraena helleri* | Barracuda | Kawele'a | Indigenous |
| *Elops hawaiensis* | Hawaiian tarpon | | Indigenous |
| *Caranx ignobilis* | White ulua | | Indigenous |
| *Lutjanus fulvus* | Toau (juv) | | Introduced |
| *Gambusia affinis* | Mosquitofish | | Introduced |
| *Poecilia sphenops* | Mexican molly | | Introduced |
| *Clarius fuscus* | Chinese catfish | | Introduced |
| *Neomyxus leuciscus* | Sharp-nosed mullet | | Introduced |
| Oreochromis mossambicus | Mozambique tilapia | | Introduced |

| | | | |
|---|---|---|---|
| *Sarotherodon melanotheron* | Black chin tilapia | | Introduced |
| *Tilapia zillii* | Redbelly tilapia | | Introduced |
| **Invertebrates** | | | |
| *Atyoida bisulcata* | Hawaiian prawn | `opae kala`ole | Endemic |
| *Macrobrachium grandimanus* | Hawaiian prawn | `opae `oeha`a | Indigenous |
| *Gonodactylus spp* | Mantis shrimp | Aloalo | Indigenous |
| *Thalamita spp* | | Alei'eke | Indigenous |
| *Charybdis hawaiiensis* | | Kuhonu | Indigenous |
| *Thalamita crenata* | Blue-pincher crab | | Indigenous |
| *Macrobrachium lar* | Tahitian prawn | | Introduced |
| *Procambarus clarkii* | Red swamp crawfish | | Introduced |
| *Metopograpsis thukuhar* | | Alamihi | Introduced |
| *Scylla serrata* | Samoan crab | | Introduced |

## Table 3 Observed Birds at Hulē'ia NWR

| ***Scientific Name*** | ***Common Name*** | ***Hawaiian Name*** | ****Status*** |
|---|---|---|---|
| *Asio flammeus sandwichensis* | *Hawaiian short-eared owl* | *pueo* | Endemic |
| *Branta sandvicensis* | *Hawaiian goose* | *nēnē* | Endemic, Endangered |
| *Anas wyvilliana* | *Hawaiian duck* | *koloa maoli* | Endemic, Endangered |
| *Gallinula chloropus sandvicensis* | *Hawaiian moorhen* | *'alae 'ula* | Endemic, Endangered |
| *Fulica alai* | *Hawaiian coot* | *'alae ke'oke'o* | Endemic, Endangered |
| *Himantopus mexicanus knudseni* | *Hawaiian stilt* | *ae'o* | Endemic, Endangered |
| *Nycticorax nycticorax* | *Black-crowned night-heron* | *'auku'u* | Indigenous |
| *Anas platyrhynchos* | *Mallard* | | Migratory |
| *Fregata minor* | *Great frigatebird* | *'iwa* | Migratory |
| *Ardea alba* | *Great egret* | | Migratory |
| *Anser albifrons* | *Greater white-fronted goose* | | Mig |
| *Branta bernicla* | *Black brant* | | Migratory |
| *Branta hutchinsii* | *Cackling goose* | | Migratory |
| *Branta canadensis* | *Canada goose* | | Migratory |
| *Anas strepera* | *Gadwall* | | Migratory |
| *Anas penelope* | *Eurasian wigeon* | | Migratory |
| *Anas americana* | *American wigeon* | | Migratory |
| *Anas discors* | *Blue-winged teal* | | Migratory |
| *Anas cyanoptera* | *Cinnamon teal* | | Migratory |
| *Anas clypeata* | *Northern shoveler* | *koloa mohā* | Migratory |
| *Anas acuta* | *Northern pintail* | *koloa māpu* | Migratory |
| *Anas carolinensis* | *Green-winged teal* | | Migratory |
| *Aythya valisineria* | *Canvasback* | | Migratory |
| *Aythya americana* | *Redhead* | | Migratory |

| | | | |
|---|---|---|---|
| *Aythya collaris* | *Ring-necked duck* | | Migratory |
| *Aythya marila* | *Greater scaup* | | Migratory |
| *Aythya affinis* | *Lesser scaup* | | Migratory |
| *Bucephala albeola* | *Bufflehead* | | Migratory |
| *Pluvialis squatarola* | *Black-bellied plover* | | Migratory |
| *Pluvialis fulva* | *Pacific golden-plover* | *kōlea* | Migratory |
| *Tringa incana* | *Wandering tattler* | *ʻūlilī* | Migratory |
| *Tringa flavipes* | *Lesser yellowlegs* | | Migratory |
| *Arenaria interpres* | *Ruddy turnstone* | *ʻakekeke* | Migratory |
| *Calidris alba* | *Sanderling* | *hunakai* | Migratory |
| *Calidris melanotos* | *Pectoral sandpiper* | *upupā* | Migratory |
| *Calidris acuminata* | *Sharp-tailed sandpiper* | *upupā* | Migratory |
| *Limnodromus scolopaceus* | *Long-billed dowitcher* | | Migratory |

Water Quality: Hulēʻia River is a EPA 303(d) listed watershed within the 2016 State of Hawaii Water Quality Monitoring and Assessment Report. Hulēʻia river is listed for exceeding: NO3+NO2, TN, turbidity and enterococcus bacteria. A Total Maximum Daily Load (TMDL) report comprises Hulēʻia River and the other streams (2008). Although polluted by state standards, the lower reach of the river and fishpond provide an important estuarine environment and nursery ground for many fish and crustacean species, and are crucial as waterbird habitat.

## HISTORY OF THE LOKO IʻA

There are lots of versions of the story about the building of Alekoko Fishpond and the record of ownership is a bit spotty. There is a historical record of the property as Land Court Application Award 3605 to Kaiohlomoku. According to the 1989 EA, there is an early 1890's photo showing the fishpond in disrepair, but that in a 1900 photo it has been repaired and reactivated. "Leasing and operation of the Fishpond by private interests occurred during the early 1900's. The Fishpond wall was again damaged during a 1946 tsunami." It is listed as owned by Kanoa Estate, c/o R. Eugene Platt, Bishop Trust Co. Ltd., PO Box 2390, Honolulu in the National Register of Historic Places, which was recorded in 1972.

A popular legend of the history of building of Alekoko Fishpond is that it was built by Menehune the mythical, magical little people, said to have been constructed in just one night for a Hawaiian Chief. This legend is responsible for one of the well-known names for the Fishpond, Menehune Fishpond. Some have said that this story is offensive to the Hawaiian workers who excavated, hauled and set those stones, and whose hands bled from the multiple cuts cause by coarse volcanic stones. The National Register claims that the "Menehune Fishpond is so old that its construction is attributed to the Menehunes, a mythical people inhabiting Hawaii before the Hawaiians arrived."

Wichman (1997:27-32, 1998:57-58[1]) offers a tale of the origin of the fishpond, as recounted below:

> In Niumalu there is a large fishpond now called the Menehune Fishpond…The rocks used for the facing, as the story goes, came from the plains of Wahiawa and were passed from hand to hand down a double row of men and women. The pond was built at the request of Chief ʻAlekokoo and Chiefess Ka-lālā-lehua, who were brother and sister. The Menehune insisted that these two must remain inside their house and must

[1] Wichman, F. B. 1997. *More Kauaʻi Tales*. Bamboo Ridge Press, Honolulu.
Wichman, F.B. 1998. *Kauaʻi Ancient Place-Names and Their Stories*. A Latitude 20 Book. University of Hawaiʻi Press, Honolulu.

not peek out at the work in progress. Through the long night and most of the day, the two listened to the voices of the Menehune and heard the sounds of stone falling on stone. At last curiosity won out, and the brother poked his fingers through the grass thatch of the house and peered out. Immediately the Menehune chief ordered his people to drop the stones they were holding and wash their hands in the almost completed fishpond. The rocks were not water polished and there was not a hand that wasn't bleeding from several cuts. The Menehune left the dam unfinished as a reminder to Chief 'Alekoko of his broken promise. The fishpond still bears his name: 'Alekoko, "rippling blood."

There is paleoenvironmental data that was collected. Burney (2002:21-23, 2003:215-218)[2] reported results of a core sample taken from the bottom of the fishpond, plus six others from a marshy area 2.4 km west of the pond. The period of the middle AD 1300s to middle 1400s is associated with an established population and the initial stages of growing intensity and expansion of the land use in the Puna District. This matches with what was proposed by Kikuchi (1973, 1976[3]) for Hawaiian fishpond construction.

## PROPOSED WORK PLAN

**Please provide a summary of the work that is being proposed under this permit. Please note any use of mechanized equipment.**

See Attached Proposed Work Plan and Map for proposed project details

## PROPOSED OPERATIONS PLAN

**Please discuss what species you intend to raise in the pond, and your proposed methods of stocking, raising, and harvesting these species.**

The proposed project is only for mangrove removal and planting of native Hawaiian vegetation. We are not proposing to bring the loko i`a back to operational condition it this time. It is best to allow the system to find balance and to monitor the response of the hydrology and fishery over some time before determining what level of restoration would be needed to bring it to operational level.

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[2] Burney, D. A. 2002. Late Quaternary Chronology and Stratigraphy of Twelve Sites on Kaua'i. *Radiocarbon* 44: 13-44.
Burney, L. P., and D. A. Burney. 2003. Charcoal Stratigraphies for Kaua'i and the Timing of Human Arrival. *Pacific Science* 57: 211-226.

[3] Kikuchi, W. K. 1973. Hawaiian Aquacultural Systems. Ph.D. disserttion, Department of Anthropology, University of Arizona, Tucson.
Kikuchi, 1976. Prehistoric Hawaiian Fishponds. *Science* 193: 295-299

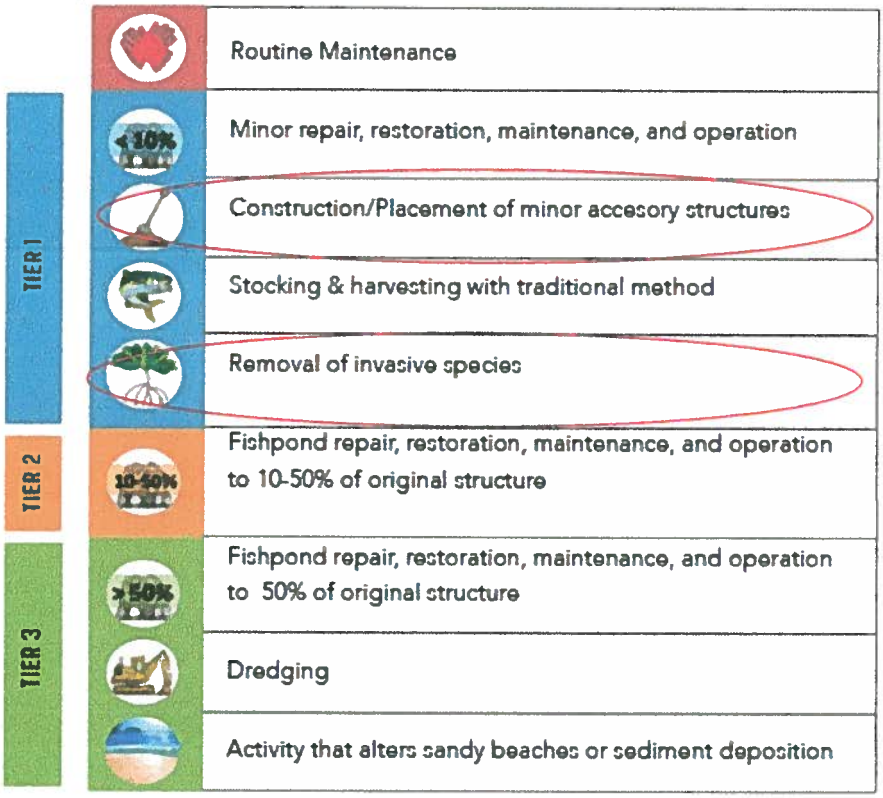
## CONSISTENCY WITH HO'ALA LOKO I'A PROGRAM

**Please discuss how this proposal is consistent with Conservation District Use Permit (CDUP) ST-3703** (available online at dlnr.hawaii.gov/special-projects) **and which tier-level the project falls under.**

The proposed project is to remove invasive mangrove from the area surrounding the Alekoko fishpond using a combination of hand-cut/ hand-remove and mechanized removal to place a native plant nursery and storage container for tools on-site as well as possibly construct a traditional Hawaiian hale (workshop for hale building being researched) to have a shady area for volunteers to meet and learn.

**THE TIERED REVIEW PROCESS**

The program identifies three tiers.




## BEST MANAGEMENT PRACTICES

**Please discuss the BMPs that will be followed to protect both the environment and the integrity of the pond** (users' guide forthcoming).

Best Management Practices will be completed throughout the project. Archaeological pre-clearing survey will be done on site by Pacific Legacy of the stockpile and staging areas. All archaeological sites encountered will be recorded with written descriptions, plan view maps, digital photographs, and GPS coordinates. The intent of this work is to minimize impact to potential important archaeological resources. If sites are found, the area will be avoided as a stockpile area to avoid impact. A pre-clearance orientation and briefing will also be conducted

with crew members prior to any work being done on site. A post clearance survey and mapping will be done at the conclusion of the mangrove removal.

Further BMP recommendations will be provided following the initial survey. Sediment control BMPs will be employed throughout the mangrove removal. Earthworks Pacific will provide sediment control BMPs, placed at the pond outlets to reduce sediment released into the river and impacting the waterbodies. In addition, Mālama Hulē'ia will ensure that any mangrove removal done in and around the rock wall will be done by hand, and will be done with care to avoid impacts to the rock wall.

Sediment control BMPs will allow sediment to be captured prior to entering the water bodies. This will be done through use of silt cloth and/or straw bales or straw waddles that will protect the river and fishpond.

# B. Project Statement

The Hulēʻia River, within the Nawiliwili Bay watershed on the island of Kauai, contains important estuarine and marine wetlands, habitat for native endangered waterbirds, migratory birds, bats, and aquatic species, as well as significant cultural resources including the Alekoko Fishpond, an ancient Hawaiian fishpond. This project is the first phase in a larger effort to eradicate the invasive red mangrove (*Rhizophora mangle)* within the entire Hulēʻia river watershed and restore native Hawaiian habitat to support a healthy and thriving coastal wetland ecosystem. Mālama Hulēʻia is committed to restoring the native ecosystem through the removal of the invasive mangrove, and restoring the wetland with native plant species. Mālama Hulēʻia has the capacity, record, and desire to commit to the long term management including monitoring and maintenance of the site, to eliminate the invasive mangrove and promote the successful recruitment of native species. The mangrove removal of this project will address approximately 38% of Mālama Hulēʻia's target of mangrove eradication for the entire watershed. This phase of the project will address key threats to the sensitive coastal ecosystems and species within the Alekoko fishpond and surrounding land. The goals of the proposed project are:

1) Removal of 26-acres of invasive red mangrove within the Okada Property (Alekoko fishpond and surrounding land consisting of two TMK's, 431001012 and 432001001);
2) Restoring 14.9-acres of regionally decreasing estuarine intertidal wetlands (NWI Type Code: E2FO3N) by replanting native Hawaiian estuarine wetland plants and wetland fringe plants within the Alekoko wetland restoration area. The remaining 11.1-acres cleared of mangrove are expected to return to estuarine deep water subtidal wetland (NWI Code: E1UBLh) without need for revegetation; and
3) Provide long-term protection and maintenance of 14.9-acres of restored wetland habitat for the benefit of native wildlife including 5 endangered birds – Hawaiian duck, stilt, coot, moorhend and goose, by Mālama Hulēʻia staff who will monitor and direct volunteers to appropriate maintenance efforts.

## 1. Project Need

Wetlands comprise a small percentage of the land mass on the Hawaiian Islands. In the state of Hawaii, estimates of wetland area ranges from 1.3 to 2.7% of the total land area (Hoffman 1991). Estimates of wetland loss in Hawaii have ranged from 12 to 31%, but detailed analysis of pre-historical and historical land use patterns are needed to accurately quantify the wetland loss. Published estimates likely underestimate the original extent of wetland habitats as large-scale land use changes occurred shortly after European contact before many historical records were maintained. Approximately 75% of the remaining 6,190 ha (15,474 ac) of wetlands throughout the state are degraded by non-native invasive plant species and altered hydrology due to urbanization and agriculture (HWJV Strategic Plan 2006). This project proposes to restore 14.9 regionally decreasing estuarine intertidal wetlands (NWI Type Code: E2FO3N).

Throughout the Pacific where native ecosystems have evolved with mangrove swamps, mangroves play an important role for protecting coastal areas from storm and wave damage, and act as a land-building agent as suspended silt settles and accumulates around mangrove swamps (Stemmermann 1981). However, there are no mangrove species native to the Hawaiian Islands, but two non-native invasive species of mangroves have become prevalent and have altered the ecological function of native coastal salt marshes, tidal flats, and ancient Hawaiian fishponds. Mangroves have caused increased siltation in natural and man-made connections between wetlands or between fresh and saline water sources, thereby further altering hydrological processes (USFWS 2010). Mangrove was introduced to reduce sedimentation resulting from agricultural practices, mainly from the sugarcane plantations. Since its introduction, it has spread along shorelines of the main Hawaiian Islands, has overtaken stream banks and is filling in the Hawaiian fishponds and damaging historic fishpond walls. The proliferation of the introduced mangrove over the last century has created many environmental concerns

including habitat loss of four endangered species of waterbirds, destruction of historic fishponds, sedimentation of reef flats, and restructuring of the coastal wetland ecosystem (Allen 1998; Cox and Allen 1999).

## 2. Project Objectives

To successfully complete the proposed coastal wetland restoration project, the following objectives will be met within the 24-month project period:

1. Remove invasive red mangrove within the Okada/ Alekoko fishpond by month 15 from notice to proceed.
    - 26-acres cleared of mangrove: 20-acres by Earthworks Pacific Inc. and 6-acres by volunteers
    - Approximately 10-acres removed using hand-cut, hand remove technique in areas identified as culturally sensitive or not suitable for heavy equipment (e.g. rock wall and any other sites of cultural significance).
2. Planting 14.9 acres of estuarine intertidal emergent wetlands with native Hawaiian wetland groundcover, sedges, bushes and trees within the Okada Property by Month 24 in schedule.
    - Site preparation – including removal of weeds, mangrove propagules and debris
    - Plant native Hawaiian vegetation
3. Work with dedicated partners on the Mālama Hulēʻia technical advisory committee to develop adaptive management plans that will guide the long term management and maintenance for:
    - Predator control (e.g. feral pigs, cats, dogs)
    - Wildlife monitoring (periodic waterbird surveys and aquatic species counts)
    - Water quality monitoring and other permit BMPs
    - Outreach and Education for responsible escorted use of area (education, volunteer, traditional Hawaiian practices)
4. Provide long-term protection, management and maintenance of restored acres of wetland habitat by Mālama Hulēʻia staff who will monitor and direct volunteers in appropriate maintenance efforts
    - Long term (20 year with option to extend) license agreement with landowner, Okada Trucking Ltd.
    - Project Volunteer Coordinator hired (June 2016) who will oversee long term monitoring and maintenance
    - Set up endowment/stewardship fund to ensure long term monitoring and maintenance
    - Expand volunteer and outreach program

## 3. Expected Results and Benefits

This proposed project will result in 26-acres of invasive mangrove removed and 14.9-acres of coastal estuarine wetlands being restored. The project will restore a healthy Hawaiian wetland ecosystem that will better support native fish, invertebrates, birds and cultural resources. General wetland ecosystem services will be restored. Water quality within and flowing from the pond will be improved. Restoration includes planting native salt tolerant wetland plants that will provide nesting and foraging habitat for endangered species. The many expected benefits that are anticipated as a result of the implementation of this proposed project are consistent with a number of ongoing resources management plans; a summarized table can be found in Criterion 4 and are briefly described in the following sections.

### Endangered, resident and migratory species

The restoration of the wetlands will increase invertebrate productivity such as aquatic insects which are important food resources for native waterbirds. Removal of the mangrove and restoration of the native wetland plants will benefit the endangered Hawaiian waterbirds including the Hawaiian duck (koloa maoli, *Anas wyvilliana),* Hawaiian coot (ʻalae keʻokeʻo, *Fulica alai),* Hawaiian moorhen (ʻalae ʻula, *Gallinula chloropus sandvicensis)*, and the Hawaiian stilt (aeʻo, *Himantopus mexicanus knudseni)*." The endangered Hawaiian goose (*Branta sandvicensis*), Pacific golden plover (kolea*, Plusvialis fulva)*, ruddy turnstone (ʻakekeke *Arenaria interpres*), and sanderling (hunakai *Calidris alba*) will also benefit as they are known in the area and frequent the adjacent lands on Hulēʻia NWR. The federally endangered Hawaiian hoary bat (*Lasiurus cinereus semotus)* is found within the Hulēʻia NWR and it is expected to benefit from the habitat restoration. Conservation of important lowland coastal habitat for foraging is essential for the recovery of the Hawaiian hoary bat (USFWS 1998). As the proposed site is adjacent to the Hulēʻia NWR, is part of the same river system, and threatened and

endangered species are known to be in the area, we expect the endemic waterbirds, migratory birds, shorebirds, and bat to greatly benefit from habitat expansion. Table 4 in Criterion 5, provides an overview of the endangered species and how the project supports their recovery.

### Fish and Shellfish

This project will provide, restore, or enhance important nursery, juvenile, and foraging habitat for endemic or native aquatic species that use the coastal estuarine wetland project site for at least part of their life cycle. These species may include amphidromous fishes, and fishes important to local fisheries and culture. The open water habitat that will occur as a result of this project should improve water circulation and water quality as a result, which should indiscriminately benefit all aquatic fauna that are important ecologically or to the local fishery. A list of fish species benefits is found in Table 6 within Criterion 6.

### Improved Water Quality and Restored Functions and Values

Although the primary goal of the proposed project is the removal of highly invasive mangrove and rebuilding of a biologically diverse Hawaiian intertidal estuarine wetland ecosystem, with all of its ecological services and functions, a valuable ancillary effect will be improving water quality in the Hulēʻia estuary and particularly in Alekoko fishpond. The Hulēʻia River comprises the largest portion of the Nawiliwili Bay watershed and has tidal saltwater influence for over two miles upstream from Nawiliwili Bay. Nawiliwili Bay Watershed is a 303(d) listed watershed within the 2016 State of Hawaii Water Quality Monitoring and Assessment Report. In the report, the Hulēʻia river is listed as impaired for exceeding the following water quality parameters: $NO_3$+$NO_2$, TN, Turbidity and enterococcus bacteria. A three-phase study was completed to assess the status of the Nawiliwili Watershed on Kauai and develop recommendations for restoration and protection (State Hawaii Department of Health, 2004). Restoration of the wetland is one of the key steps in this process.

### Cultural Resources

More than 350 fishponds have been identified on coastal lowlands and shorelines on all 8 of the main islands (Burrows 1989). Most fishponds were constructed along the coastal plains, ranged in size from 0.2 to 200 ha (0.5-500 ac), had varying salinity, areas of open water, and vegetated marshlands. Hawaiian fishponds are unique and advanced forms of aquaculture found nowhere else in the world. Preventing their destruction through the removal of invasive mangrove and restoration of native wetland plants restores the ecological conditions for the native wildlife, as well as contributing to the understanding and perpetuation of the Hawaiian culture and practice. Alekoko Fishpond was listed on the National Register of Historic Places, authorized under the United States Department of the Interior, National Park Service (DOI, NPS) in 1972, as well as on the Hawaii Register of Historic Places under the State of Hawaii Department of Land and Natural Resources.

## 4. Approach and Timetable

**a. The organizations that will act as a sub recipient and their role(s) in meeting the project objectives**
Sub recipient: Mālama Hulēʻia
Role: Project Management including hiring and oversight of contractors; coordination and oversight of volunteers (insurance policy in place); and long term maintenance and monitoring of completed project. Mālama Hulēʻia has formed a technical advisory committee (TAC) for the purpose of having the most relevant expertise and input to the development of our monitoring plans. Baseline monitoring of waterbirds and vegetation will begin summer 2017, as detailed below.

**b. What organization will hold title to the real property being acquired or restored**;
The property being restored is owned by Okada Trucking Company Ltd, a family owned company based on Oahu. The family is supportive of the work and has granted a 20 year license that designates Mālama Hulēʻia as the stewardship organization for the restoration area. See Appendix A for a copy of the agreement.

**c. How will long-term management (20 years or longer) of acquired or restored lands be accomplished;**
A long-term license agreement with the landowner has been secured and a stewardship fund and policy are now being set up to ensure that the management, maintenance, and monitoring of the site will be sustained for a minimum of 20 years. Mālama Hulēʻia has estimated that the cost for the long-term

management to be $360,000 for the 20 year period with support from long term funders as well as through partnerships (see Section K, Mālama Hulēʻia letter of commitment for Stewardship Fund and Policy information). With our past project experience at Pu`ali wetland we know that community volunteers play an enormous role in contributing to successful long-term restoration. Mālama Hulēʻia is dedicated to maintaining a staff person to implement these management plans with the help of dedicated volunteers, agency partners and internship positions.

**d. What type of ownership interest is involved, e.g., fee-simple, easement, combination, etc., and the related acres;**

The property is within a Special Management Area, protected from development by County and State through layers of conservation including County zoning designation of Conservation, designated as Conservation Lands within the Conservation District, as well as under the State and National Registry of Historic Places. Long term preservation and continued conservation of the site is enhanced due to its historical designation and cultural significance of the site. Under State Land Use Commission, Conservation lands are defined as lands in existing forest or water reserve zones and include areas necessary for protecting watersheds and water sources, scenic and historic areas, parks, wilderness, open space, recreational areas, habitats of endemic plants, fish and wildlife and all submerged lands seaward of the shoreline. Conservation Districts are administered by the State Board of Land and Natural Resources and uses are governed by rules promulgated by the State Department of Land and Natural Resources. Any changes to this designation requires extensive public review and approval by the State Board of Land and Natural Resourcs.

**e. What organization (or individual) will manage the real property interest;**

Okada Trucking Company Ltd. and Mālama Hulēʻia as designated by license agreement (Appendix B)

**f. What will be involved in the restoration?**

Mālama Hulēʻia has successfully completed the Puʻali wetland restoration project at Niumalu, which has given us experience using different methods to remove mangrove and the opportunity to experiment with native plant restoration. We have learned that there is a real value to assembling community volunteers to do conservation work but that there is an efficiency and scale that requires a professional service with mechanized equipment necessary to be successful in our goal of eradicating mangrove in the Hulēʻia River watershed. Mālama Hulēʻia contracted with Univ. Hawaii Sea Grant to develop a Strategic Action Plan (SAP) for the removal of mangrove throughout the Hulēʻia watershed. Part of that SAP was the comparison of other mangrove removal projects throughout Hawaii and the determination of best practices for the size and scope of this proposed project. We've spent the year doing field assessment work and sought equipment and cost estimate proposals from Earthworks Pacific Inc.(included as Appendix C), as they are a large construction firm with years of experience working on similar types of project on Kauai. Dr. Berg (Mālama Hulēʻia BOD) is familiar with the environmentally conscious efforts of Earthworks Pacific from his work doing bird census work with them. Based on the extensive hands-on experience of Mālama Hulēʻia and Earthworks Pacific, we are confident that mangrove removal will succeed on schedule.

Once mangrove is removed from a ¼ acre plot and equipment moved to a new adjoining site, then all debris and weeds will be removed by volunteers and out-planting of nursery reared shrubs, bushes and trees grown in the on-site nursery will commence. Our nursery and native plant stock will include plugs and seed stock of native Hawaiian plants from the nearby Puʻali wetland demonstration site and will be planted immediately in the cleared site. These methods proved quite effective at Puʻali wetland. Weeds and mangrove propagules will be removed from re-planted sites by monthly volunteer groups. Mangrove propagules will be prevented from floating in to Alekoko fishpond by a floating silt barrier across the top few inches of the constructed opening in the rock wall. Long term management, monitoring and maintenance will be completed by Mālama Hulēʻia staff and volunteers to ensure mangrove does not re-establish in the project area.

**g. Is the project ready to implement?**

The project design/cost estimate is completed and is attached to the proposal in Appendix C. Permit applications will be submitted by September 1, 2017 enabling work to begin within the schedule presented

in this proposal. The landowners are supportive of the proposed work (see letter of support in Section K) and have provided a long term license agreement (Appendix B).

## 5. Project Area Location

The project location is along the Hulēʻia River, it surrounds Alekoko fishpond (also known as the Menehune Fishpond), adjacent to the Hulēʻia National Wildlife Refuge on the southeast side of the island of Kauai. The coordinates are 21.9489°N, -159.3726° E. See Maps, Section J, of this application.

## 6. Useful Life

No construction of structures or infrastructure will occur at the threshold price to qualify. The road and driveway into the Okada Property will be improved to allow access for the larger vehicles; however this cost will not exceed $100,000.

## 7. Program Income

No program income will occur as a result of this project.

## 8. Budget and Planned Expenditures

The budget is described in the table below. The cost of the professional mangrove removal was provided through a proposal from Earthworks Pacific, LLC., found on the attached EWP Proposal. The remaining details have been developed based on the standard volunteer rates, based on the work done by Mālama Hulēʻia to date, or were provided by professionals.

| Category Description | Federal | Cash-On-Hand & non-federal grants | In-Kind | Other Federal (not included in project cost) |
|---|---|---|---|---|
| Mangrove Removal Contract (see attached EWP proposal) | $929,982 | $45,500 | | |
| 6-acres Volunteer Mangrove Removal (based on 1,800 volunteer hours per acre x $31.65/hr)*over 3-years | | | $341,820 | |
| Mangrove Biomass Hauling - Green Energy Kauai | | | $59,182 | |
| Volunteer Planting (based on 1,800 volunteer hours per acre x $31.65/hr)* | | | $37,980 | |
| Mangrove Removal Volunteer Tools and Supplies (saws, oil/gas, replacement chains, misc. tools, gloves, etc.) | | $1,000 | | |
| Nursery Supplies and Consultant Contract | | $15,000 | | |
| Nursery manager (MH Board 10 hr/mo @ $50/hr ) | | | $12,000 | |
| Project Manager (MH ED) .90 FTE | | $112,320 | | |
| Project Coordinator .50 FTE | | $43,000 | | |
| Water Quality Monitoring (Surfrider Foundation 10 hrs/month @ $100/hr) | | | $24,000 | |
| National Parks Service Tech Assistance (2-year) | | | | $88,000 |
| Archaeological Survey/Sec 106 Compliance (see attached proposal) | | $18,881 | | |
| Biological Monitor | | $10,000 | | |
| Drone Vegetation Monitoring (KISC) | | | $4,000 | |
| KISC Crew Labor (1-day/yr x 2-years) | | | $4,686 | |

| | | | | |
|---|---|---|---|---|
| KISC Donation: predator traps ($50 each x 10) | | | $500 | |
| Predator Control Supplies & Tool Storage (see Appendix E for cost details) | | $25,000 | | |
| State DLNR Negotiated Indirect Rate is 11.8% (applying 7.5% to federal request and request that the unrecovered 4.3% be included as in-kind match) | $69,748.65 | | $39,989 | |
| **Sub totals:** | **$999,731** | **$270,701** | **$523,657** | |
| **Total Project Cost:** | | | | **$1,794,089** |

* Volunteer rate provided by Hawaii DLNR: based on a Wildlife Worker II, which is a BU1/BC5 with a base salary of $20.82/hr. (effective 4/1/17). Fringe is 52% in July 2017 (FY18). So total is $31.65/hr.

Cost Statement: We are a State government entity receiving more than $35 million in direct Federal funding with a negotiated indirect cost rate of 11.82%. We request permission to apply $39,989 in unrecovered indirect costs as part of this match as field operations costs (the difference between the negotiated 11.82% and the 7.5% we are applying).

## 9. The Method used for Allocating Costs in multipurpose projects and facilities

This is a single purpose project with no facilities.

## 10. Relationship with other federal funds

This project is a part of an overall program to eradicate mangrove from the Hulēʻia River watershed. We have been awarded a technical assistance grant through the National Parks Service Rivers, Trails, and Conservation Assistance Program for two cycles and expect to extend the grant for an additional year (FFY 2018). We did not include the funds in our project budget calculations but did show it in the budget table to acknowledge it. There are currently no other federal funds being used for the project. Our demonstration/pilot project did use Community Based Restoration Grant (NOAA) funds through the Hawaii Community Foundation; however those grants were completed successfully and are now closed out. Future federal grants to complete the project are likely, however, if additional federal funds are sought out for this project, it is understood that they cannot be used as match for either application.

## 11. Timeline

Table 3 outlines significant milestones in completing the project, accomplishments to date, and project implementation.

**Table 3 Project Milestones and Timeline**

| Timeline | Description |
|---|---|
| Accomplishments | |
| 2012 | Formation of special mangrove removal project under Kiaola Canoe Club |
| 2012 and 2013 | Community Restoration Grants (HCF/NOAA) for Demonstration Project |
| 2013 – October 2015 | Invasive Species Action Plan (Contracted to UH SeaGrant) |
| August 2014 | Formation of 501c3 – Mālama Hulēʻia (EIN 47-1610214) |
| June 2015 | Hiring of Executive Director by Mālama Hulēʻia |
| 2016, 2017 and 2018 | Technical Assistance Grant with National Parks Service |
| May 30, 2017 | Grant from County of Kauai to develop project plan |
| 2015 – Ongoing | Communication with landowner, Okada Trucking Company LTD |
| March 2017 – Ongoing | Begin Water Quality Sampling |
| April 2017 – Ongoing | Formation of Technical Advisory Committee (see Section E. Evidence of Experience) |
| May 2017 | Hulēʻia Watershed Mangrove Removal Plan Finalized |
| Immediate Next Steps | |

| | |
|---|---|
| September 2017 | Permit Applications (described in compliance section below) |
| Summer 2017 | Develop Stewardship Fund policies to have a fund in place if awarded and begin fundraising |
| Project Initiation | |
| 60 days after NTP | Earthwork Pacific begins contract implementation |
| Months 3-15 | Mangrove Removal – Earthworks Pacific |
| Months 1-24 | Grow and Plant native wetland vegetation |
| Months 1-24 | Develop adaptive management and monitoring plans consistent with State and Federal guidelines |
| Month 25-Year 20+ | Implement adaptive management, monitoring, and management plans to keep site a functioning, native ecosystem. |

## 12. Compliance

Compliance for the proposed project includes a Tier 1 Hoʻala Loko Iʻa permit application and determination requests for SMA (County), Section 10 Rivers and Harbors, Section 404 CWA (Army Corp). Additionally, because the work proposed in for this project occurs at the property boundary of the Hulēʻia NWR we want to have a SUP in place for instances where we may cross the property line. Table 4 below outlines the permit/review process, agency and timeline. Details (including the programmatic EA and signing of Act 230) on the new streamlined process can be found at http://dlnr.hawaii.gov/occl/hoala-loko-ia/.

**Table 5 Compliance Activities**

| Permit / Determination Request | Agency | Timeline and expected determination |
|---|---|---|
| Tier 1 Hoʻala Loko Iʻa Permit Application | DLNR -OCCL | September, 2017 Submittal, 30-day review |
| Archaeological Inventory Survey | SHPD/NHPA | September 2017 |
| Section 7 | USFWS | Informal, intra-service consultation (see 2015-TA-0426 Letter, Appendix E ) |
| Determination Request (CWA Sec. 404 and Sec. 10 Rivers and Harbors Act) | Army Corp of Engineers | Submit September 1, 2017 – expect a determination of No Permit Required (NPR) |
| SMA Determination Request | County of Kauai | Submit September 1, 2017 – expect that our activities are determined to be exempt. |
| General Activities Special Use Permit | USFWS, Kauai Refuge | Submit June 2017 for start of work in 2018. |

## 13. Funding Eligibility

The project will meet endangered species goals and objectives (USFWS 2011), follows recommendations to improve water quality and function (DOH 2004) and meets the conservation goals of the Hulēʻia NWR. The project work is substantial in both character and design.

## 14. State Trust Fund

Eligibility has been previously approved by the Service and no change has occurred in the fund.

## 15. Relationship to Other Projects

The Hulēʻia NWR is currently completing their draft Comprehensive Conservation Plan and Environmental Assessment. Mālama Hulēʻia has coordinated with Hulēʻia NWR to provide support and partnership with the overall plan of mangrove eradication and native wetland restoration to benefit the endangered species. The work in the proposed project will directly benefit the Refuge. Past pilot projects at Puʻali wetland demonstration site is part of the larger project initiative and work will continue throughout the river corridor. DAR is conducting a juvenile sport fish study to quantify the impacts of this type of restoration work on the fishery.

## 16. Public Involvement and Interagency Coordination

Mālama Hulēʻia has a strong record of public involvement and support, including thousands of volunteer hours. The County of Kauai, State DLNR DOFAW, DAR, and DOBOR, National Park Service, and USFWS have all been involved and support the project.

## Section I Summary Information for Ranking National Coastal Wetlands Conservation Program

### 1. Wetlands conservation. Will the project reverse coastal wetland loss or habitat degradation in decreasing or stable coastal wetland types?

Mālama Hulēʻia's goal is the eradication of invasive mangrove (*Rhizophora mangle*) from the entire Hulēʻia River watershed in a series of phased projects. This project proposal (Phase I) removes approximately 38% of the mangrove from the entire Hulēʻia river watershed. It will address key threats to sensitive coastal ecosystems and species by implementing specific restoration actions. Restoration work will be within Alekoko fishpond and surrounding estuarine wetlands, consisting of a total 26-acres of mangrove removal and re-planting native vegetation on 14.9-acres of regionally decreasing estuarine intertidal wetlands (NWI Code: E2FO3N). The project will restore the wetland by removing invasive, non-native plants and planting native Hawaiian coastal estuarine vegetation. The acres (11.1) identified for mangrove removal that are not included in the revegetation plan are either expected to return to estuarine deep water subtidal wetlands (NWI Code: E1UBLh), sand bar at the river edge, or are part of the historic fishpond structure (rock wall and historic nursery walls), see Map J3 in Section J. While these areas are not part of the vegetation plan, they are included in our long-term monitoring and maintenance plan and provide key habitat and foraging for endangered waterbirds and migratory seabirds. Ongoing monitoring and maintenance of the entire project area will ensure that mangrove does not reestablish. Those acres not initially included in the vegetation plan will be adaptively managed and if found that some areas are better suited for revegetation, they will be included in our planting efforts. See Section J (J-1 – J-6) for maps and images of the project area, specifically, Map J-3 and J-5, for project area details.

Nationally, estuarine intertidal wetlands are decreasing (T. E. Dahl, USFWS) and this trend is found within the Hawaiian Islands as well. Wetlands comprise a small percentage of the land mass on the Hawaiian Islands. In the State of Hawaii, estimates of wetland area ranges from 1.3 to 2.7% of the total land area (Hoffman 1991). Estimates of wetland loss in Hawaii have ranged from 12 to 31%, but detailed analysis of pre-historical and historical land use patterns are needed to accurately quantify the wetland loss. Published estimates likely underestimate the original extent of wetland habitats as large-scale land use changes occurred shortly after European contact before many historical records were maintained. Approximately 75% of the remaining 6,190 ha (15,474 ac) of wetlands throughout the state are degraded by non-native invasive plant species and altered hydrology due to urbanization and agriculture (HWJV Strategic Plan 2006).

While the current classification of the wetland within the project area is a nationally recognized wetland type, a healthy, thriving estuarine intertidal wetland in Kauai does not include the invasive red mangrove. Throughout the Pacific where native ecosystems have evolved with mangrove swamps, they play an important role for protecting coastal areas from storm and wave damage, and act as a land-building agent as suspended silt settles and accumulates around mangrove swamps (Stemmermann 1981). However, there are no mangrove species native to the Hawaiian Islands and two non-native invasive species of mangroves have become prevalent and have altered the ecological function of native coastal salt marshes, tidal flats, and ancient Hawaiian fishponds. Mangroves have caused increased siltation in natural and man-made connections between wetlands or between fresh and saline water sources, thereby further altering hydrological processes (USFWS Pearl Harbor NWR CCP, 2010). Multiple studies (Demopoulos and Smith 2010, Diorio et.al 2007, Allen 1998, Alongi and Sasekumar 1992, Smith et. al. 2000, Simberloff 1995) as well as management plans (see Tables 3 and 4 in Criterion 4 and 5) address the threats and impact that the mangrove has made within the natural wetland systems. The success and rapid proliferation of introduced mangroves over the last century has created many environmental concerns such as the loss of habitat for four endangered Hawaiian waterbirds, loss of fisheries nursey grounds, destruction of historic fishponds, and restructuring of the coastal wetland ecosystem (Allen 1998; Cox and Allen

1999). This project will remove the invasive plants, restore a native plant ecosystem, and restore an ancient and culturally significant fishpond, Alekoko.

***Table 1 Wetlands Conservation.***

| Project Area | Acres | Percent of Project Site |
|---|---|---|
| **Estuarine intertidal (E2FO3N)*** ** | **23.4** | **84%** |
| Estuarine and Marine Deepwater (E1UBLh) | 2.6 | 9% |
| Upland Area | 2.0 | 7% |
| Total | 28 | 100% |

***Declining Wetland: Estuarine intertidal (E2FO3N)

**2. Maritime forests on coastal barriers. Will the application significantly benefit maritime forests on coastal barriers?**

This project is not eligible. Maritime forests are defined, for the purposes of this regulation, as broad-leaved forests that occur on barrier islands and along the mainland coast from Delaware to Texas.

**3. Long-term conservation. Will the project ensure long-term conservation of coastal wetland functions? The project must provide at least 20 years of conservation benefits to be eligible.**

With a long term license in place, Mālama Hulēʻia will manage and maintain the project for a minimum of 20 years and provide long term conservation benefits to the site and the entire Hulēʻia river. Mālama Hulēʻia will continue to realize the ultimate vision of eradicating mangrove from the entire watershed, which will contribute to this project's success in the long term. Mālama Hulēʻia has a strong community-based mission that is committed to eradicating the mangrove and restoring a native, healthy, functioning ecosystem.

This project contributes to implementation of a comprehensive restoration plan for the Hulēʻia River watershed to eradicate invasive mangrove ensuring the project benefits will be sustained into the future. Project activities will be effective for more than 20 years. Once mangrove is removed and native Hawaiian coastal wetland vegetation planted, Mālama Hulēʻia is committed to managing the long-term benefits provided by this grant by implementing our adaptive management plans including vegetation monitoring and maintenance, wildlife monitoring, predator control and volunteer/stewardship program. Mālama Hulēʻia has formed a Technical Advisory Committee (TAC), Table 2, for the purpose of having the most relevant expertise and input to the development of our adaptive management plans. In addition, consultation with all relevant government agencies will be done to ensure that the adaptive management plans complement and contribute to the successful restoration of habitat for the native, migratory, and threatened and endangered species that will utilize the restored wetland.

**Table 2 Mālama Hulēʻia Technical Advisory Committee**

| Name and Organization | Expertise |
|---|---|
| Dr. Carl J. Berg, Mālama Hulēʻia Board President, Surfrider Foundation Board | Water quality, bird surveys, stream habitat enhancement, ecology |
| Mike DeMotta, National Tropical Botanical Garden | Native Hawaiian Plants, Nursery Consultation |
| Thomas Kaiakapu, DOFAW Kauai District Biologist | Wetland Biology, Predator Control, Wildlife Monitoring |
| Bill Lucey, Manager Kauai Invasive Species Committee (KISC) | Invasive Species, Predator Control, Leveraging Funds |
| Michael Mitchell (or alternate depending on expertise), Deputy Project Leader, Kauai National Wildlife Refuge Complex | Wetland Management, Endangered Waterbirds, Permitting |
| Mary J. Naone, (past) Lead Archaeologist DLNR SHPD | Archaeological Inventory Study |
| Kimberly Peyton, Research Scientist, DLNR DAR | Fish Habitat, Fish Surveys |

Mālama Hulēʻia has estimated that the cost for the long-term management to be $360,000 for the 20 year period with support from long term funders as well as through partnerships (see Section K, Mālama Hulēʻia letter attachment, Stewardship Fund Plan for details). With our past project experience at Pu`ali wetland we know that community volunteers play an enormous role in contributing to successful long-term restoration. Mālama Hulēʻia is dedicated to maintaining a staff person (Hired June 5, 2017) to implement these management plans with the help of dedicated volunteers, agency partners and internship positions.

In addition to the long term (20-years with the option to extend) license agreement, there are a number of existing protection measures on the property. The property is within a Special Management Area, protected from development by County and State through layers of conservation including County zoning designation of Conservation, designated as Conservation Lands within the State Conservation District, as well as under the State and National Registry of Historic Places. Long term preservation and continued conservation of the site is enhanced due to its historical designation and significance of the site. Protections under the Special Management Area (SMA) requires a SMA permit, under enactment of Act 176, known as the Shoreline Protection Act. The permit is necessary to provide "…special controls on developments within an area along the shoreline are necessary to avoid permanent losses of valuable resources and the foreclosure of management options, and to ensure that adequate access, by dedication or other means, to public owned or used beaches, recreation areas, and natural reserves is provided." It is state policy to preserve, protect, and where possible, to restore the natural resources of the coastal zone of Hawaiʻi.

In addition to the SMA designation, the land is in a Conservation District, subzone as a resource, and zoned conservation within the County of Kauai. Under the Hawaii State Land Use Commission, Conservation lands are defined as lands in existing forest or water reserve zones and include areas necessary for protecting watersheds and water sources, scenic and historic areas, parks, wilderness, open space, recreational areas, habitats of endemic plants, fish and wildlife and all submerged lands seaward of the shoreline. Conservation Districts are administered by the State Board of Land and Natural Resources and uses are governed by rules promulgated by the State Department of Land and Natural Resources.

Under the State of Hawaii Conservation District Administrative Rule, 13-5-13, Resource (R) subzone is designated for specific uses. The objective of this subzone is to ensure, with proper management, the sustainable use of the natural resources of those areas (Auth: HRS §183C-3) (Imp: HRS §183C-4). Any change to that designation requires extensive action. Administrative Rules[1] are regulations established by the department through an extensive public review and hearing process. The procedure for administrative rules is set by Hawaiʻi Revised Statutes (HRS) Chapter 91. Should any change to the use of the land be proposed (or amended), it must be drafted by the department, approved by the Board of Land and Natural Resources (BLNR) for public meetings/hearings, and reviewed by the Department of the Attorney General (AG). Then the draft is taken out to public meetings and/or hearings, where the public can give formal testimony on the draft rule. The rule is revised, if necessary, and then submitted to the Board of Land and Natural Resources for final approval. Then it is reviewed again by the AG, and after signing by the Governor and filing with the Lieutenant Governor, it has the effect of law. Thus, the conservation status provides an additional regulatory layer of protection for the project.

Alekoko Fishpond was listed on the National Register of Historic Places, authorized under the United States Department of the Interior, National Park Service in 1972 as well as on the Hawaii Register of Historic Places under the State of Hawaii Department of Land and Natural Resources. The property has a level of protection under the State and National Registry of Historic Places. The historic significance of the site under the federal and state registry, in addition to the conservation designation and willingness of the current land owners, Okada

[1] Referenced from: http://dlnr.hawaii.gov/occl/rules/

Trucking LLC. to lease the property for the purposes of long term restoration maintenance, environmental monitoring and education and perpetuation of traditional Hawaiian practices. Mālama Hulēʻia has secured a long term license of the property to ensure that Mālama Hulēʻia has the legal permissions necessary to conduct long term maintenance and has oversight of recreational access on the site. The larger term goal of mangrove removal from the entire watershed will continue to be pursued, which will also assist in the efforts to restore the functions and values of the wetlands and river to support wildlife as well as traditional stewardship of the river watershed.

**4. Coastal watershed management. Will the completed project help accomplish the natural resource goals and objectives of one or more formal, ongoing coastal watershed management plan or effort?**

The project is a key piece in coastal watershed management for the Nawiliwili watershed on Kauai. The Hulēʻia River comprises the largest portion of the Nawiliwili Bay watershed and has tidal saltwater influence for over two miles upstream from Nawiliwili Bay. The lower reach of the river and fishpond provide an important estuarine environment and nursery ground for many fish and crustacean species, and are crucial as endemic and migratory habitat. The Hulēʻia NWR abuts the Alekoko fishpond acreage in the lower reaches of the river (see Section J for map). The removal of the invasive red mangrove coupled with native wetland restoration within the Hulēʻia river is an essential management strategy for the recovery of Hawaii's endemic endangered water birds as well as efforts to restore the ecological function and water quality of the Nawiliwili watershed. This section identifies those plans and efforts that address the project need (Table 3).

A three-phase study was completed to assess the status of the Nawiliwili Watershed on Kauai and develop recommendations for restoration and protection (State Hawaii Department of Health, 2004). Strategies to improve functions and values of the watershed, as well as impacts were presented. This project supports the recommendations found in the report. It was found that mangrove contribute a significant amount of organic material to the streams, thereby increasing turbidity and nutrient concentrations and decreasing oxygen levels. Additionally, the extensive root system extending from these plants into the stream slows water flow and traps sediment. An anoxic environment, unsuitable for Hawaiian species, forms a degraded ecosystem among the roots. This leads to the filling in of the river and fishpond with sediment and its transformation from a tidal wetland to a supra-tidal mangrove forest ecosystem. This eliminates critical habitat used by native water birds and migratory shorebirds. The rock walls of the fishpond are being torn apart by the mangrove roots, and the estuary itself seems to be shrinking in size as the mangrove continues to spread into the fishpond open waters. It no longer provides suitable nursery grounds for native fishes and crustaceans.

The table below provides a summary of the other management plans that support the project. These management plans (Table 3) collectively recommend the restoration of native ecosystems that support the lifecycles of threatened, endangered, resident, and migrant species. Removal of invasive species is a key first step in that process. Together the management plans support the Nawiliwili Watershed studies and support efforts to continue the native habitat restoration of the entire Hulēʻia river.

***Table 3 Project Benefits to Existing Management Plans***

| Management plan or effort | How this project helps implement plan goals |
|---|---|
| **County and State Plans (*specifically mentions Hulēʻia River or Alekoko Fish Pond)** | |
| *Assessment and Protection Pan for the Nawilwili Watershed: Phases 1-3 – Restoration and Protection Plan, 2014 State of Hawaii Department of Health Clean Water Branch | A three-phase study was completed to assess the status of the Nawiliwili Watershed on Kauai and develop recommendations for restoration and protection. Hulēʻia river is one of the rivers within the watershed, and the study looked at the nine elements the U.S. EPA requires for a watershed based plan to address Section 319 of Section 303(d) of the federal Clean Water Act for listed waters. The Plan recommends the removal of the red mangrove and restoration with native plants as a key strategy to address the nine elements required |

| | |
|---|---|
| | by the U.S. EPA. |
| **Pacific Coast Joint Venture Hawaii*, Strategic Plan for Wetland Conservation in Hawaii, January 2006 | The Plan provides recommended actions for the Hulēʻia river and recommends that the stream should be managed as a complex of wetland habitats. To be able to do this, mangrove removal is recommended to open up habitat for endangered Hawaiian waterbirds and to restore the ancient cultural resources at "Menehune" (Alekoko) Fishpond. |
| *USFWS Revised Recovery Plan for Hawaiian Waterbirds*; second revision (2011) | Addresses four species of Hawaiian waterbirds: the Hawaiian duck or koloa maoli (*Anas wyvilliana)*, Hawaiian coot or ʻalae keʻokeʻo (*Fulica alai)*, Hawaiian common moorhen or ʻalae ʻula (*Gallinula chloropus sandvicensis*), and Hawaiian stilt or aeʻo (*Himantopus mexicanus knudseni)*, all listed as endangered. The project supports USFWS Waterbird Recovery Objective 1.3.2.2 - Control undesirable plant species. Undesirable plants, mainly introduced species such as…*Rhizophora mangle* (red mangrove), make wetlands less useful or unusable for waterbirds (Morin 1996, 1998; Rauzon and Drigot 2002; Chimner et al. 2006) These plants should be eliminated, where feasible, or controlled. Restored habitat will increase numbers by providing additional nesting, foraging and loafing areas and improving nesting success. Wetland restoration, including out-planting native species is listed as recovery objectives. |
| Hawaii's State Wildlife Action Plan (2015) | The Strategy calls for maintaining, protecting, and restoring native ecosystems and native species and combating introduced invasive species. The invasive mangrove is called out in numerous locations noting that it reduces open water, mudflats, or shallows, all key to the life cycle of Hawai'i's endangered waterbirds. Removing and controlling mangrove is a management strategy for State owned wetlands, and key to the recovery of the endangered waterbirds. The document lists Hawaiian goose, duck, moorhen, coot, and stilt as species of greatest conservation needs, and lists wetland restoration and conservation as important conservation actions for recovery of these species. |
| *Hawaii Coastal and Estuarine Land Conservation Plan* | Addresses the importance of estuarine systems and the need to protect and conserve. The proposed project is consistent with the goals and objectives. It recognizes that sheltered coastal wetlands in Hawaii support numerous unique plant and animal communities, and species dependent on Hawaiian estuaries are unusual in their ability to tolerate highly variable water quality conditions and significant sediment inputs |
| *USFWS Multi-Island Plants Recovery Plan.* | Lists alien animals and plants as one of the primary causes of the historical declines on the Multi-island cluster taxa, and the presence of these introduced species as the continued primary threats to their survival and recovery. |
| *Hawaii Fish Habitat Partnership. 2010. Hawaii Fish Habitat Partnership Strategic Plan. Honolulu, HI. 24 pp.* | Many of the important euryhaline species that are found in the Hulēʻia River/Alekoko Fishpond are transient and utilize the fishpond and nearby waters as primarily juveniles, these include: papio (blue trevally, white ulua), ʻamaʻama (striped mullet), Marquesan mullet (*Valamugil englei*), awa (milkfish), toau (blacktail snapper), and others (Table 2). These species generally avoid waters invaded by mangrove, |

| | |
|---|---|
| | and restoration of suitable habitat for these species will enhance community productivity within the Hulēʻia River/Alekoko Fishpond project area and, as these transient fish mature, will move on to repopulate nearby open coastal waters and coral reefs. |
| ***Regional and National Plans*** | |
| *US Coastal Program Strategic Plan* | The Plan identifies restoration of coastal wetlands for the benefit of endangered waterbirds, within the Hawaii Focus Area, as a high priority. |
| *Ducks Unlimited Conservation Plan* (2001) | Hawaiian wetlands are identified as a "High" priority for wetland conservation activities. |
| *North American Waterbird Conservation Plan (*2002) | Calls for restoration and protection of habitats that support the life cycle needs of water birds, including endangered waterbirds. |
| *Migratory Bird Program Strategic Plan (*2004) | Seeks to protect, restore, and manage migratory bird habitats such as the Hulēʻia watershed. |
| *U.S. Pacific Islands Regional Shorebird Conservation Plan* (2004) | Calls for high quality habitat to ensure that shorebirds in the region are not unduly limited by habitat availability and directs that efforts to provide habitat for shorebirds are integrated into multiple species habitat management initiatives. |

**5. Conservation of threatened and endangered species. Will the project benefit any federally listed endangered or threatened species, species proposed for Federal listing, recently delisted species or designated or proposed critical habitat in coastal wetlands? Will it benefit State-listed species?**

The Hulēʻia River and associated estuarine and marine wetlands provide habitat for endemic waterbirds, migratory birds, and shorebirds. Removal of the mangrove and restoration 26-acres of native wetland habitat will benefit the state and federally listed endangered Hawaiian waterbirds including the Hawaiian duck (koloa maoli, *Anas wyvilliana),* Hawaiian coot (ʻalae keʻokeʻo, *Fulica alai),* Hawaiian morehen (ʻalae ʻula, *Gallinula chloropus sandvicensis)*, and the Hawaiian stilt (aeʻo, *Himantopus mexicanus knudseni)*." The Hawaiian goose (*Branta sandvicensis*) will also benefit as it frequents the adjacent lands on Hulēʻia NWR. The federally endangered Hawaiian hoary bat (*Lasiurus cinereus semotus)* is found within the Hulēʻia NWR and it is expected to benefit from the habitat restoration. Conservation of important lowland coastal habitat for foraging is essential for the recovery of the Hawaiian hoary bat (USFWS 1998).

Expanding foraging and nesting areas for the endangered species addresses the Draft Revised Recovery Plan for Hawaiian Waterbirds (USFWS 2011). See Table 4, below, for a summary of anticipated benefits. According to the U.S. Fish and Wildlife Service (2015-TA-0426 letter), the following species are known to occur or transit through the vicinity of the project area: Hawaiian stilt (aeʻo, *Himantopus mexicanus knudseni),* Hawaiian moorhen (ʻalae ʻula, *Gallinula chloropus sandvicensis)*, Hawaiian coot (ʻalae keʻokeʻo, *Fulica alai),* Hawaiian duck (koloa maoli, *Anas wyvilliana),* and the Hawaiian goose (*Branta sandvicensis*). The project site is located adjacent to Hulēʻia NWR (Map J2 in Section J), whose purpose is to "conserve (A) fish or wildlife which are listed as endangered species or threatened species." 16 U.S.C. § 1534 (Endangered Species Act of 1973). The focus of Refuge management is habitat restoration and creating infrastructure, primarily for water management, to expand wetland functions throughout the Refuge and support conservation and recovery of the listed species that occur there. A key requirement to restore functioning wetlands is to remove the invasive species, such as red mangrove, and replant with native wetland plants that improve water management, provide the wetland foraging and nesting habitat to support the endangered Hawaiian waterbirds. Approximately 30 acres of wetland are currently being managed at Hulēʻia NWR, which comprises 240 total acres of wetland. This project will increase the appropriate wetland habitat by 14.9 acres, and support conservation and recovery of the listed species that are known from this area. As the proposed site abuts Hulēʻia NWR, has no fenced boundaries with the refuge, is part of the same river system, and the endangered waterbirds, bat, and migratory birds are known

to be in the area, we expect the endemic waterbirds, migratory birds, shorebirds, and bat to greatly benefit from habitat expansion.

The 2015 Hawaii State Wildlife Action Plan (SWAP) identifies potential areas for enhanced conservation management. These are areas where additional efforts are needed for the long-term conservation of Kauai's native wildlife. Hulēʻia stream and associated watershed were called out as core or supporting wetlands for Hawaiian duck (koloa maoli, *Anas wyvilliana),* Hawaiian coot (ʻalae keʻokeʻo, *Fulica alai),* Hawaiian morehen (ʻalae ʻula, *Gallinula chloropus sandvicensis)*, and the Hawaiian stilt (aeʻo, *Himantopus mexicanus knudseni)*, the Hawaiian goose (*Branta sandvicensis*), Pacific golden plover (kolea*, Plusvialis fulva)*, ruddy turnstone (ʻakekeke *Arenaria interpres*), sanderling (hunakai *Calidris alba*), freshwater fishes, and freshwater invertebrates. They recognized that the implementation of the Waterbird Recovery Plan with the management of additional wetland habitat through coordination with private or public landowners, removal of invasive plants, and institution of predator control was needed. This project would be working to implement these recommendations. Mālama Hulēʻia will be removing the invasive red mangrove, restoring lost mud flats with native wetland plants, and is working with the private landowner as a long term conservation manager for the project site. Table 4 provides an overview of the endangered species and how the project supports their recovery.

***Table 4 Alekoko Restoration Project T&E Species and Benefits Summary***

| **Threatened and Endangered Species at Alekoko - Benefits Summary** | | | | |
|---|---|---|---|---|
| **Common Name *Scientific Name*** | **Status** | **Mangrove Removal/Wetland Restoration Benefits** | **Does the project support the Recovery Goal*?** | **Specific Recovery Objectives** Implemented** |
| Hawaiian stilt *Himantopus mexicanus knudseni*<br>Hawaiian moorhen *Gallinula chloropus sandvicensis*<br>Hawaiian coot *Fulica alai* | FE<br>SE | This action supports USFWS Waterbird Recovery 1.3.2.2 Control undesirable plant species. Undesirable plants, mainly introduced species such as…*Rhizophora mangle* (red mangrove), make wetlands less useful or unusable for waterbirds (Morin 1996, 1998; Rauzon and Drigot 2002; Chimner et al. 2006) These plants should be eliminated, where feasible, or controlled. Restored habitat will increase numbers by providing additional nesting, foraging and loafing areas and improving nesting success.<br>The Hawaii State Wildlife Action Plan identifies Hulēʻia stream and associated watershed restoration and protection as needed for the long-term conservation of the Hawaiian coot, moorhen, and stilt. | Yes, and supports the Hawaii State Wildlife Action Plan (2015) that specifically calls for the removal of red mangrove within the Hulēʻia river | 2, 3, and 4 |
| Hawaiian duck *Anas wyvilliana* | FE/SE | This action supports Recovery 1.3.2.2 Control undesirable plant species. Undesirable plants, mainly introduced species such as…*Rhizophora mangle* (red mangrove), make wetlands less useful or unusable for waterbirds (Morin 1996, 1998; Rauzon and Drigot 2002; Chimner et al. 2006). Restored habitat will provide food for | Yes | 2, 3, and 4 |

| | | | | |
|---|---|---|---|---|
| | | foraging areas. The Hawaii State Wildlife Action Plan identifies Hulēʻia stream and associated watershed restoration and protection as needed for the long-term conservation of the Hawaiian duck. | | |
| Hawaiian hoary bat *Lasiurus cinereus semotus* | FE<br>SE | Conservation of important lowland coastal habitat for foraging. | Yes | 1998 Recovery Plan for the Hawaiian Hoary bat goal of protecting key foraging areas. |
| Hawaiian goose *Branta sandvicensis* nēnē | FE<br>SE | The Hawaii State Wildlife Action Plan identifies Hulēʻia stream and associated watershed restoration and protection as needed for the long-term conservation of the Hawaiian goose. | | |

**USFWS Recovery Plan for Hawaiian Waterbirds*Recovery Goal**: The ultimate goal of the recovery program for Hawaiian waterbirds is to restore and maintain multiple self-sustaining populations within their respective historical ranges, which will allow them to be reclassified to threatened status (downlisted) and eventually removed from the Federal List of Endangered and Threatened Wildlife and Plants (delisted)

****Recovery Objectives**: Recovery of the four endangered waterbirds focuses on the following objectives:

1. Ensuring that population numbers are large enough to persist into the forseable future in the face of stochastic demographic variability;
2. Establishing multiple, self-sustaining breeding populations broadly distributed throughout each species' historical range to insure against population declines from localized demographic stresses;
3. Establishing and protecting a stable network of both core and supporting wetlands that are managed as habitat suitable for waterbirds, including the maintenance of appropriate hydrological conditions and control of invasive non-native plants;
4. Eliminating or controlling the threats posted by introduced predators, conditions that promote avian diseases, and contaminants to a sufficient degree for populations to be self-sustaining and
5. Specifically for the Hawaiian duck, removing the threat of hybridization with domestic mallards.

**6. Benefits to fish. Will the project provide, restore or enhance important fisheries habitat?**

Coastal wetlands adjacent to stream-mouth estuaries and historic fishponds in Hawaii have been severely degraded in recent decades as a result of encroachment of non-native woody vegetation, particularly red mangrove and hau bush. The prolific growth of these species results in altered hydrology and degraded water quality. In the case of Hulēʻia River/Alekoko Fishpond, waters that were historically open and circulating freely have become occluded by a thick overgrowth of mangrove. These reaches are now completely shaded by a dense canopy cover interspersed with trunks and prop roots. These areas lack water circulation and accumulate enormous amounts of leaf litter which create persistent anoxic conditions in the benthos and adjacent water column. All of these changes severely limit development of diverse and healthy fish and invertebrate communities.

This project will result in restoration and enhancement of estuarine and coastal wetland habitats that historically supported a variety of recreationally, commercially, and culturally important fish and invertebrates. Many of the important euryhaline species that are found in the Hulēʻia River/Alekoko Fishpond are transient and utilize the fishpond and nearby waters as primarily juveniles, these include: papio (blue trevally, white ulua), ʻamaʻama (striped mullet), Marquesan mullet (*Valamugil englei*), awa (milkfish), toau (blacktail snapper), and

others (Tables 6, 7). These species generally avoid waters invaded by mangrove, and restoration of suitable habitat for these species will enhance community productivity within the Hulēʻia River/Alekoko Fishpond project area and, as these transient fish mature, will move on to repopulate nearby open coastal waters and coral reefs. Table 5, below, provides a summary of the fish species likely to occur, and known to occur within the Hulēʻia River and Alekoko fishpond. References include personal communication and observation by aquatic biologists (Don Heacock, State DLNR DAR, and Dr. Carl Berg, consultant), surveys at the Hulēʻia NWR by USFWS staff, and the Atlas of Hawaiian Watersheds.

***Table 5 – Fish and Invertebrates at Hulēʻia NWR and nearby waters***

| Scientific Name | Common Name | Hawaiian Name | Status |
|---|---|---|---|
| **Fish** | | | |
| *Eleotris sandwicensis* | Hawaiian sleeper | O'opu akupa | Endemic |
| *Awaous stamineus* | Stream goby | ʻOʻopu nākea | Endemic |
| *Stenogobius hawaiiensis* | Freshwater goby, naniha goby | O'opu naniha | Endemic |
| *Kuhlia xenura* | Hawaiian flagtail | ʻāholehole | Endemic |
| *Kuhlia sandvicensis* | Reticulated flagtail | ʻāholehole | Endemic |
| *Mugil cephalus* | Flathead mullet | ʻAma'ama | Indigenous |
| *Chanos chanos* | Milkfish | Awa | Indigenous |
| *Sphyraena helleri* | Barracuda | Kawele'a | Indigenous |
| *Elops hawaiensis* | Hawaiian tarpon | | Indigenous |
| *Caranx ignobilis* | White ulua | | Indigenous |
| *Lutjanus fulvus* | Toau (juv) | | Introduced |
| *Gambusia affinis* | Mosquitofish | | Introduced |
| *Poecilia sphenops* | Mexican molly | | Introduced |
| *Clarius fuscus* | Chinese catfish | | Introduced |
| *Neomyxus leuciscus* | Sharp-nosed mullet | | Introduced |
| Oreochromis mossambicus | Mozambique tilapia | | Introduced |
| *Sarotherodon melanotheron* | Black chin tilapia | | Introduced |
| *Tilapia zillii* | Redbelly tilapia | | Introduced |
| **Invertebrates** | | | |
| *Atyoida bisulcata* | Hawaiian prawn | `opae kala`ole | Endemic |
| *Macrobrachium grandimanus* | Hawaiian prawn | `opae `oeha`a | Indigenous |
| *Gonodactylus spp* | Mantis shrimp | Aloalo | Indigenous |
| *Thalamita spp* | | Alei'eke | Indigenous |
| *Charybdis hawaiiensis* | | Kuhonu | Indigenous |
| *Thalamita crenata* | Blue-pincher crab | | Indigenous |
| *Macrobrachium lar* | Tahitian prawn | | Introduced |
| *Procambarus clarkii* | Red swamp crawfish | | Introduced |
| *Metopograpsis thukuhar* | | Alamihi | Introduced |
| *Scylla serrata* | Samoan crab | | Introduced |

All of Hawaii's stream fish and larger invertebrates are diadromous and are dispersed downstream to seawater as larvae and then undertake an upstream migration to suitable river and stream habitat as returning juveniles. Populations of these stream fish and invertebrates are widely recognized as depleted. The restoration of natural flow conditions in the Hulēʻia River portion of the proposed project area will improve both adult resident habitat

and migratory pathways used by native freshwater and estuarine fish known from the Hulēʻia River and its tributaries. These include ʻoʻopu akupa (*Eleotris sandwicensis*) ʻoʻopu naniha (*Stenogobius hawaiiensis*),ʻoʻopu nakea (*Awaous stamineus*), ʻopae oehaa (*Macrobrachium gandimanus*), hapawai (*Neritina vespertina*).
The State of Hawaii Department of Land and Natural Resources (DLNR) Division of Aquatic Resources (DAR) is currently conducting a fisheries study on estuaries throughout the state, including the Puali Stream pilot project area, to determine the impact and benefits of mangrove removal and native habitat restoration for juvenile stages of important fish species. We continue to work closely with the DAR estuary team to utilize their study methodology and data collection at the proposed project site in order to measure the impact and benefits of our restoration efforts to the fishery resources.

***Table 6 Fish Species, Habitat Type and Benefits***

| Fish Species | Habitat Types & Benefits |
|---|---|
| *Mugil cephalus* , *ʻamaʻama*, Striped Mullet | Indigenous herbivorous fish that prefers shallow estuarine habitat as juveniles and also utilizes these areas as adults for shelter and grazing. Open shallow habitat allows more growth of *limu*, or algae, which is a primary food source for this species; prized culturally and as a food fish in Hawaii. |
| *Eleotris sandwicensis – ʻoʻopu akupa*, Sandwich Island Sleeper | Endemic goby that is common throughout shallow open habitat in Hawaiian estuaries and stream mouths throughout Hawaii; targeted as a food fish and as bait |
| *Caranx ignobilis, ulua aukea*, Giant Trevally | Indigenous predatory fish that utilizes protected estuarine habitats primarily as juveniles; feeds on small fishes and crustaceans in these habitats; highly prized as a sport fish and food fish in Hawaii; open habitat in the fish pond would provide more foraging area for this species. |
| *Caranx melamgygus, omilu, Blue Trevally* | Indigenous predatory fish that utilizes protected estuarine habitats primarily as juveniles; feeds on small fishes and crustaceans in these habitats; highly prized as a sport fish and food fish in Hawaii; open habitat in the fish pond would provide more foraging area for this species. |
| *Kuhlia xenura, āholehole*, Hawaiian Flagtail | Endemic fish, common in estuarine habitat as juveniles and adults; highly prized as a food fish; open shallow areas would provide more foraging area and habitat, especially for juveniles. |
| *Chanos chanos, Awa,* Milkfish | Indigenous fish, common in estuarine habitat as juveniles and adults; highly prized as a food fish; open shallow areas would provide more foraging area and habitat, especially for juveniles. |
| *Scylla serrata, Samoan crab,* | Large introduced crab common in estuarine habitat and comprising subsistence and recreational fishery in Hawaii. A top predator and scavenger it moves between estuary and reef flats in its natural habitat. It inhabits both mangrove and open areas in Hulēʻia estuary. |
| *Thalamita crenata,. Blue-pincher crab* | Large indigenous swimming crab common in estuaries. Forms a subsistence and recreational fishery in same areas as Samoan crab. Mangrove removal will increase suitable habitat in submerged wetlands. |

**7. Benefits to coastal-dependent or migratory birds. Will the project provide, restore, or enhance important habitat for coastal-dependent or migratory birds?**

The project will provide benefits to coastal-dependent and migratory birds by restoring habitat and long term habitat protection and predator control. Table 7, below provides a summary of the bird species observed on the Hulēʻia NWR. Table 8 provides a list of bird species observed at Alekoko fishpond through the annual state bird surveys. Waterbirds and migratory shorebirds in Hawaii utilize coastal wetland habitat, with 80 percent of the state's koloa maoli (*Anas wylvilliana* [Hawaiian duck]) population, and 50 percent of the state's nēnē (*Branta sandvicensis* [Hawaiian goose]) population are found on Kauaʻi (SWAP 2015). The 2015 SWAP identifies Hulēʻia stream and associated watershed as core or supporting wetlands for Hawaiian duck (koloa maoli, *Anas wyvilliana),* Hawaiian coot (ʻalae keʻokeʻo, *Fulica alai),* Hawaiian morehen (ʻalae ʻula, *Gallinula chloropus sandvicensis)*, the Hawaiian stilt (aeʻo, *Himantopus mexicanus knudseni)*, the Hawaiian goose (*Branta sandvicensis*), Pacific golden plover (kolea*, Plusvialis fulva)*, ruddy turnstone (ʻakekeke *Arenaria interpres*), and sanderling (hunakai *Calidris alba*). Most of these species have been recorded at the restored Puali stream wetland. The implementation of the Waterbird Recovery Plan recommends the management of additional wetland habitat through coordination with private or public landowners, removal of invasive plants, and institution of predator control. The project will be working to implement these recommendations. We expect to see a similar list of species as Table 7 once the project restores native wetland habitat at Alekoko fishpond.

***Table 7 Observed Birds at Hulēʻia NWR***

| ***Scientific Name*** | ***Common Name*** | ***Hawaiian Name*** | ****Status*** |
|---|---|---|---|
| *Asio flammeus sandwichensis* | *Hawaiian short-eared owl* | *pueo* | End |
| *Branta sandvicensis* | *Hawaiian goose* | *nēnē* | End, E |
| *Anas wyvilliana* | *Hawaiian duck* | *koloa maoli* | End, E |
| *Gallinula chloropus sandvicensis* | *Hawaiian moorhen* | *ʻalae ʻula* | End, E |
| *Fulica alai* | *Hawaiian coot* | *ʻalae keʻokeʻo* | End, E |
| *Himantopus mexicanus knudseni* | *Hawaiian stilt* | *aeʻo* | End, E |
| *Nycticorax nycticorax* | *Black-crowned night-heron* | *ʻaukuʻu* | Ind |
| *Anas platyrhynchos* | *Mallard* | | Mig |
| *Fregata minor* | *Great frigatebird* | *ʻiwa* | Mig |
| *Ardea alba* | *Great egret* | | Mig |
| *Anser albifrons* | *Greater white-fronted goose* | | Mig |
| *Branta bernicla* | *Black brant* | | Mig |
| *Branta hutchinsii* | *Cackling goose* | | Mig |
| *Branta canadensis* | *Canada goose* | | Mig |
| *Anas strepera* | *Gadwall* | | Mig |
| *Anas penelope* | *Eurasian wigeon* | | Mig |
| *Anas americana* | *American wigeon* | | Mig |
| *Anas discors* | *Blue-winged teal* | | Mig |
| *Anas cyanoptera* | *Cinnamon teal* | | Mig |
| *Anas clypeata* | *Northern shoveler* | *koloa mohā* | Mig |
| *Anas acuta* | *Northern pintail* | *koloa māpu* | Mig |
| *Anas carolinensis* | *Green-winged teal* | | Mig |
| *Aythya valisineria* | *Canvasback* | | Mig |
| *Aythya americana* | *Redhead* | | Mig |
| *Aythya collaris* | *Ring-necked duck* | | Mig |
| *Aythya marila* | *Greater scaup* | | Mig |

| | | | |
|---|---|---|---|
| *Aythya affinis* | *Lesser scaup* | | Mig |
| *Bucephala albeola* | *Bufflehead* | | Mig |
| *Pluvialis squatarola* | *Black-bellied plover* | | Mig |
| *Pluvialis fulva* | *Pacific golden-plover* | *kōlea* | Mig |
| *Tringa incana* | *Wandering tattler* | *ʻūlilī* | Mig |
| *Tringa flavipes* | *Lesser yellowlegs* | | Mig |
| *Arenaria interpres* | *Ruddy turnstone* | *ʻakekeke* | Mig |
| *Calidris alba* | *Sanderling* | *hunakai* | Mig |
| *Calidris melanotos* | *Pectoral sandpiper* | *upupā* | Mig |
| *Calidris acuminata* | *Sharp-tailed sandpiper* | *upupā* | Mig |
| *Limnodromus scolopaceus* | *Long-billed dowitcher* | | Mig |

* Status Definitions (from *Hulēʻia NWR)* End=endemic, E=endangered, Ind=indigenous Mig=Migratory

Table 8, below, provides a summary of the birds observed within Alekoko Fishpond from the State DLNR DOFAW's annual bird counts. These birds have been observed on the project site. It is anticipated that a restored, native ecosystem will support the species that are found adjacent, and are known in the area.

***Table 8 – Species Observed During Hawaii DLNR Annual Bird Surveys***

| Taxon Name | Common Name |
|---|---|
| *Bubulcus ibis* | Cattle Egret |
| *Gallinula galeata sandvicensis* | *ʻAlae ʻula,* moorehen |
| *Anas wyvilliana* koloa | *Koloa,* (Hawaiian duck) |
| *Nycticorax nycticorax,* | *aukuʻu (*night heron) |
| *Himantopus mexicanus knudseni* | *Aeʻo,* Hawaiian stilt |
| *Fulica alai* | *ʻAlae ke ʻokeʻo,* Hawaiian coot |

Mālama Hulēʻia will be removing the invasive red mangrove, restoring lost mud flats and native wetland plants, and is working with the private landowner on long term management. This will lead to habitat for various life stages and needs of migrant, migratory, and coastal dependent birds. Table 9, below, provides a summary of the benefits to each specific migratory bird. We anticipate that the restoration of native habitat will benefit the life cycles and recovery.

***Table 9 Migratory Birds - species of greatest conservation need, Hawaii State Wildlife Action Plan***

| Migratory Birds | Species Status | Habitat/Life cycle benefit | |
|---|---|---|---|
| Kolea (Pacific golden plover)<br>*Pluvialis fulva* | State recognized as Indigenous U.S. Shorebird Conservation Plan - High concern | Protect (or expand) habitat for wintering in Hawaii. Restored habitat will increase numbers by providing additional foraging and loafing areas. | M<br>N<br>U |
| ʻAkekeke (Ruddy turnstone)<br>*Arenaria interpres* | State recognized as Indigenous U.S. Shorebird Conservation Plan—High Concern | Protection of coastal habitat. Restoration of additional coastal habitat, continued protection and management of wildlife refuges. | M<br>N<br>U |
| Koloa mapu (Northern pintail)<br>*Anas acuta* | State recognized as Indigenous | Protection of current habitat. Restoration of additional wetland habitat, especially where it can be reclaimed from abandoned agricultural uses. | M<br>N |

| | | | |
|---|---|---|---|
| Koloa moha (Northern shoveler) *Anas clypeata* | State recognized as Indigenous | Protect and restore habitat to include a preferred food availability koloa mōhā are adapted to a diet primarily of aquatic invertebrates such as water fleas (Daphnia spp.) and crustaceans (copepods and ostracods) | M<br>N |
| Lesser scaup<br>*Aythya affinis* | State recognized as Indigenous | Protection of current habitat. Restoration of additional wetland habitat, especially where it can be reclaimed from abandoned agricultural uses. Restored habitat will increase numbers by providing additional foraging and loafing areas. | M<br>N |
| Huna kai (Sanderling)<br>*Calidris alba* | State recognized as Indigenous | Protection of habitat. Huna kai will benefit from an increase in mudflats and river banks. | M<br>N<br>U |
| ʻUlili (Wandering tattler)<br>*Heteroscelus incanus* | State recognized as Indigenous U.S. Shorebird Conservation Plan—Moderate concern | Protection of current habitat. Protection and restoration of additional wetland habitat. ʻUlili will benefit from an increase in mudflats and river banks. | M<br>N<br>U |
| American wigeon<br>*Anas americana* | State recognized as Indigenous | Degradation of habitat due to pollution, hydrology alteration, or invasions by alien species is a major threat. Restoring wetlands and protecting habitat. | M<br>N |

Recovery Plan Key:

M: Migratory Bird Program Strategic Plan seeks to protect, restore and manage migratory bird habitats.

N: 2002 North American Water Bird Conservation Plan – Calls for restoration and protection of habitats that support the lifecycle needs of water birds, including endangered waterbirds.

U: U.S. Pacific Islands Regional Shorebird Conservation Plan (2004) – Calls for high quality habitat to ensure that shorebirds in the region are not unduly limited by habitat availability.

**8. Prevent or reduce contamination. Will the project prevent or reduce input of contaminants to the coastal wetlands and associated coastal waters that are already contaminated?**

The primary goal of the proposed project is the removal of highly invasive mangrove and rebuilding of a biologically diverse Hawaiian intertidal estuarine wetland ecosystem, with all of its ecological services and functions; but a valuable ancillary effect will be improving water quality and water flow in Alekoko fishpond and its waters discharging in to the Hulēʻia estuary.

Alekoko fishpond is in the lower reaches of the Hulēʻia River and is set off from the river itself by an ancient Hawaiian rock wall. There are no known outside sources of contaminants from the land surrounding the fishpond. Sugar agriculture, the only industry of note in the upper reaches of the watershed, stopped in 2000. The land abutting Alekoko fishpond upstream and inland from the river is the Hulēʻia NWR (Map 2). Land inland from the fishpond is steep fallow former sugar land. Land immediately downstream is light urban. The has been no wetland fill by major debris, only minor urban garbage (bottles and cans) that will be removed along with mangrove propagules, wood, and weeds after cutting of the mangrove. No agriculture or livestock will occur on property surrounding the fishpond, in Hulēʻia NWR, or the steep slopes going inland from the fishpond.

Hulēʻia River is a EPA 303(d) listed watershed within the 2016 State of Hawaii Water Quality Monitoring and Assessment Report. Hulēʻia river is listed for exceeding: NO3+NO2, TN, turbidity and enterococcus bacteria. A Total Maximum Daily Load (TMDL) report comprises Hulēʻia River and the other streams (2008). Although

polluted by state standards, the lower reach of the river and fishpond provide an important estuarine environment and nursery ground for many fish and crustacean species, and are crucial as waterbird habitat.

Demopoulos (2004) found that invasive mangrove in Hawaii export more organic matter (leaf, wood, flowers, propagules) than in their native habitats (Puerto Rico), with very little particulate organic carbon retained in the soil. With low flushing rates in the fishpond, mangroves contribute a significant amount of organic matter in to the water column, thereby increasing turbidity and nutrient concentrations and decreasing oxygen levels. Extensive root systems extending from these plants into the stream slows water flow and traps leaf litter and sediment. An anoxic environment, unsuitable for Hawaiian species, forms a degraded ecosystem among the roots (Demopoulos, 2004). This leads to the filling in of the river and fishpond with litter and sediment and its transformation from a tidal wetland to a supra-tidal mangrove forest ecosystem, which eliminates critical habitat used by native waterbirds and migratory shorebirds. Culturally important rock walls of the fishpond are being torn apart by mangrove roots, and the estuary itself seems to be shrinking in size as the mangrove continues to spread into the fishpond open waters.

Mangrove (26 acres) will be removed by cutting the roots below the mean high tide level, thus causing the roots to rot away without regeneration. Recruitment of new seedlings into the fishpond from upstream will be controlled by a floating boon and suspended mesh in the wall gate opening. Periodic (bi-monthly) manual picking of newly set seedlings will also keep mangrove from re-establishing. School groups have been shown to be especially effective at mangrove "weeding".

A three-phase study was completed to assess the status of the Nawiliwili Watershed on Kauai and develop recommendations for restoration and protection (State Hawaii Department of Health, 2004). The study addressed the recommended steps needed to improve the water quality to de-list and meet TMDL standards. Restoration of the wetland is one of the key steps in this process. Strategy 5 within the Nawiliwili Watershed plan is to control invasive and non-native species. The study noted that red mangrove is an invasive species targeted for removal.

While removal of mangrove from the rock wall may have little impact on the entire Hulēʻia River water quality, mangrove removal and wetland restoration within the fishpond should have a demonstrable effect on water oxygen levels, turbidity and nutrients in the fishpond. Water enters the fishpond through the permeable rock wall and through an opening approximately mid-way along the length of the wall. Water exits through the wall, over a low portion of the downstream wall and through a channel at the most downstream portion of the fishpond. No hydrographic studies have yet been done to quantify flow and flushing rates of the fishpond. Measurements will be done throughout the project to quantify the effects of mangrove removal and wetland restoration on key water quality parameters.

Invasive animal species (e.g. feral pigs, dogs, cats, rats) are contaminants that could have a major impact on the wetland ecosystem and particularly target the waterbirds. In addition to being predators *per se*, such animal species carry parasitic diseases e.g. toxoplasmosis that is known to affect Hawaiian geese, ducks and coots. There are active predator control programs on Kauai by the State Department of Land and Natural Resources (DLNR)-Kauai Invasive Species Committee, DLNR-Division of Forestry and Wildlife, and by USFWS at the abutting Hulēʻia NWR. While the members of those groups will provide local specific expertise, we are asking them to include our project area in their ongoing predator control efforts. We are committed to long-term invasive species and predator control as an important aspect of project management and maintenance. Mālama Hulēʻia will develop the monitoring and predator control program with the members of the Technical Advisory Committee, made up of local State and Federal subject matter experts. Consultation with the agencies will also be done to ensure success.

Removal of the mangrove trees increases sunlight to water, water flow and oxygenation, and thus helps control invasive mosquito populations and the diseases they carry that are known to affect birds on Kauai e.g. avian malaria (Plasmodium relictum), and avian pox (avipoxvirus) but that rarely affect waterbirds. The prevalence of

avian botulism (Clostridium botulinum) which is devastating to Hawaiian ducks, coots and moorhens on Kauai, will also be reduced by better water flow.

While there are numerous invasive plant species on the dryland edges of the fishpond, it is the red mangrove that dominates the intertidal wetlands, with little else growing there. Sea hibiscus (Hibiscus tiliaceus, known as Hau in Hawaii) is an invasive Polynesian introduction that forms dense thickets on dry land adjacent to the mangrove. While it extends branches in to the water, it does not root in intertidal areas. While we may trim Hau as it occurs intertwined with mangrove, we will not be clearing the dryland areas. Invasive grasses and other weeds will be pulled up from the newly exposed mudflats.

**9. Catalyst for future conservation. Will the project leverage other ongoing coastal wetlands conservation efforts in an area or provide additional impetus for conservation?**

This project proposal is designed to leverage and expand upon ongoing coastal wetlands protection and management in the area including the efforts to conserve threatened flora and fauna at the Hulēʻia NWR. The proposed project will catalyze Mālama Hulēʻia's efforts of eradicating invasive mangrove along the Hulēʻia river by removing approximately 38% of the total watershed mangrove acres and continuing to expand and develop community conservation involvement in a place that is historically and culturally significant. Note: This project represents the first phase of a two or three phase effort for complete eradication of red mangrove in the remaining portions of the river corridor.

This project will contribute to efforts of improving water quality by the State Department Health under the TMDL action plan and will stimulate other groups such as the Nawiliwili Bay Watershed Council to initiate other watershed projects leveraging off of the work we do to improve ecosystem function with this grant. For example with this project there will be more of an impetus for the Hulēʻia NWR to expand their management units, enhance the wetland corridor connecting to Alekoko restoration site, resulting in a 2 mile contiguous wetland complex along the river.

**Criterion 10: Partners in Conservation. Will the proposal receive financial support including in-kind match, from private, local, or other Federal interests?**

Below is a table of partners in conservation who have made a financial commitment to the proposed project. Letters of support and commitment are included as Section K.

***Table 10 Financial Partners in Conservation***

| Entity | Funding Amount | Commitment |
|---|---|---|
| Green Energy Team | $59,182 | Hauling mangrove biomass |
| County of Kauai | $18,881 | The County is very supportive of the project. Past support (not included as match) is $29,059 for planning and permitting support and $18,881 for archaeological study (included as match). |
| Kauai Invasive Species Council | $9,186 | Predator control traps ($500), Drone surveys ($2000/yr * 2 years), KISC Crew labor (1-day $2343/yr * 2 years= $4,686) |
| Private Donor | $50,000 - $100,000 | Unrestricted annual donation to support the MH mission of mangrove removal and watershed restoration |
| Carl J. Berg, Jr, Ph.D. | $12,000 | Nursery manager (10 hrs/month @ $50/hr ) = $12,000 |
| Surfrider Foundation, Kauai Chapter | $24,000 | Water Quality Monitoring: professional in-kind contribution of time and equipment will be: |

| | | |
|---|---|---|
| | | 10 hrs/month @ $100/hr = $24,000 |
| Malama Hule`ia | $270,701 | Detailed in Budget (Section B, 8) |

Partner involvement that is not directly connected to financial contributions comes from the Technical Advisory Committee as described in Criterion 3 and Table 2.The project does include State technical support from DLNR – DAR, DOFAW and DOBOR. Federal contributions include project and technical support from USFWS, Hulēʻia NWR and a technical assistance grant from National Park Service Rivers, Trails and Conservation Assistance Program (approximately $88,000).

**11. Federal Share Reduced**

Yes, Mālama Hulēʻia will contribute $270,701 non-federal cash match above the required base match. State Trust Fund – Hawaii State qualifies for the 25% non-federal match as it has recurring funds for habitat conservation purposes. These funds are provided through the State's Legacy Lands Program. The Legacy Land Conservation Program is authorized under Chapter 173A, Hawaii Revised Statues. This program provides funding from the Land Conservation Fund for the acquisition of lands, including easements, for watershed protection; parks; coastal areas; beaches; and ocean access; natural areas; habitat protection; agricultural production; cultural and historical sites; and open spaces and scenic resources. Eligibility has been previously approved and no change has occurred in the funds.

| **Total Project Cost** | **$1,794,089** |
|---|---|
| Federal Share Requested | $999,731 |
| Base Match (25%) | $333,244 ($523,657 budgeted) |
| Non-federal Cash Match | $270,701 |

**12. Education/outreach program or wildlife-oriented recreation. Is the project designed to increase environmental awareness and develop support for coastal wetlands conservation? Does it provide recreational opportunities that are consistent with the conservation goals of the site?**

Hulēʻia River is a popular place for Hawaiian outrigger paddlers and for kayak tours for visitors to the island. Alekoko fishpond is a national and state historic property and thus has great significance for Hawaiian culture and for people to learn about Hawaiian fishponds. County of Kauai has made a scenic lookout on the road above the pond and has interpretive signage depicting the fishpond wall and cultural fishing practices of the fishpond. With collaboration of Hulēʻia NWR and the County, we will install interpretive signs depicting the endangered species of waterbirds present in, and the ecological functions of, the restored wetland. Mālama Hulēʻia's restoration efforts will be shared with recreational and educational groups with outreach materials about ecological functions and endangered species protection, that will enhance the experience for wildlife and culturally oriented recreation already taking place on the river.

Access to the coastal wetland restoration site will be limited to educational activities including traditional Hawaiian cultural activities and escorted volunteer and community groups who are providing service to the land. Primary focus for the first two years will be invasive species removal and planting of native plants. Our volunteer coordinator will continue existing programs with nearby primary and secondary schools, Kauai Community College, Rotary Clubs, and local businesses and restaurants looking for outdoor teambuilding experiences, as well as state vocational programs and landscape industry looking for training opportunities. Each group that volunteers with us will learn about the ecological importance of this coastal estuarine wetland and the wildlife that depend on it.

A gathering area will be set-up outside of the wetland restoration area, with guided access to the wetland for specific monitoring, maintenance and educational activities. Very limited fishing may be allowed in the future, based on fishery resource management and limited bird disturbance. With consultation from the agencies on

impacts to endangered species, we will review other fishpond restoration programs which offer a family fishing day each month with limited access by registration.

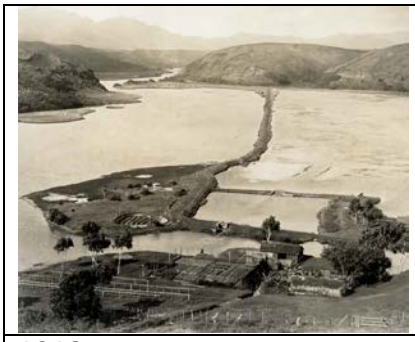
Mālama Hulēʻia staff will oversee volunteer and educational activities to allow the volunteer, educational, and recreational opportunities to be done in a managed way to ensure that the site is not loved to death. The goal of the education and outreach program is to protect natural and cultural heritage, and develop appreciation, understanding and *kuleana* (Hawaiian for responsibility) for the Alekoko fish pond and the entire watershed through education and interpretation. In addition, this program increases management capacity through volunteer programs and implements targeted educational and outreach efforts for the community, both residents and visitors.

**13. Other factors. Do any other factors, not covered in the previous criteria, make this project or site particularly unique and valuable?**

Other factors for consideration include the Hawaiian cultural benefits and sea level rise/climate change resiliency.

**Hawaiian Cultural Benefits**

Alekoko Fishpond, over the last 100-years

| | | |
|---|---|---|
|  |   |  |
| 1912 | 197? | 2017 |

Fishponds are considered valuable cultural and ecological resources that can positively impact coastal ecosystems and their adjacent communities. Hawaiian fishpond systems, loko iʻa, are some of Hawaii's most significant traditional cultural resources. They are biocultural articulations of Hawaiian innovation in the areas of engineering, education, hydrology, aquaculture and biology. Further, they demonstrate traditional Hawaii's excellence in sustainability, food sovereignty and natural resource management. Research shows that approximately 400 fishponds once functioned across the main Hawaiian Islands and provided a significant and sustainable food source to the Islands' population, estimated at 1,000,000 people. Many of those that remain are in disrepair. Many have been completely destroyed (DLNR 2013).

Alekoko (Menehune) fishpond, lies at a large bend in the Huleʻia River, from which it is separated by a wall 900 yards long. It is the best example of a loko ʻwai (inland fresh water fishpond) in the entire state, and is said to have been built by Menehune, suggesting that it was built during the earliest period of Hawaiian settlement. Alekoko Fishpond was listed on the National Register of Historic Places, authorized under the United States Department of the Interior, National Park Service (DOI, NPS) in 1972, as well as on the Hawaii Register of Historic Places under the State of Hawaii Department of Land and Natural Resources.

At the time of the national listing in 1972, the fishpond (as found in the official National register from 1972) was described as:

> Located near the mouth of the Hulēʻia River on the southeast coast of the "garden isle" of Kauai. This ancient fishpond, also known as Alekoko Pond, consists primarily of a stone faced dirt wall that runs for over 900 yards and cuts off a large bend in the river for use as a fishpond. There is 50 yards of shallow

> swamp land between the west end of the wall and the shore. A dirt wall runs for 145 yards whereupon the stone facing starts on the river side of the wall. The dirt wall is 5 feet above the water level, 4 feet wide on top and the dirt slants up on both sides. The facing wall begins with a single row of stones and then becomes of double thickness as it gets further out into the river and the current starts to become effective. The stones also become larger until the double layer is 2 feet thick. The stone facing on the outside is five feet high in most places and is quite perpendicular. The stones are very carefully fitted together; the stone facing runs for about two-thirds of the total length of the wall.

The 50 yards of "shallow swamp land" (wetland) have become thick stands of invasive mangrove, and the rock wall contains mangrove on either side, filling in both the Hulēʻia river and the inside of the fishpond itself. The statement of significance from the National Historic registry is as follows:

> Menehune Fishpond is the most significant fishpond on Kauai, both in Hawaiian legends and folklore and in the eyes of Kauai's people today. It is so old that its construction is attributed to the Menehunes, a mythical people inhabiting Hawaii before the Hawaiians arrived. Its antiquity makes it undoubtedly the oldest fishpond on Kauai and therefore it has an extremely high research potential. Additionally, it is the best example of an inland fishpond in the entire state. Close to the major urban center on Kauai, the pond has high public visibility because of a road that runs along the slopes of the hill behind the fishpond.

While the fishpond has a great viewing platform from above that is frequented by thousands of island visitors, the fishpond and the refuge from the road, the area is not open to the public. Access to the fishpond and coastal wetland restoration site will be limited to escorted volunteer and educational groups as described in detail for Criteria 12.

**Sea Level Rise / Climate Change Resiliency**

This project will result in a healthy native ecosystem that will be more resilient in the case of sea level rise and climate change. Under currently predicted future climate scenarios, the spread of invasive species will likely be increased, which will mimic the current situation that Hulēʻia watershed is experiencing (Root et al. 2003). With rising sea levels, it is expected that the invasive mangrove in the Hulēʻia River will further spread into existing functioning wetland habitats (at Hulēʻia NWR for example) and would be detrimental if not removed. The Hulēʻia NWR is currently one of the highest functioning habitat areas on Kauai and in the Hawaiian Islands, supporting listed, endemic and migratory waterbirds. Wetland systems are vulnerable and susceptible to changes. Some of the most pronounced effects on wetlands are seen through alterations in hydrological function; specifically, the nature and variability of the hydro-period and the number and severity of extreme events. Climate change will affect the hydrology of individual wetland ecosystems mostly through changes in precipitation and temperature regimes. In the Hulēʻia River, altered hydrologic function by invasive mangrove is changing the flow and quality of water through the watershed. With increased storm events and increased intensity of storms, a river system that is choked out by mangrove will not allow for the river to flow at the rate to sustain increased rain and storm events. However, a restored, native wetland ecosystem can better accommodate high flow and storm events. Maintaining hydrology, reducing pollution, controlling exotic vegetation, and protecting wetland biological diversity and integrity are important activities to maintain and improve the resiliency of wetland ecosystems so that they continue to provide important services under changed climatic conditions (Kusler et al. 1999; Ferrati et al. 2005)

**b) Additional Considerations/Tie-breakers:**

**1) Is the habitat imminently threatened from pending sale?**

No, the habitat associated with this project is not threatened from pending sale. However, Alekoko fishpond is imminently threatened by the invasive red mangrove. If not removed, it will continue to fill in the fish pond and

destroy its function. It will choke out native wetland species and not expand habitat needed to recover the endangered Hawaiian waterbirds.

**2) Does the site have unique and significant biological diversity?**

Yes the site, once this proposed project is implemented, will have unique and significant biological diversity, as the case was made in the earlier responses showing diverse species use in the area. Currently there are extreme limits to the biological diversity due to the monotypic mangrove.

**3) What are the costs per acre?**

Total project Cost of $1,794,089 over the total project area of 28-acres results in a cost of $64,075 per acre. This cost falls on the lower end of the range identified in our Invasive Species Action Plan prepared by UH SeaGrant in 2015. We expect other phases of the mangrove eradication project to have a higher per acre cost due to access, use of barge system and more extensive permitting.

**4a) Are there new sources of funds, lands, or services being applied to this project? (As opposed to lands already owned by the state or third party that are being offered as match.)**

Access to the proposed coastal restoration project site is a new service to this project. The access is occurring by means of a newly donated long term license agreement by the landowner.

**4b) What percentage of the funds, lands, or services is new?**

100%. Mālama Hulēʻia has been reserving unrestricted funds to leverage grant match funds since 2015 and has been planning for this project during that time. However, this proposed project is new and no funds have been expended.

## Section J – Maps and Images

J-1 – Location Map

J-2 – Proximity to Wildlife Refuge and Previous Restoration Projects

J-3 - Project Area & Landowner Map

J-4 – Project Detail Map - Alekoko Coastal Wetland Restoration

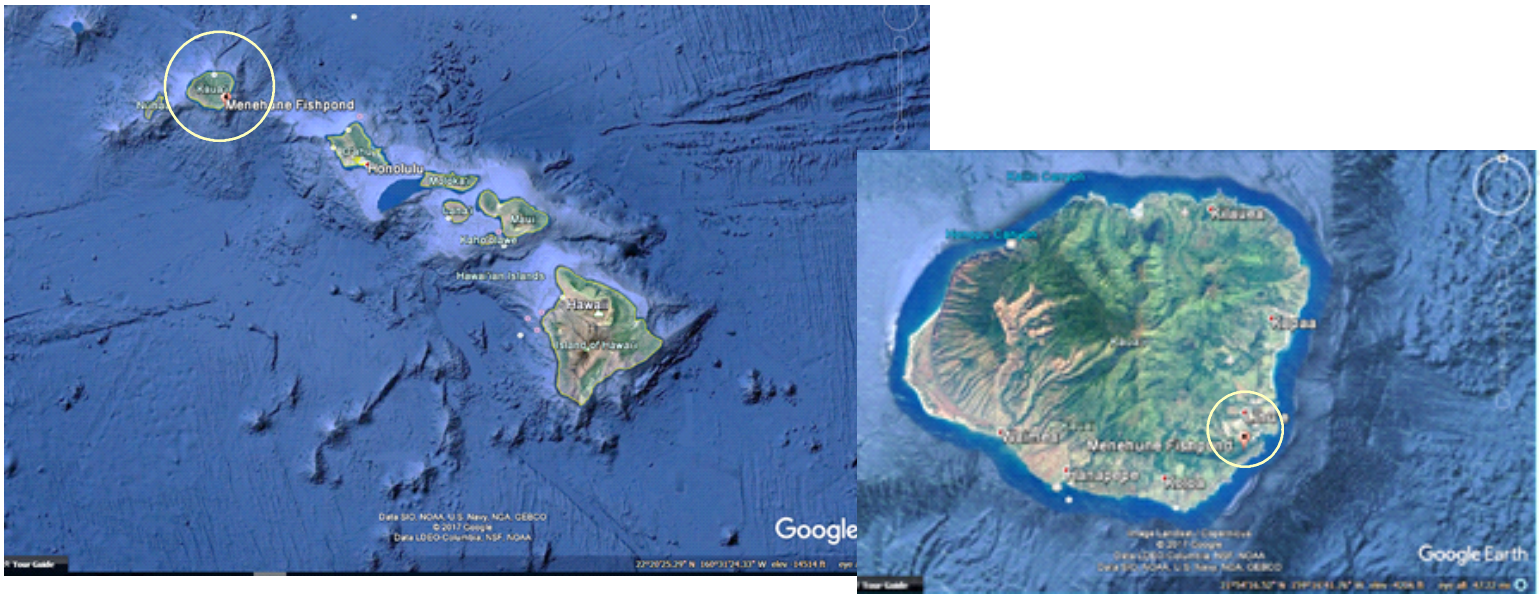
J-5 – Project Area & NWI Map (Criteria 1)

J-6 – Before & After Photos at Previous Restoration Sites

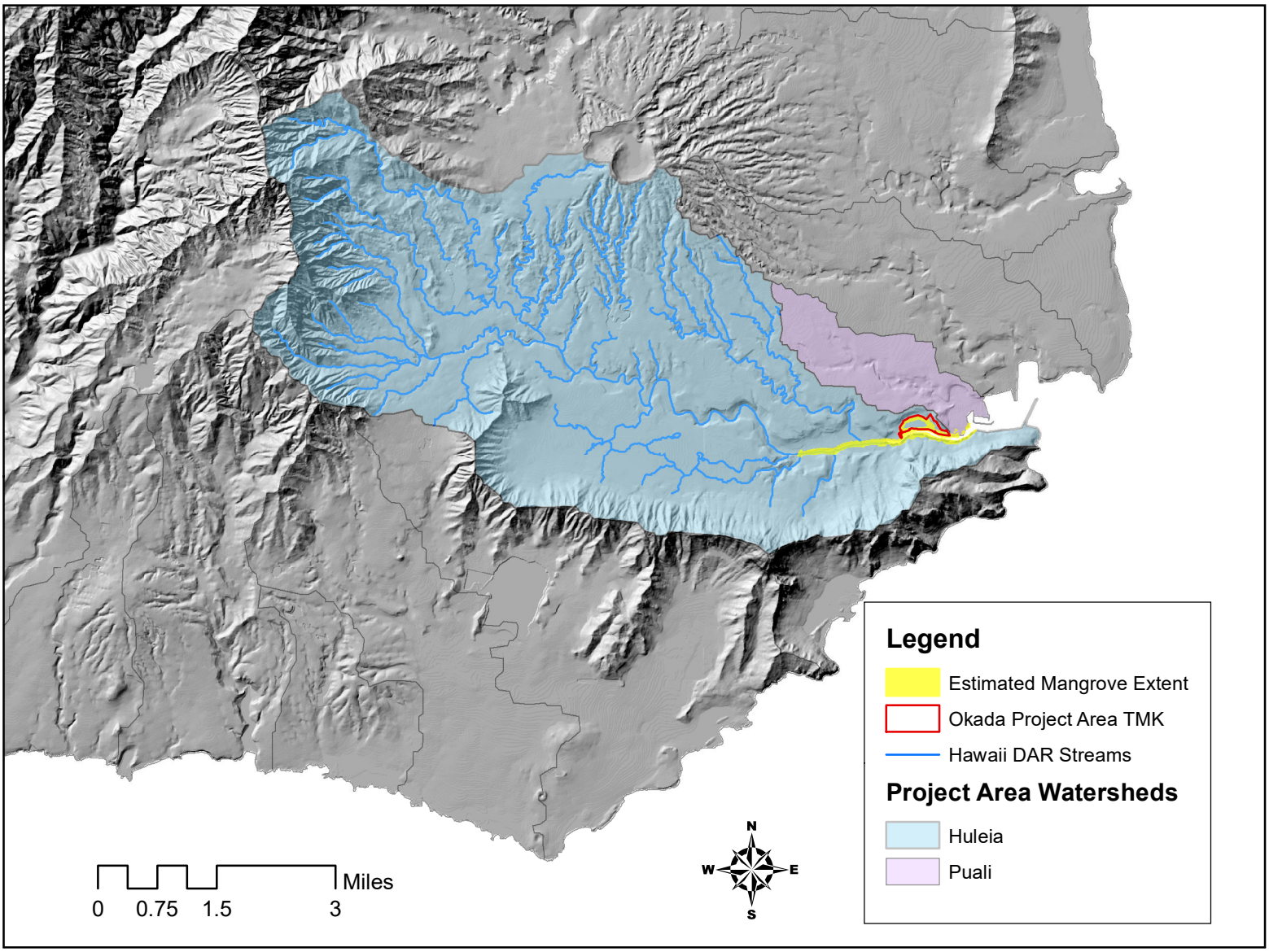
J-7 – Proposed Project Site Current Conditions

# Location Map

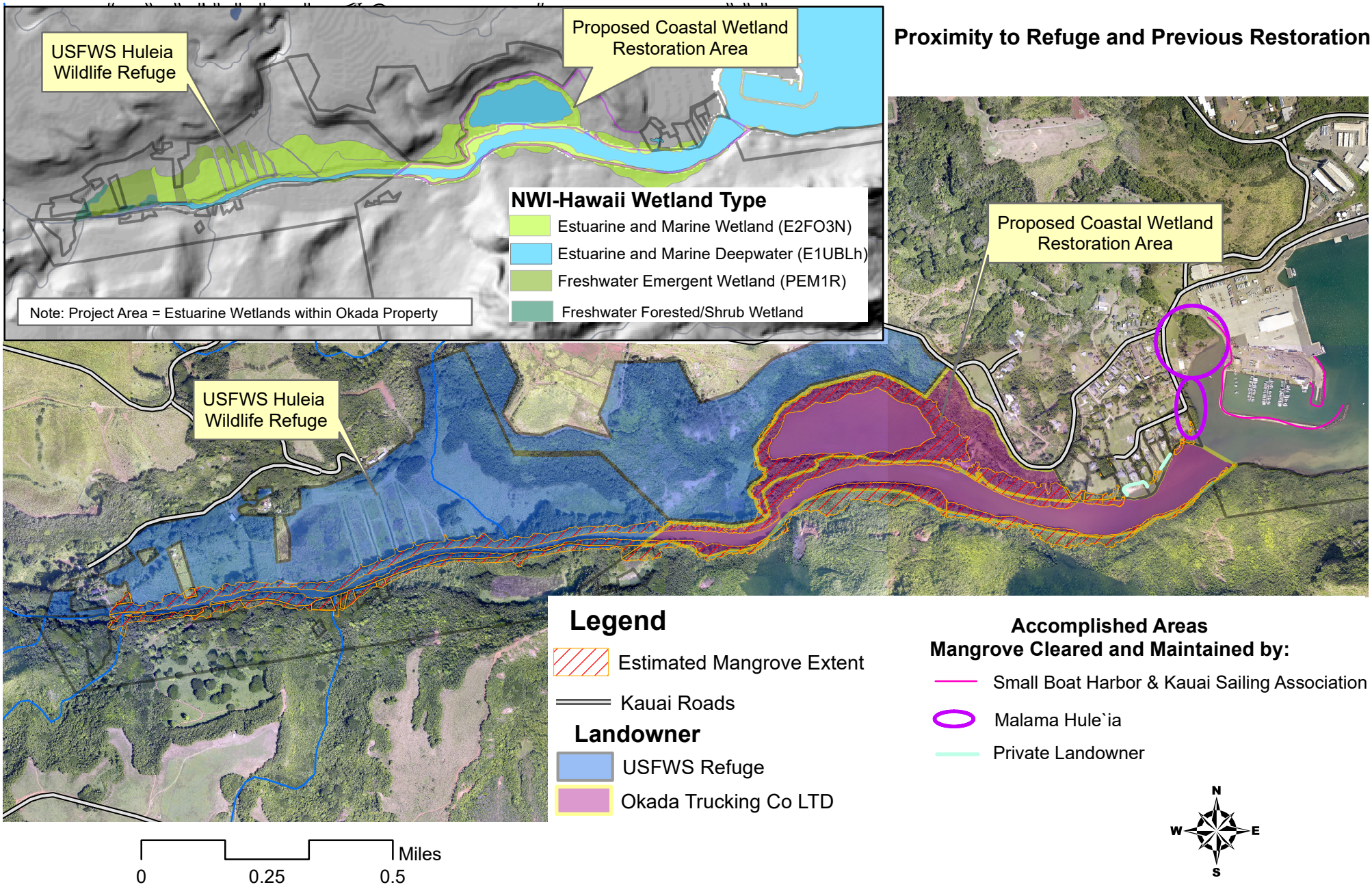
Hawaii State and Island of Kauai Google Maps Showing Project Area (known as Menehune Fishpond)



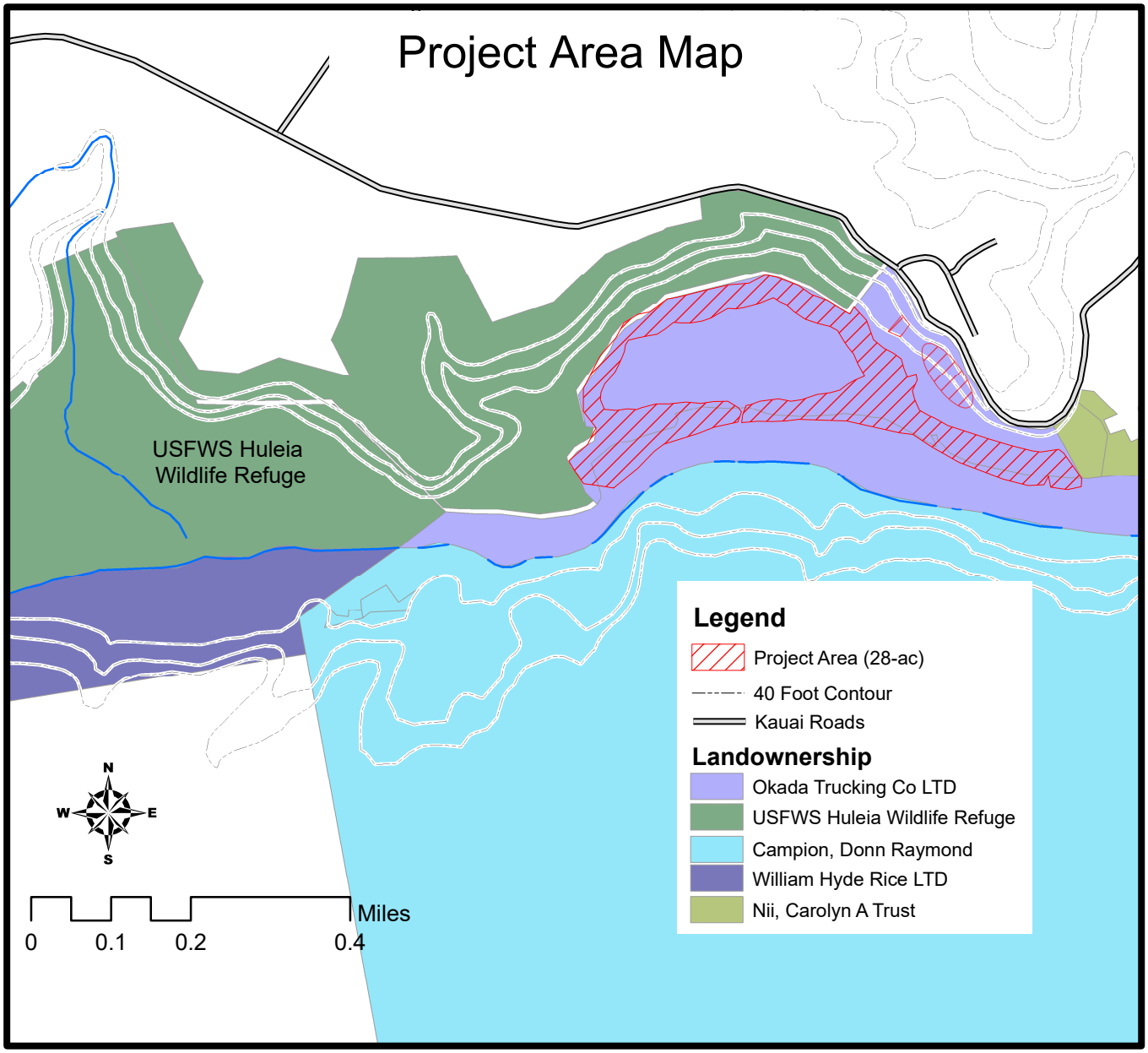

Hule`ia/Pu`ali Watershed Map
Showing Mangrove Extent and Project Area



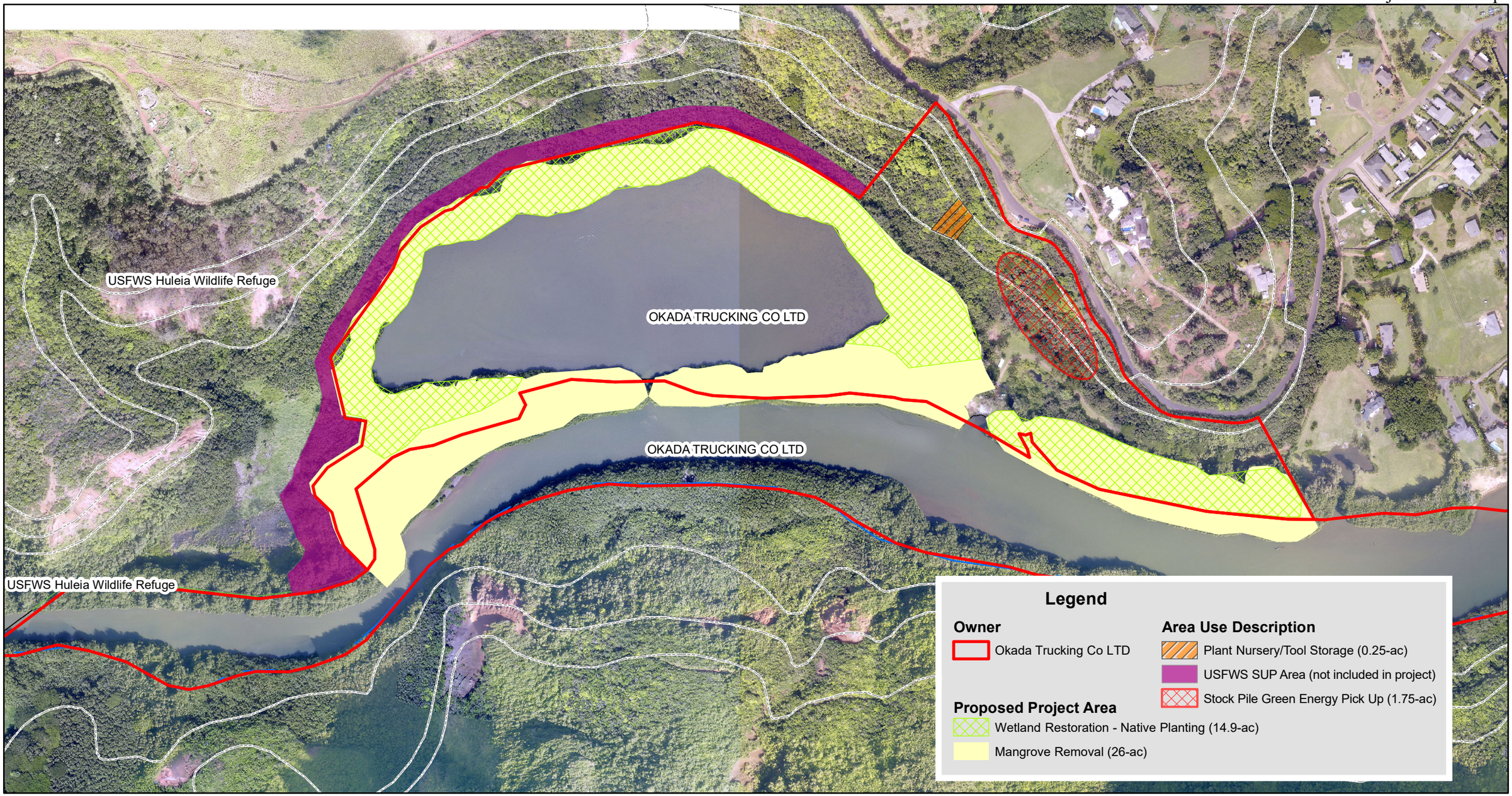
## Proximity to Refuge and Previous Restoration




This map is intended to show the proposed project in relation to the Hule`ia Wildlife Refuge (shown in blue), the approximate extent of mangrove along the river (red hatching) and other restoration areas where mangrove has been removed and maintenance is occurring (by landowner, small boat harbor/sailing association, and Malama Hule`ia). The inset map is for easy reference to the National Wetland Inventory wetlands in the area. Further project details are shown on Map J-3.


Project Area Map
USFWS Huleia
Wildlife Refuge
Legend
Project Area (28-ac)
40 Foot Contour
Kauai Roads
Landownership
Okada Trucking Co LTD
USFWS Huleia Wildlife Refuge
Campion, Donn Raymond
William Hyde Rice LTD
Nii, Carolyn A Trust
N
W
E
S
Miles
0
0.1
0.2
0.4

# Alekoko Wetland Restoration Mangrove Removal & Planting Area



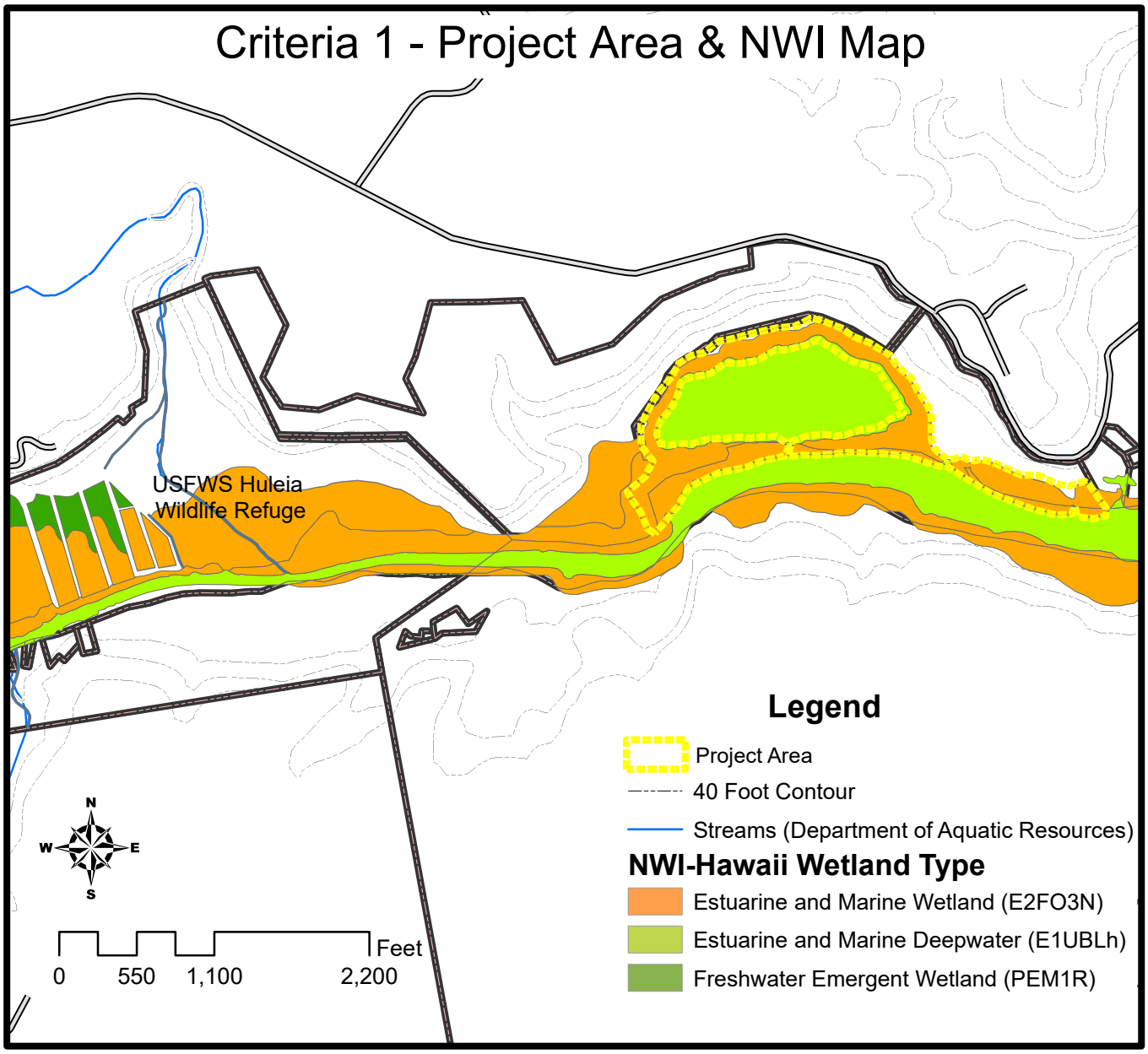

N

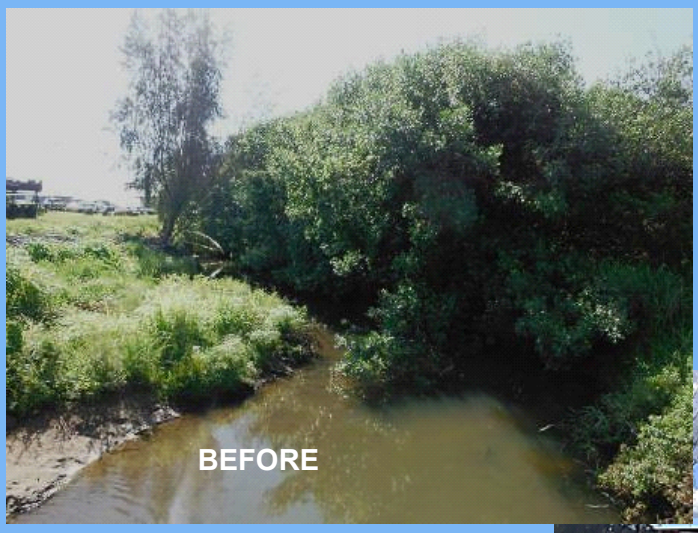
0 500 1,000 2,000 Feet

Imagery: © 2013-2016 Pictometry Inc

Scale = 1:4,500

Note: Long-term monitoring and maintenance will take place in entire proposed project area and watershed to make sure mangrove are not able to re-establish.


Criteria 1 - Project Area & NWI Map
USFWS Huleia
Wildlife Refuge
N
W
E
S
0
550
1,100
2,200
Feet
Legend
Project Area
40 Foot Contour
Streams (Department of Aquatic Resources)
NWI-Hawaii Wetland Type
Estuarine and Marine Wetland (E2FO3N)
Estuarine and Marine Deepwater (E1UBLh)
Freshwater Emergent Wetland (PEM1R)

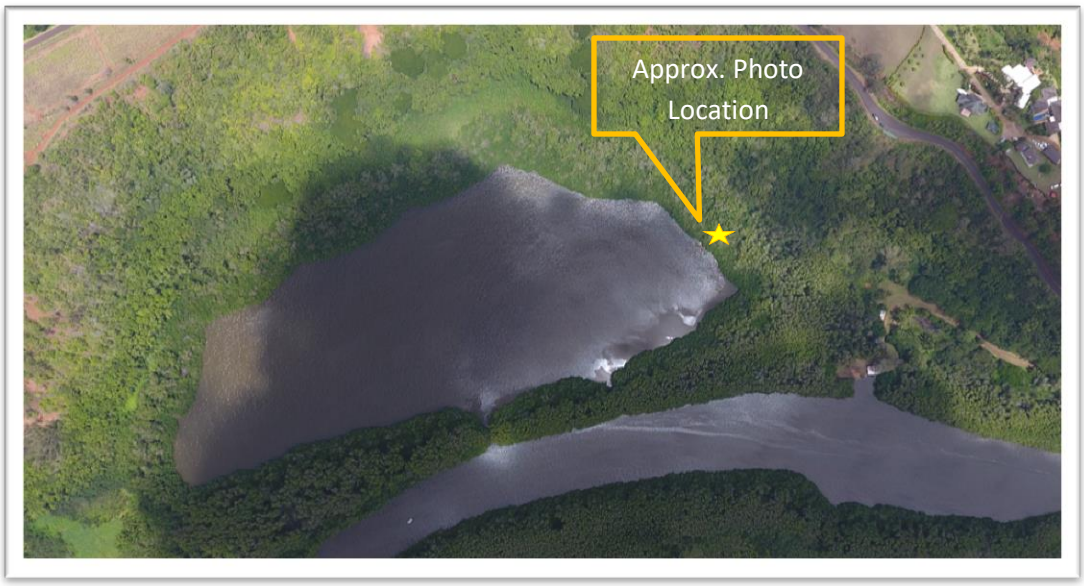



**Looking at Pu`ali Wetland Demonstration Site from Bridge**

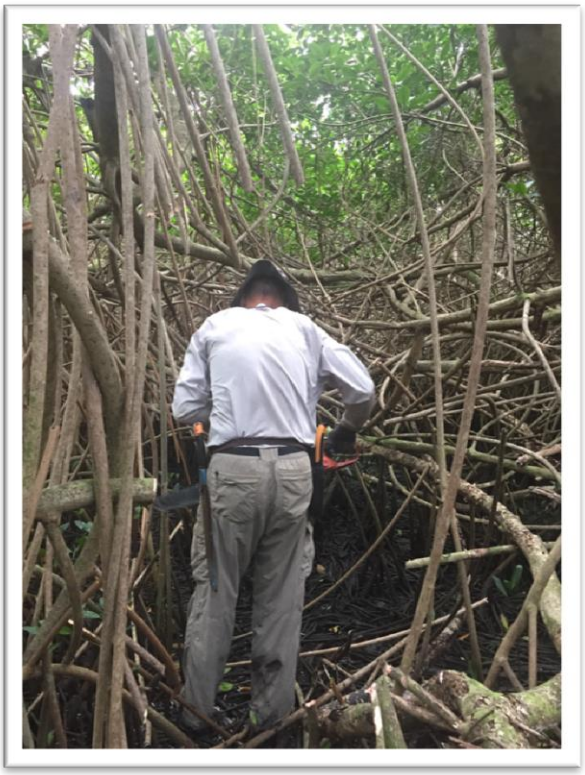



**Looking Toward End of Niumalu Road**

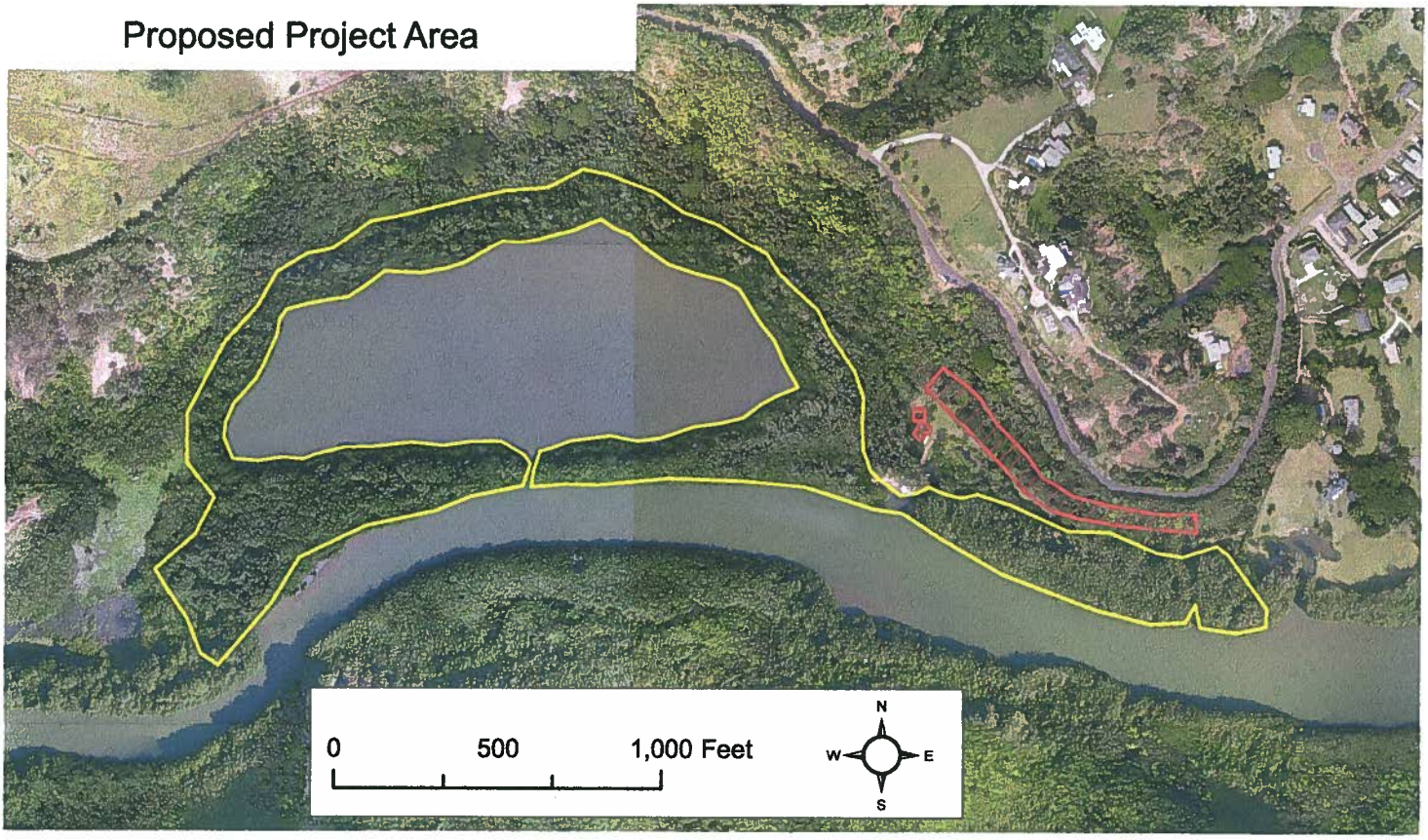
Aerial Image of Fishpond/Project Area, September 2016




Images of Mangrove - Field Assessment, March 2017



Proposed Project Area

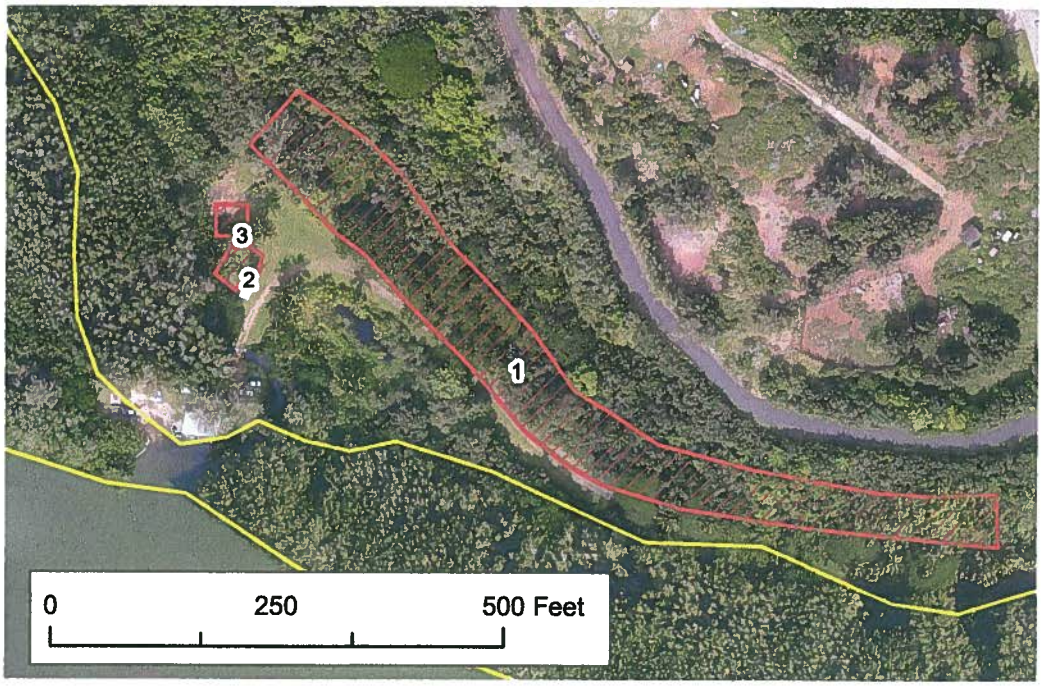



## Proposed Project Areas

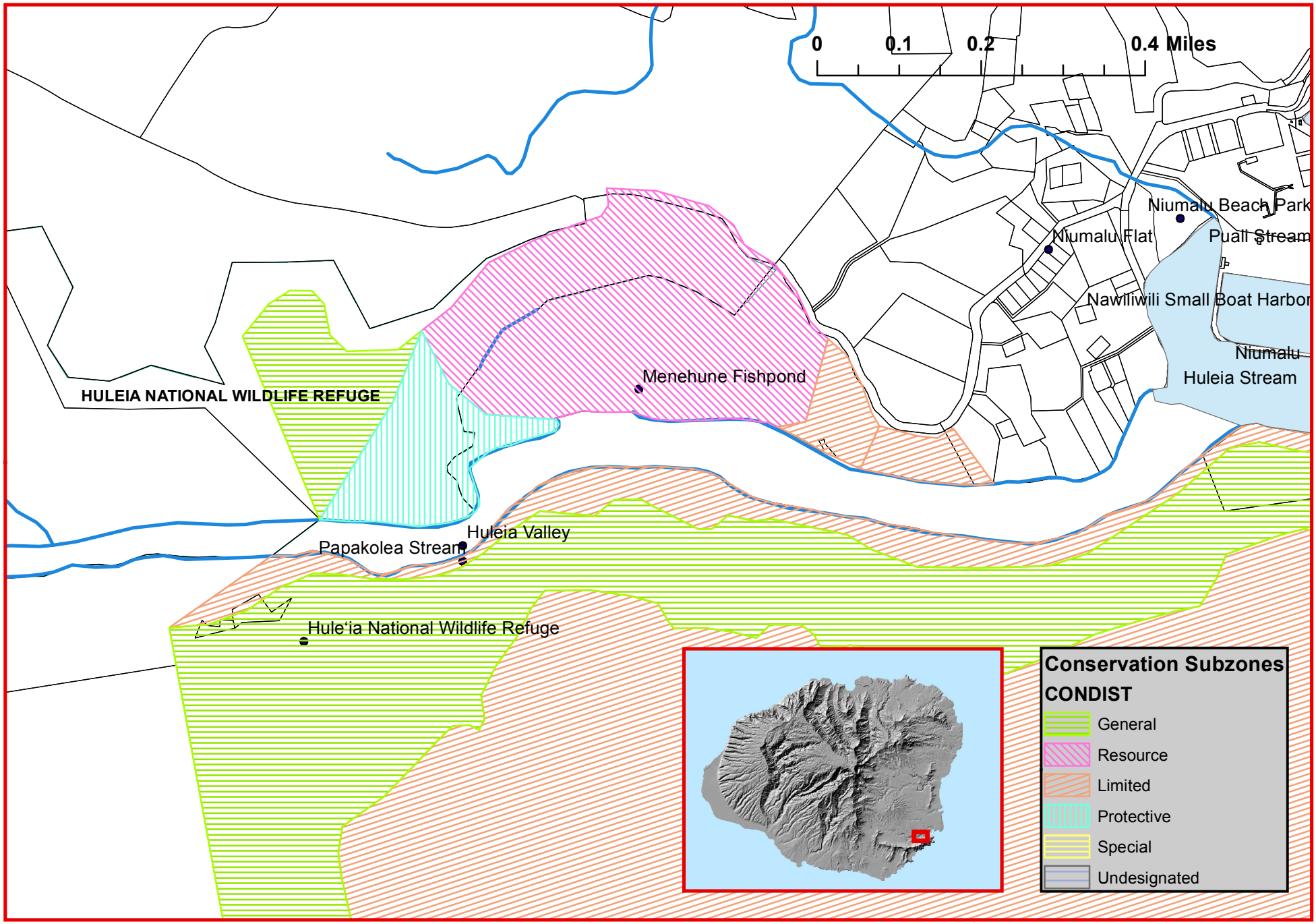
Project Elements

Mangrove Removal Area

Project Elements include:
1 - Stockpile for biomass out hauling
2 - Native plant nursery
3 - Potential Hale



# Conservation District lands in the Huleia Watershed




*Produced by Michael Cain @ OCCL* *February 3, 2015* *All boundaries are approximate*

**STATE OF HAWAII**
**DEPARTMENT OF LAND AND NATURAL RESOURCES**
**DIVISION OF AQUATIC RESOURCES**
1151 PUNCHBOWL STREET, ROOM 330
HONOLULU, HAWAII 96813

Date: 8/31/2017
DAR # 5594

MEMORANDUM

TO: Bruce S. Anderson, PhD
DAR Administrator

FROM: Justin Goggins JG., Aquatic Biologist

SUBJECT: Alekoko Fishpond Restoration

Request Submitted by: Mālama Hule'ia

Location of Project: Hule'ia, Puna, Kaua'i

Brief Description of Project:

The current application is to remove 26 acres of mangrove using mechanized equipment and hand removal, and to replant approximately 15 acres in the supra-tidal area with native Hawaiian vegetation.

Comments:
☐ No Comments ☒ Comments Attached

Thank you for providing DAR the opportunity to review and comment on the proposed project. Should there be any changes to the project plan, DAR requests the opportunity to review and comment on those changes.

Comments Approved: Bruce S. Anderson Date: 9/14/17
Bruce S. Anderson, PhD
DAR Administrator

DAR# 5594

Comments

The Division of Aquatic Resources (DAR) is in general support of this project. The Aquatic Invasive Species team has limited resources relative to the aquatic invasive threats to the islands. The project is appreciated as it moves towards effectively managing and preserving state aquatic resources. Such an effort not only preserves a culturally significant fish pond, but will significantly reduce a seed-bank of invasive species along the Hule'ia River. The historical photographs provided compared to current images show how invasive mangroves can become and the Division recognizes the benefits of your restoration efforts.

DAR has a few questions that we would like your project to address:

- What native plant species are planned for re-vegetating the supratidal zone?

The plan mentions sediment will be controlled by BMPs with the use of silt cloth and/or straw bales or straw wattles.
- Can you provide more detail about the deployment configurations of these three catchment systems?
- How and where will you dispose of the sediment collected?

Thank you for providing us the opportunity to review and comment on the proposed project. Should there be any changes, amendments or modifications to the current plans, DAR requests the opportunity to review and comment on those changes.

**Bernard P. Carvalho, Jr.**
Mayor

**Wallace G. Rezentes, Jr.**
Managing Director

**Michael A. Dahilig**
Director of Planning

**Ka'āina S. Hull**
Deputy Director of Planning

**PLANNING DEPARTMENT**
**Regulatory Division**
**County of Kaua'i, State of Hawai'i**
4444 Rice Street, Suite A-473, Līhu'e, Hawai'i 96766
TEL (808) 241-4050 FAX (808) 241-6699

SEP 11 2017

RECEIVED
OFFICE OF CONSERVATION
AND COASTAL LANDS
2017 SEP 13 A 11:49
DEPT OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands
PO Box 621
Honolulu, HI 96809

**SUBJECT:** **Alekoko Fishpond Restoration**
**Malama Hule'ia**
**Hule'ia Puna, Kaua'i**
**Tax Map Key: (4) 3-2-001:001**

The Kauai Planning Department is in favor of the proposed restoration of Alekoko Fishpond and have no comments for this application.

Should you have question regarding this matter, please don't hesitate to contact me at (808) 241-4050.

Sincerely,

Michael A. Dahilig
Director of Planning

DAVID Y. IGE
GOVERNOR OF HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEKOA KALUHIWA
FIRST DEPUTY

JEFFREY T. PEARSON, P.E.
DEPUTY DIRECTOR - WATER

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**STATE OF HAWAII**
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET, ROOM 325
HONOLULU, HAWAII 96813

September 8, 2017

TO: Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands

FROM: James Cogswell, Wildlife Program Manager
Division of Forestry and Wildlife

SUBJECT: Division of Forestry and Wildlife Comments on Alekoko Fishpond Restoration

The Department of Forestry and Wildlife has received your inquiry regarding the Loko I'a Restoration Application KA-19-01 for the proposed Alekoko Fishpond Restoration. The Alekoko Fishpond is located on the Hulē'ia River in Kaua'i, and has been overtaken by mangroves, with only 23-acres of open water remaining. The proposed action would include removal of approximately 26 acres of mangrove and replanting with native Hawaiian vegetation. Mangrove removal would be accomplished using chainsaw or hand saws, as well as mechanized heavy equipment such as an excavator with tree shear attachment. Access roads would require minor clearing and grading to allow passage of off-road trucks to haul off green waste. DOFAW would like to ensure that the following best management practices are followed:

**Hawaiian hoary bat**
The State and Federally listed Hawaiian hoary bat or 'Ōpe'ape'a (*Lasiurus cinereus semotus*) has the potential to occur in the vicinity of the proposed project. Hawaiian hoary bats roost in both exotic and native trees. If any trees are planned for removal during the bat breeding season there is a risk of injury or mortality to juvenile bats. To minimize the potential for impacts to this species, site clearing should be timed to avoid disturbance to breeding Hawaiian hoary bats; woody plants greater than 15 feet (4.6 meters) tall should not be disturbed, removed, or trimmed during the bat birthing and pup rearing season (June 1 through September 15).

**Waterbirds**
State and Federally listed waterbirds such as the Hawaiian duck (*Anas wyvilliana*), Hawaiian stilt (*Himantopus mexicanus knudseni*), Hawaiian moorhen (*Gallinula chloropus sandvicensis*), Hawaiian coot (*Fulica alai*), and Hawaiian goose, or Nēnē (*Branta sandvicensis*) are likely to occur in the vicinity of the proposed project site due to the proximity of the Hulē'ia National Wildlife Refuge. To minimize the potential for take, surveys for waterbirds by a qualified biologist are recommended before any land clearing or excavation activities occur, and should be repeated if these activities are delayed more than three days. If a nest is discovered at any point, please contact DOFAW staff. If a bird is present during ongoing activities, then all activities within 100 feet (30 m) of the bird should cease, and the bird should also not be approached. Work may continue after the bird leaves the area of its own accord.

**Hawaiian short-eared owl**

The state endangered Hawaiian short-eared owl or Pueo (*Asio flammeus sandwichensis*) has the potential to occur in the project vicinity site. Pueo are a crepuscular species, nest on the ground, and are most active during dawn and dusk twilights. DOFAW recommends twilight pre-construction surveys by a qualified biologist prior to clearing vegetation. If Pueo nests are present, a buffer zone should be established in which no clearing occurs until nesting ceases and notify DOFAW staff.

**Seabirds**

DOFAW would like to ensure that effective avoidance measures are in place to prevent adverse impacts to native seabirds. DOFAW strongly recommends the use of only "seabird-friendly lighting" during the seabird nesting season beginning in March through mid-December. DOFAW Wildlife Biologists will be able to provide technical assistance in developing "seabird-friendly lighting."

We appreciate your efforts to work with our office for the conservation of native species. If you have any questions, please contact Katherine Cullison, Conservation Initiatives Coordinator at (808)587-4148 or Katherine.cullison@hawaii.gov.

DAVID Y. IGE
GOVERNOR OF HAWAII

VIRGINIA PRESSLER, M.D.
DIRECTOR OF HEALTH



JANET M. BERREMAN, M.D., M.P.H., F.A.A.P.
DISTRICT HEALTH OFFICER

STATE OF HAWAII
DEPARTMENT OF HEALTH
KAUAI DISTRICT HEALTH OFFICE
3040 UMI STREET
LIHUE, HAWAII 96766

September 28, 2017

Mr. Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Lemmo,

SUBJECT: **Request for Comments**
Project: **Alekoko Fishpond Restoration (EPO 17-220)**
Applicant: **Malama Hule`ia**

Based on our review, we offer the following environmental health concerns for your consideration, which needs to be addressed, prior to the Departments' approval:

The Department of Health (DOH), Clean Water Branch (CWB) has reviewed the subject document and offers these comments. Please note that our review is based solely on the information provided in the subject document and its compliance with the Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at:
http://health.hawaii.gov/epo/files/2013/05/Clean-Water-Branch-Std-Comments.pdf

1. Any project and its potential impacts to State waters must meet the following criteria:

   a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.

   b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.

   c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).

2. You may be required to obtain National Pollutant Discharge Elimination System (NPDES) permit coverage for discharges of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55).

   For NPDES general permit coverage, a Notice of Intent (NOI) form must be submitted at least 30 calendar days before the commencement of the discharge. An application for a NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. To request NPDES permit coverage, you must submit the applicable form ("CWB Individual NPDES Form" or "CWB NOI Form") through the e-Permitting Portal and the hard copy certification statement with the respective filing fee ($1,000 for an individual NPDES permit or $500 for a Notice of General Permit Coverage). Please open the e-Permitting Portal website located at: https://eha-cloud.doh.hawaii.gov/epermit/. You will be asked to do a one-time registration to obtain your login and password. After you register, click on the Application Finder tool and locate the appropriate form. Follow the instructions to complete and submit the form.

3. If your project involves work in, over, or under waters of the United States, it is highly recommended that you contact the Army Corp of Engineers, Regulatory Branch (Tel: 835-4303) regarding their permitting requirements.

   Pursuant to Federal Water Pollution Control Act [commonly known as the "Clean Water Act" (CWA)], Paragraph 401(a)(1), a Section 401 Water Quality Certification (WQC) is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may **result** in any discharge into the navigable waters..." (emphasis added). The term "discharge" is defined in CWA, Subsections 502(16), 502(12), and 502(6); Title 40 of the Code of Federal Regulations, Section 122.2; and Hawaii Administrative Rules (HAR), Chapter 11-54.

4. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 WQC are required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of $25,000 per day per violation.

5. It is the State's position that all projects must reduce, reuse, and recycle to protect, restore, and sustain water quality and beneficial uses of State waters. Project planning should:

   a. Treat storm water as a resource to be protected by integrating it into project planning and permitting. Storm water has long been recognized as a source of irrigation that will not deplete potable water resources. What is often overlooked is that storm water recharges ground water supplies and feeds streams and estuaries; to ensure that these water cycles are not disrupted, storm water cannot be relegated as a waste product of impervious surfaces. Any project

planning must recognize storm water as an asset that sustains and protects natural ecosystems and traditional beneficial uses of State waters, like community beautification, beach going, swimming, and fishing. The approaches necessary to do so, including low impact development methods or ecological bioengineering of drainage ways must be identified in the planning stages to allow designers opportunity to include those approaches up front, prior to seeking zoning, construction, or building permits.

b. Clearly articulate the State's position on water quality and the beneficial uses of State waters. The plan should include statements regarding the implementation of methods to conserve natural resources (e.g. minimizing potable water for irrigation, gray water re-use options, energy conservation through smart design) and improve water quality.

c. Consider storm water Best Management Practice (BMP) approaches that minimize the use of potable water for irrigation through storm water storage and reuse, percolate storm water to recharge groundwater to revitalize natural hydrology, and treat storm water which is to be discharged.

d. Consider the use of green building practices, such as pervious pavement and landscaping with native vegetation, to improve water quality by reducing excessive runoff and the need for excessive fertilization, respectively.

e. Identify opportunities for retrofitting or bio-engineering existing storm water infrastructure to restore ecological function while maintaining, or even enhancing, hydraulic capacity. Particular consideration should be given to areas prone to flooding, or where the infrastructure is aged and will need to be rehabilitated.

If you have any questions, please visit our website at:http://health.hawaii.gov/cwb/, or contact the Engineering Section, CWB, at (808) 586-4309.

6. National Pollutant Discharge Elimination System (NPDES) permit coverage is required for pollutant discharges into State surface waters and for certain situations involving storm water (HAR, Chapter 11-55).

   a. Discharges into Class 2 or Class A State waters can be covered under an NPDES general permit only if all of the NPDES general permit requirements are met. Please see the DOH-CWB website (http://health.hawaii.gov/cwb/) for the NPDES general permits and instructions to request coverage.

   b. All other discharges into State surface waters (including discharges from Concentrated Animal Feeding Operations) and discharges into Class 1 or Class AA State waters require an NPDES individual permit. To request NPDES individual permit coverage, please see the DOH-CWB forms website located at: http://health.hawaii.gov/cwb/site-map/clean-water-branch-home-page/forms/

   c. NPDES permit coverage for storm water associated with construction activities is required if your project will result in the disturbance of one (1) acre or more of

total land area. The total land area includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a larger common plan of development or sale. NPDES permit coverage is required before the start of the construction activities.

Land disturbance includes, but is not limited to clearing, grading, grubbing, uprooting of vegetation, demolition (even if leaving foundation slab), staging, stockpiling, excavation into pavement areas which go down to the base course, and storage areas (including areas on the roadway to park equipment if these areas are blocked off from public usage, grassed areas, or bare ground).

7. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 WQC are required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of $25,000 per day per violation.

8. Please call the Army Corps of Engineers at (808) 438-9258 to see if this project requires a Department of the Army (DA) permit. Permits may be required for work performed in, over, and under navigable waters of the United States. Projects requiring a DA permit also require a Section 401 Water Quality Certification (WQC) from our office.

9. Noise will be generated during the construction and demolition phase of this project. The applicable maximum permissible sound levels as stated in Title 11, Hawaii Administrative Rules, Chapter 11-46, "Community Noise Control" shall not be exceeded unless a noise permit is obtained from the DOH.

10. Temporary fugitive dust emissions could be emitted when the project site is prepared for construction and when construction activities occur. In accordance with Title 11, Hawaii Administrative Rules Chapter 11-60.1 "Air Pollution Control", effective air pollution control measures shall be provided to prevent or minimize any fugitive dust emissions caused by construction work from affecting the surrounding areas. This includes the off-site roadways used to enter/exit the project. The control measures include but are not limited to the use of water wagons, sprinkler systems, dust fences, etc.

11. Should the mangroves/green waste not be disposed of on site, it shall be disposed of at a solid waste disposal facility that is in compliance with the applicable provisions of Title 11, HAR, Chapter 11-58.1 "Solid Waste Management Control". The open burning of any of these wastes on or off site prohibited.

Although we submit the previously mentioned concerns, the Environmental Planning Office is the Department of Health's authority for the review of environmental assessments and environmental impact statements.

Should you have any questions, please call me at 241-3323.

Sincerely,

Gerald N. Takamura, Chief
District Environmental Health Program Kaua'i

GNT: DTT

Cc: Environmental Planning Office

DAVID Y. IGE
GOVERNOR OF
HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA
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JEFFREY T. PEARSON, P.E.
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
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STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
Office of Conservation and Coastal Lands
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

OCT 24 2017

File No: Loko I'a: KA-18-01

Gerald N. Takamura, Chief
District Environmental Health Program Kauai
State Department of Health
Kauai District Health Office
3040 Umi Street
Lihue, Hawaii 96766

Dear Mr. Takamura,

SUBJECT: LOKO I'A PERMIT KA-18-01: Alekoko Fishpond Restoration
Hulie'ia, Puna, Kauai
(4) 3-2-001:001

The Office of Conservation and Coastal Lands (OCCL) has reviewed the information you sent regarding proposed work at the Alekoko Fishpond on the above subject parcel. Under normal circumstances, I would ask the project applicant to respond to your letter. However, I am personally responding to your October 16, 2017 letter because I want to inform you about the State's Loko I'a Program which is administered by my office under specific statutory regulatory authorities.

Alekoko Fishpond is a loko wai, on the Hulie'ia River, approximately 1,000 meters upstream from the mouth of the river and Nawiliwil Small Boast Harbor in Lihue, Kauai. The loko i'a once measured approximately 40-acres of open water, but is currently approximately 23-acres and measures approximately 550-meters by 215-meters at its widest cross sections. The reduced size is due to overgrowth of invasive mangrove. The Permittee would like to remove 26-acres of mangrove that are surrounding the pond and destroying the historic Hawaiian fishpond walls.

The proposed project is only for mangrove removal and planting of native Hawaiian vegetation. The applicant is not proposing to bring the loko i`a back to operational condition it this time. It is best to allow the system to find balance and to monitor the response of the hydrology and fishery over some time before determining what level of restoration would be needed to bring it to operational level.

The proposed removal includes two primary removal methods; 1) Hand cut (chainsaw), hand remove and 2) Mechanized heavy equipment. The hand cut hand remove method will be used in areas of archaeological sensitivity such as the rock wall and any other areas identified by the archaeological consultant. The mechanized equipment will be used in all other appropriate areas. The project involves cutting the mangrove while leaving the submerged root system intact to minimize disturbance to soil. The exception will be where mangrove air roots are hanging in the water and have only slight contact with the pond sediment; these will likely be pulled rather than cut resulting in less root biomass left in water to decay over time.

One objective of the project is to contain all sediment on site. The applicant anticipates installation of straw wattles around the designated stock pile areas and temporary containment areas of ½ to one acre in active work areas. The Bio Sock Pro does not require the need for ground disturbance and trenching. These will likely be used in most cases where they are found to be suitable for sediment and/or run-off containment. Secondary sediment control BMPs will be installed at the outlet channel at the downstream end of the pond and the two rock wall openings. These will include the use of geotextile fabrics (Mirafi 600x geotextile fabrics) integrated within a sluice-type gate at each makaha/opening along the fish pond wall. These secondary BMPs will capture any sediment that could be released because of the mangrove removal if not 100% contained on (active work area) site.

The consultant indicates that the sediment will be collected when the straw wattle is 2/3 full. The wattle will be replaced and those sediment filled ones will be moved to the upland stockpile area. At the end of the project the sediment and straw will be incorporated into the soil of the stockpile area which will be revegetated with native upland trees and shrubs.

Historically, fishponds have been subject to an extensive permitting process that takes large amounts of resources and time to secure. The OCCL and many collaborators have developed a master permit for traditional Hawaiian fishponds that encompasses the main permits that are currently required. The program is called Hoʻāla Loko Iʻa. The program was designed to be in compliance with as many of the federal and state regulations as possible to make the permitting process easier to navigate for fishpond practitioners.

The Hoʻāla Loko Iʻa Conservation District Use Permit (CDUP) ST-3703 is a statewide programmatic permit for the repair, restoration, maintenance, and operation of traditional fishponds systems in Hawaiʻi. A Programmatic Environmental Assessment (PEA) was also completed to comply with Chapter 343, HRS. The CDUP and PEA were designed to cover all existing traditional fishpond systems in the State. The Board of Land and Natural Resources (BLNR) approved this process in June 2014. In addition to this, The Army Corps of Engineers Honolulu Regulatory Office is working with Fishpond Practitioners by endeavoring to allow pond maintenance and restoration to occur under their Nationwide General Permits.

Finally, in 2015, Governor David Ige signed Bill 230, which waved the need for Loko Iʻa restoration projects to obtain permits under the Hoʻāla Loko Iʻa program to obtain water quality certifications for their activities. This waiver is only available to projects that obtain permits through the OCCL Hoʻāla Loko Iʻa program. This landmark legislation means that Hoʻāla Loko Iʻa programs are waived from having to complete the water quality certification application with

the Department of Health. Under the CDUP ST-3703 all Ho'āla Loko permittees are still required to have water quality monitoring, mitigation, and best management practices in place. Keeping Hawaii's waters clean and our reefs healthy are all of our responsibility.

Our findings on the project are as follows:

1. The proposed work at the Alekoko Fishpond maintenance work is consistent with the statewide programmatic general permit for the restoration, repair, maintenance, and operation of loko i'a (Conservation District Use Permit ST-3703: Ho'āla Loko I'a), as approved by the Board of Land and Natural Resources on June 27, 2014;

2. The activities described were covered in the Programmatic Final Environmental Assessment (PFEA) and Finding of No Significant Impact (FONSI) for the Ho'āla Loko I'a program, which was published on October 23, 2013;

3. The proposal requires the need for a Tier 2 Loko I'a permit signed by the Chair of the Board of Land and Natural Resources; and

4. As mentioned in the above, the State Department of Health water quality certifications are waived pursuant to Hawai'i Revised Statutes (HRS) Chapter 342D WATER POLLUTION, Section 6.5 Hawaiian loko i'a (b) The department shall waive the requirement to obtain water quality certification under this chapter for any person that has received notice of authorization to proceed from the department of land and natural resources office of conservation and coastal lands under the statewide programmatic general permit for the restoration, repair, maintenance, and operation of loko i'a.

The Department appreciates your input on this important matter. I have attached a Ho'āla Loko I'a Permit Application Guidebook (see best management practices, pages 32-35) and a copy of the approved Loko I'a Permit (KA-18-01) for your information and use.

Should you have any questions feel free to contact me at 587-0377.

Sincerely,

Samuel Lemmo, Administrator

C: Chairperson

DAVID Y. IGE
GOVERNOR OF
HAWAII

SUZANNE D. CASE
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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
POST OFFICE BOX 621
HONOLULU, HAWAII 96809



File No: Loko I'a: KA-18-01

OCT 25 2017

Sara Bowen, Executive Director
Hui Malama Hule'ia
PO Box 662092
Lihue, HI 96766

Dear Ms. Bowen,

SUBJECT: LOKO I'A PERMIT KA-18-01: Alekoko Fishpond Restoration
Hulie'ia, Puna, Kauai
(4) 3-2-001:001

The Office of Conservation and Coastal Lands (OCCL) has reviewed your application regarding proposed work at the Alekoko Fishpond on the above subject parcel. The pond is in the Resource and Limited Subzones of the State Land Use Conservation District.

The 40-acre fishpond is on private property owned by Okada Trucking Company, LTD and managed in partnership with Malama Hulie'ia.

Alekoko Fishpond is a loko wai, on the Hulie'ia River, approximately 1,000 meters upstream from the mouth of the river and Nawiliwil Small Boast Harbor in Lihue, Kauai. The loko i'a once measured approximately 40-acres of open water, but is currently approximately 23-acres and measures approximately 550-meters by 215-meters at its widest cross sections. The reduced size is due to overgrowth of invasive mangrove. The Permittee would like to remove 26-acres of mangrove that are surrounding the pond and destroying the historic Hawaiian fishpond walls.

The National Register of Historic Places Nomination Form, dated March 14, 1973, describes the physical characteristics as consisting of:

...primarily of a stone-faced dirt wall that runs for over 900 yards and cuts off a large bend in the river for use as a fishpond. There is 50 yards of shallow swamp land between the west end of the wall and the shore. A dirt wall runs for 145 yards whereupon the stone facing starts on the river side of the wall. The dirt wall is 5 feet above the water level, 4 feet wide on top and the dirt slants up on both sides. The facing wall begins with a single row of stones and then becomes of double thickness as it gets further out into the river and the current starts to become effective. The stones also become larger until the

double layer is 2 feet thick. The stone facing on the outside is five feet high in most places and is quite perpendicular. The stones are very carefully fitted together; the stone facing runs for about two-thirds of the total length of the wall.

The proposed project is only for mangrove removal and planting of native Hawaiian vegetation. The applicant is not proposing to bring the loko i`a back to operational condition it this time. It is best to allow the system to find balance and to monitor the response of the hydrology and fishery over some time before determining what level of restoration would be needed to bring it to operational level.

Best Management Practices will be completed throughout the project. Archaeological pre-clearing survey will be done on site by Pacific Legacy of the stockpile and staging areas. All archaeological sites encountered will be recorded with written descriptions, plan view maps, digital photographs, and GPS coordinates. The intent of this work is to minimize impact to potential important archaeological resources. If sites are found, the area will be avoided as a stockpile area to avoid impact. A pre-clearance orientation and briefing will also be conducted with crew members prior to any work being done on site. A post clearance survey and mapping will be done after the mangrove removal.

Further BMP recommendations will be provided following the initial survey. Sediment control BMPs will be employed throughout the mangrove removal. Earthworks Pacific will provide sediment control BMPs, placed at the pond outlets to reduce sediment released into the river and impacting the waterbodies. In addition, Mālama Hulē'ia will ensure that any mangrove removal done in and around the rock wall will be done by hand, and will be done with care to avoid impacts to the rock wall.

Sediment control BMPs will allow sediment to be captured prior to entering the water bodies. This will be done through use of silt cloth and/or straw bales or straw waddles that will protect the river and fishpond.

The proposed mangrove removal includes two primary removal methods; 1) Hand cut (chainsaw), hand remove and 2) Mechanized heavy equipment. The hand cut hand remove method will be used in areas of archaeological sensitivity such as the rock wall and any other areas identified by our archaeological consultant. The mechanized equipment will be used in all other appropriate areas. The project involves cutting the mangrove while leaving the root system intact so as to minimize disturbance to soil. The exception will be where mangrove air roots are hanging in the water and have only slight contact with the pond sediment; these will likely be pulled rather than cut resulting in less root biomass left in water to decay over time.

The steps involved in this project are as follows:

1. Archaeological pre-clearing survey and associated BMPs.
2. Prepare stockpile area and access.
3. Prepare a perimeter path along the edge of the mangrove along back (north) side of pond.
4. Clear mangrove with mechanized equipment along back (north) side of pond starting at upstream end and working down.
5. Begin planting native Hawaiian vegetation in cleared areas immediately.
6. Simultaneously clear mangrove with hand cut hand remove technique along rock wall and other archaeologically sensitive areas.

7. Final area to be cleared and replanted with native Hawaiian vegetation will be the side channel that flows from the pond to the Hulē'ia River between the access road and river.

Specialty Equipment

Based on the unique requirements of the mangrove removal project some specialty equipment will be required.

- Long Stick Excavator – Earthworks Pacific currently has a long stick for a CAT 325 on Kaua'i for projects that require extended reach.
- Tree shear – Equipment will require tree shear attachment. These custom attachments must be fabricated/adapted for use on specific machines and will require some lead time for delivery from the mainland.

OCCL sought comments on the proposal and associated best management plan from DLNR's Land Division, Division of Aquatic Resources, Division of Forestry and Wildlife, and Historic Preservation; the Office of Hawaiian Affair; Kua'āina Ulu 'Auamo, the Hawai'i County Planning Department; the U.S. Army Corps of Engineers; NOAA Fisheries Pacific Islands Regional Office; and the State Department of Health, Environmental Planning Office.

**Division of Aquatic Resources**

The Division of Aquatic Resources is generally in favor of the project. The project is appreciated as it moved towards effectively managing the preserving state aquatic resources. Such an effort not only preserves a culturally significant fishpond, but will significantly reduce a seed-bank of invasive species along the Hulie'ia River. The historical photographs provided compared to current images show how invasive mangroves can become and the Division recognizes the benefits of your efforts.

DAR has a few questions that we would like your project to address:

- What native plant species are planned for re-vegetation in the subtidal zone?

*The consultant indicates that the primary native vegetation that will be planted are: `Ae`ae, `Akulikuli, Kipukai, Makaloa, `Uki, Ahu`awa, `Aki`aki*

The plan mentions sediment will be controlled by BMPs with the use of silt cloth and/or straw bales or straw wattles.

- Can you provide more detail about the deployment configurations of these three catchment systems?

*The consultant indicates that following the archaeological surveys, they will obtain recommendations on BMPs associated with protecting cultural sites/resources found. The deployment of water quality/sediment control BMPs will be done under the guidance of their contractor, Earthworks Pacific who has extensive experience in selecting and installing appropriate sediment control BMPs. They have*

*provided product sheets for the most commonly used sediment control BMPs including silt cloth, stakes, and straw wattles.*

*The objective is to contain all sediment on site. The applicant anticipates installation of straw wattles around the designated stock pile areas and temporary containment areas of ½ to one acre in active work areas. The Bio Sock Pro does not require the need for ground disturbance and trenching. These will likely be used in most cases where they are found to be suitable for sediment and/or run-off containment. Secondary sediment control BMPs will be installed at the outlet channel at the downstream end of the pond and the two rock wall openings. These will include the use of geotextile fabrics (Mirafi 600x geotextile fabrics) integrated within a sluice-type gate at each makaha/opening along the fish pond wall. These secondary BMPs will capture any sediment that could be released because of the mangrove removal if not 100% contained on (active work area) site.*

- How and where will you dispose of the sediment collected?

*The consultant indicates that the sediment will be collected when the straw wattle is 2/3 full. The wattle will be replaced and those sediment filled ones will be moved to the upland stockpile area. At the end of the project the sediment and straw will be incorporated into the soil of the stockpile area which will be revegetated with native upland trees and shrubs.*

**Division of Forestry and Wildlife**

The Department of Forestry and Wildlife has received your inquiry regarding the Loko I'a Restoration Application KA-19-01 for the proposed Alekoko Fishpond Restoration. The Alekoko Fishpond is located on the Hulē'ia River in Kaua'i, and has been overtaken by mangroves, with only 23-acres of open water remaining. The proposed action would include removal of approximately 26 acres of mangrove and replanting with native Hawaiian vegetation. Mangrove removal would be accomplished using chainsaw or hand saws, as well as mechanized heavy equipment such as an excavator with tree shear attachment. Access roads would require minor clearing and grading to allow passage of off-road trucks to haul off green waste. DOFAW would like to ensure that the following best management practices are followed:

Hawaiian hoary bat
The State and Federally listed Hawaiian hoary bat or 'Ōpe'ape'a (Lasiurus cinereus semotus) has the potential to occur in the vicinity of the proposed project. Hawaiian hoary bats roost in both exotic and native trees. If any trees are planned for removal during the bat breeding season there is a risk of injury or mortality to juvenile bats. To minimize the potential for impacts to this species, site clearing should be timed to avoid disturbance to breeding Hawaiian hoary bats; woody plants greater than 15 feet (4.6 meters) tall should not be disturbed, removed, or trimmed during the bat birthing and pup rearing season (June 1 through September 15).

Waterbirds
State and Federally listed waterbirds such as the Hawaiian duck (Anas wyvilliana), Hawaiian stilt (Himantopus mexicanus knudseni), Hawaiian moorhen (Gallinula chloropus sandvicensis), Hawaiian coot (Fulica alai), and Hawaiian goose, or Nēnē (Branta sandvicensis) are likely to occur in the vicinity of the proposed project site due to the proximity of the Hulē'ia National Wildlife Refuge. To minimize

the potential for take, surveys for waterbirds by a qualified biologist are recommended before any land clearing or excavation activities occur, and should be repeated if these activities are delayed more than three days. If a nest is discovered at any point, please contact DOFAW staff. If a bird is present during ongoing activities, then all activities within 100 feet (30 m) of the bird should cease, and the bird should also not be approached. Work may continue after the bird leaves the area of its own accord.

Hawaiian short-eared owl
The state endangered Hawaiian short-eared owl or Pueo (Asio flammeus sandwichensis) has the potential to occur in the project vicinity site. Pueo are a crepuscular species, nest on the ground, and are most active during dawn and dusk twilights. DOFAW recommends twilight pre-construction surveys by a qualified biologist prior to clearing vegetation. If Pueo nests are present, a buffer zone should be established in which no clearing occurs until nesting ceases and notify DOFAW staff.

Seabirds
DOFAW would like to ensure that effective avoidance measures are in place to prevent adverse impacts to native seabirds. DOFAW strongly recommends the use of only "seabird-friendly lighting" during the seabird nesting season beginning in March through mid-December. DOFAW Wildlife Biologists will be able to provide technical assistance in developing "seabird-friendly lighting."

*Staff Comments*
*The work will include a condition the permittee implement and sustain throughout the duration of the work all applicable best management practices described in the Ho'āla Loko I'a Permit Application Guidebook as well those mitigation measures outlined in the permittee's application. These best management practices include measures to mitigate and eliminate potential impacts endangered water birds and other species, water quality management, and cultural and archaeological resources.*

**County of Kauai, Planning Department**

The County of Kauai Planning Department is in favor of the project.

**After reviewing the application, OCCL finds that:**

The proposed work at the Alekoko Fishpond is consistent with the statewide programmatic general permit for the restoration, repair, maintenance, and operation of loko i'a (Conservation District Use Permit ST-3703: Ho'āla Loko I'a), as approved by the Board of Land and Natural Resources on June 27, 2014;

The activities described were covered in the Programmatic Final Environmental Assessment (PFEA) and Finding of No Significant Impact (FONSI) for the Ho'āla Loko I'a program, which was published on October 23, 2013;

The proposal requires the need for a Tier 2 Loko I'a permit signed by the Chair of the Board of Land and Natural Resources;

The State Department of Health water quality certifications are waived pursuant to Hawai'i Revised Statutes (HRS) Chapter 342D WATER POLLUTION, Section 6.5 Hawaiian loko i'a (b) The department

shall waive the requirement to obtain water quality certification under this chapter for any person that has received notice of authorization to proceed from the department of land and natural resources office of conservation and coastal lands under the statewide programmatic general permit for the restoration, repair, maintenance, and operation of loko i'a; and[1]

The standard conditions found in Hawai'i Administrative Rules (HAR) §13-5-42 apply.

After careful review of the proposed project, the Department finds that the proposed work will not negatively impact water quality, endangered or threatened species, archeological and cultural resources, provided that the permittee implement appropriate mitigation measures, and therefore, authorizes a Tier 2 Loko I'a permit for mangrove removal and native plant propagation at Alekoko Fishpond Hulie'ia, Puna, Kauai, TMKS (4) 3-2-001:00, subject to the following standard conditions:

1. The permittee shall comply with all applicable statutes, ordinances, rules, and regulations of the federal, state, and county governments, and applicable parts of this chapter;

2. The permittee shall implement and sustain throughout the duration of the work all applicable best management practices described in the Ho'āla Loko I'a Permit Application Guidebook as well those mitigation measures outlined in the permittee's application;

3. The permittee, its successors and assigns, shall indemnify and hold the State of Hawai'i harmless from and against any loss, liability, claim, or demand for property damage, personal injury, and death arising out of any act or omission of the applicant, its successors, assigns, officers, employees, contractors, and agents under this permit or relating to or connected with the granting of this permit;

4. The permittee shall obtain appropriate authorization from the department for the occupancy of state lands, if applicable;

5. The actions outlined in the best management plan submitted with the application are incorporated as conditions of the permit;

6. The permittee understands and agrees that the permit does not convey any vested right(s) or exclusive privilege;

7. In issuing the permit, the department and board have relied on the information and data that the permittee has provided in connection with the permit application. If, subsequent to the issuance of the permit such information and data prove to be false, incomplete, or inaccurate, this permit may be modified, suspended, or revoked, in whole or in part, and the department may, in addition, institute appropriate legal proceedings;

8. Where any interference, nuisance, or harm may be caused, or hazard established by the use, the permittee shall be required to take measures to minimize or eliminate the interference, nuisance, harm, or hazard;

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1 *The Department received comments from the Department of Health and responded via written comments. Both letters are attached here for reference.*

9. The permittee acknowledges that the approved work shall not hamper, impede, or otherwise limit the exercise of traditional, customary, or religious practices of native Hawaiians in the immediate area, to the extent the practices are provided for by the Constitution of the State of Hawai'i, and by Hawai'i statutory and case law;

10. Should historic remains such as artifacts, burials or concentration of charcoal be encountered, work shall cease immediately in the vicinity of the find, and the find shall be protected from further damage. The contractor shall immediately contact HPD (692-8015), which will assess the significance of the find and recommend an appropriate mitigation measure, if necessary;

11. Other terms and conditions as prescribed by the chairperson; and

12. Failure to comply with any of these conditions shall render a permit void under the chapter, as determined by the chairperson or board.

Please acknowledge receipt of this approval, with the above noted conditions, in the space provided below. Please sign two copies. Retain one and return the other within thirty days. Should you have any questions feel free to contact Michael Cain at 587-0048.

Sincerely,

Suzanne D. Case, Chairperson
Board of Land and Natural Resources

Receipt acknowledged:

Permittee's Signature

Date 11/8/17

copy: U.S. Army Corps of Engineers