

TRANSMITTAL and OFFER LETTER RFP WSAG17

Name of Organization: Ko'olau Mountains Watershed Partnership

Point of Contact: Tracey Gotthardt, Operations Supervisor

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Water Security Advisory Group
Department of Land and Natural Resources, Commission on Water Resource Management
Punchbowl Street, Room 227
Honolulu, Hawaii 96813

The undersigned has carefully read and understands the terms and conditions specified in RFP WSAG17, the Special Provisions attached hereto, and hereby submits the following offer to perform the work specified herein, all in accordance with the true intent and meaning thereof. The undersigned further understands and agrees that by submitting this offer, 1) he/she is declaring his/her offer is not in violation of Chapter 84, Hawaii Revised Statutes, concerning prohibited State contracts, and 2) he/she is certifying that the price submitted was independently arrived at without collusion.

A list of secured and required permits necessary to implement the project are hereto attached.

Proposal Title: Increasing Efficacy in Water Usage and Recharge at Ala Mahamoe, O'ahu, through Native Plant Restoration and the Establishment of a Hawaiian Cultural Garden

Total Amount of Proposal: \$ 19,470

If awarded, the contract with the State would be made with the following entity (please use the **exact legal name** as registered with the Dept. of Commerce and Consumer Affairs):

University of Hawaii

Legal name

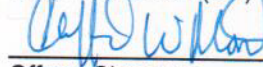
ORS, 2440 Campus Road, Box 368, Honolulu, HI 96822

Address (Contract and Billing Address must be the same)

none

State Tax ID No. (GE)

Federal Tax ID No.



412017

Offeror Signature

Date

Clifford W. Morden

PI, Deputy Director, PCSU

Print Name

Title

OFFER FORM OF-1
2017 IMPLEMENTATION OF WATER SECURITY PROJECTS AND PROGRAMS
STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES
RFP-WSAG17

Procurement Officer
Department of Land and Natural Resources
State of Hawaii
Honolulu, Hawaii 96813

Dear Procurement Officer:

The undersigned has carefully read and understands the terms and conditions specified in the Specifications and Special Provisions; and hereby submits the following offer to perform the work specified herein, all in accordance with the true intent and meaning thereof. The undersigned further understands and agrees that by submitting this offer, 1) he/she is declaring his/her offer is not in violation of Chapter 84, Hawaii Revised Statutes, concerning prohibited State contracts, and 2) he/she is certifying that the price(s) submitted was (were) independently arrived at without collusion.

Offeror is: Sole Proprietor Partnership *Corporation Joint Venture
 Other _____

*State of incorporation: _____

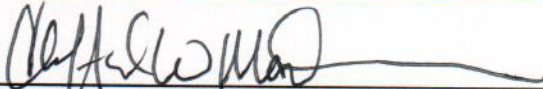
Hawaii General Excise Tax License I.D. No. none

Federal I.D. No. [REDACTED]

Payment address (other than street address below): _____
City, State, Zip Code: _____

Business address (street address): ORS, 2440 Campus Rd., Box 368
City, State, Zip Code: Honolulu, 96822

Respectfully submitted:
Date: 5/23/2017

(x) 
Authorized (Original) Signature

Telephone No.: (808)956-9636

Clifford W. Morden, PI, Deputy Director, PCSU
Name and Title (Please Type or Print)

Fax No.: (808)956-3923

E-mail Address:
cmorden@hawaii.edu

** University of Hawaii
Exact Legal Name of Company (Offeror)

**If Offeror is a "dba" or a "division" of a corporation, furnish the exact legal name of the corporation under which the awarded contract will be executed.

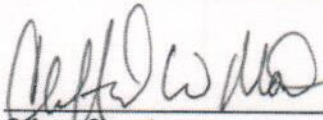
OFFER FORM OF-2

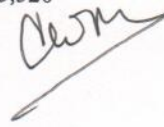
Total contract cost for accomplishing the development and delivery of the services.

\$ 19,470

Note: Pricing shall include labor, materials, supplies, all applicable taxes, and any other costs incurred to provide the specified services.

I, University of Hawaii (Offeror), certify that at time of award the 1:1 matching fund requirement will be met for Alamahamoe restoration (project). The total amount of matching funds will be \$ 17,000 (DOFAW) + 8,320 (in-kind volunteer) = \$25,320

 5/23/2017
Offeror Signature Date



Clifford W. Morden PI, Deputy Director, PCSU
Print Name Title

SCOPE OF WORK: NARRATIVE

Project Title: WSAG17: Increasing Efficacy in Water Usage and Recharge at Ala Mahamoe, O‘ahu, through Native Plant Restoration and the Establishment of a Hawaiian Cultural Garden

Applicant: Ko‘olau Mountains Watershed Partnership, Pacific Cooperative Studies Unit, University of Hawaii at Manoa, 2551 Waimano Home Rd. #202, Pearl City, HI 96782

Description of Proposed Activities and Justification of Need

As the primary source of fresh water for O‘ahu, groundwater recharge is a valuable product of watershed management in the Ko‘olau forest – providing millions of gallons of water per day. Groundwater recharge services are of particular interest because groundwater provides nearly 99 percent of Hawai‘i’s domestic water and roughly 50 percent of all freshwater used in the state (Gingerich and Oki 2000). Groundwater levels in the Pearl Harbor Aquifer, which provides the majority of O‘ahu’s drinking water, have declined significantly since 1910. Future demands for water are expected to increase as per capita incomes rise and the population continues to grow. Furthermore, climate change is projected to exacerbate the problem through changes in precipitation patterns and quantities, evapotranspiration, and land cover – all of which could directly or indirectly affect the amount of water that ultimately infiltrates back into groundwater aquifers (Burnett and Wada 2014).

The forests in the mauka regions of the central Ko‘olau Mountains comprise some of the most important watersheds on the island of O‘ahu. These watersheds rely on the presence of native plant species to efficiently capture and hold onto precipitation to consistently replenish underground aquifers with fresh water. This is true in both wet and dryland forest ecosystems, where the traits of native plant species have evolved to suit their climatic conditions and efficiently retain water. Restoration of forested ecosystems that have been invaded by non-native plants is a common management practice employed by natural resource managers to improve groundwater recharge services. Forest restoration practices are employed provided that some semblance of a native forest remains intact. The restoration process entails removing the causes for that degradation and returning the forest to its former native state, thereby increasing its water-holding capacity.

The Ko‘olau Mountains Watershed Partnership (KMWP) is a voluntary alliance of 16 public and private landowners and nine associate partners, united to manage a contiguous, mostly forested area of over 100,000 acres on O‘ahu. The partnership was established in 1999 with the recognition that the forested watershed areas of the Ko‘olau Mountains are an invaluable resource for the island of O‘ahu and that proper management of its native ecosystems is needed to secure the island’s supply of freshwater in perpetuity. Because of this agreement among

partners, KMWP has the ability to work across landowner boundaries on both public and private lands. This unique position allows for continuity in land management practices such as the control of invasive species and the restoration of native forest areas. Support for KMWP's work has grown in recent years and the program has expanded to fund a full-time staff of ten, plus interns. Though small, KMWP performs a critical mission in connecting management activities across the large partnership area, as most of the landowning partners do not employ field staff.

The Moanalua watershed area, owned by the State of Hawai'i Division of Land and Natural Resources (DLNR), is located within the KMWP management boundary (Figure 1). This watershed has been recognized by the Honolulu Board of Water Supply (HBWS) as being a high priority watershed in the Ko'olau – indicating that the watershed has “potentially high recharge” and “potentially high production / high chloride”. The forests of the upper mauka sections of the Moanalua watershed are highly intact, while mid-elevation and lower sections have been degraded by agricultural practices and urban development.

This project seeks to restore 5.1 acres of dryland forest at the Ala Mahamoe site, located in the lower mauka portion of the Moanalua Section of the Honolulu Forest Reserve, on the leeward slopes of the Ko'olau Mountain Range (Figure 2). The project site is currently dominated by a monotypic stand of invasive guinea grass and other ecosystem modifying weeds such as haole koa and kiawe. While past management practices in the area are unknown, it is suspected that cattle ranching may have been prevalent in the area due to the lack of flat ground and the dominance of non-native vegetation such as guinea grass, haole koa, kiawe, silk oak and other alien species. Individuals of native species, such as 'uhaloa, 'ūlei and 'ilima, are interspersed in low numbers. Our goal is to restore this area to a more native-dominated system to increase recharge capacity in this high priority watershed area.

The objectives of the Ala Mahamoe Restoration Project are three-fold:

- (1) Control invasive species in the project area to improve the integrity and ecological services of the watershed through increased recharge capacity;
- (2) Provide opportunities for students and community members to be involved in forest stewardship and conservation work through a green infrastructure project; and
- (3) Perpetuate native Hawaiian cultural practices through the establishment of a Hawaiian cultural garden.

Watershed efficiency and recharge will be improved through the restoration of the area into a multi-strata native dryland forest ecosystem. Restoration activities will entail the removal and continuous control of invasive plant species, as well as the outplanting of a diverse array of native species. The added benefits of ecosystem restoration include increased biodiversity, increased capacity for soil water-retention, improvements in aquifer recharge, erosion and runoff mitigation, and a reduced risk of wildfire.

This project also has several educational aims, including increasing conservation knowledge for students in grades K-12 by getting classes out into the Forest Reserve. Students will participate in activities such as seed collection, invasive species removal, site preparation, seed germination, outplanting and site maintenance and watering. Volunteers from the surrounding residential community will be invited to participate in the restoration efforts as well, and will ultimately be encouraged to take ownership of the site through adoption.

Methods

Objective 1: Control invasive species to improve ecological integrity and watershed services.

- *Approximate budget for this activity: \$18,894*

Through this objective we aim to restore 5.1 acres of degraded forest by eliminating major ecological disturbances. This will be accomplished through the removal of invasive plants, followed by replanting the area with native species and allowing ecological processes to bring about an independent recovery. We anticipate this project will take 3 to 4 years to complete and implementation will be conducted in phases. Here we are requesting funding for Year 1 activities only.

A site assessment of the area was completed in September 2016 by KMWP and state Division of Forestry and Wildlife (DOFAW) staff and prospective restoration sites were identified and mapped (Figure 2). Access from the landowner, the state of Hawai'i DLNR, has already been obtained by KMWP through a Forest Reserve Special Use Permit (attached at end of narrative). DOFAW has begun to prepare the area by placing a water catchment tank on site and removing brush adjacent to the roadway. During Year 1, staff from KMWP will visit the site at various times of the year to collect seed from native plants on the property. Collected seeds will be propagated and used in future outplantings at the site.

During Year 1, KMWP staff and volunteers will manually and chemically control and clear up to 2.2 acres of invasive plants from restoration sites 1 (1.0 acre) and 2 (1.2 acres, see Figure 2) using best use management practices for weed control activities. Weed matt will be placed in cleared areas when appropriate to prohibit rapid reestablishment of non-native species. Approximately 800 native plants (5' x 5' spacing) will be planted in the first year. Native plant seedlings will either be from seeds collected on-site or native plants provided by DOFAW staff, both of which will be propagated at the DOFAW Makiki Greenhouse, which adheres to rigorous phytosanitation protocols.

- *Quarterly Timeline and strategy*

Fiscal Year/ Quarter	Summary of Action and Deliverable
2017/3	Seed collection; weed control, site clearing (restoration site 1)
2017/4	Seed collection; weed control, site clearing (complete site 1, begin with site 2)
2018/1	Seed collection; weed control, site clearing (complete site 2)
2018/2	Weed control, planting (site 1 – 350 plants), watering as needed
2018/3	Weed control, planting (site 2 – 450 plants), watering as needed

**Quarterly reporting for 2017: 3 = Sept. 1 – Sept. 31, 4 = Oct. 1 – Dec. 31; for 2018: 1 = Jan. 1 – Mar. 31, 2 = Apr. 1 – Jun. 30, 3 = Jul. 1 – Sep. 31.*

Objective 2: Provide opportunities for students and community members to be involved in forest stewardship and conservation work through a green infrastructure project.

- *Approximate budget for this activity: \$12,000*

With evidence that O‘ahu’s fresh water resources are declining, it is more important than ever that the public feels connected to our watershed forests, and that these forests be protected from harm. Due to their lush, tropical appearance most residents are not aware of the level of degradation in our native forests. Research cited in the State of Hawai‘i’s Department of Land and Natural Resources (DLNR’s) “Rain Follows the Forest” report indicates that Hawai‘i’s residents have a very low understanding of our dependence on watershed forests for our fresh water supply. The need for more education is a recurring theme in conservation discussions. To help promote long-term sustainability for this project, KMWP will provide opportunities for students and community members to assist in weed control and native plant outplanting activities, while simultaneously gaining a greater understanding about the importance of protecting O‘ahu’s native forested watersheds.

Our goal is to engage and educate 150 K-12 students per year in this project (approximately 6 classes) through visits to local Pearl City classrooms. KMWP’s Outreach Specialist will be responsible for enlisting teachers to participate in the project by making contacts with nearby Pearl City schools. The KMWP Outreach Specialist will visit local participating classrooms to explain the project and the benefits of such work in watershed protection. Education topics will include a discussion of native vs. non-native species and the role native plants play in overall watershed health; an introduction into what the greatest threats are to watershed productivity including ungulates, diseases, weeds, fire, insects, and erosion; discussion of the importance of wildfire prevention; and identification of rare and threatened plants as well as common native species on site.

Students will be given native seeds collected from the Ala Mahamoe site to grow and propagate in their classrooms for future outplanting. Our goal is to have 25 native plants grown for outplanting purposes in each participating class. Students will then assist in outplanting their seedlings at the Ala Mahamoe site, since it is easily accessible from the roadside. Our hope is that by targeting neighboring schools we will be able to enlist specific teachers that will adopt the site for the duration of the school year (and hopefully in future years), to not only assist in the initial planting, but also in continued maintenance (weeding, watering) of the site.

Because this site is situated in an urban area and is easily accessible by road, KMWP will also enlist volunteers from the community to assist in clearing, planting, weeding, and watering activities. KMWP has an active outreach campaign and is able to garner help through our existing network of volunteers as well as through social media outlets such as Facebook and Twitter. Our overall goal is to achieve 450 volunteer hours through a combination of school and community participation.

In-kind support provided by the DOFAW Makiki nursery will include pots and media for plants to be grown in classrooms. The Makiki nursery will also provide additional plants for outplanting as needed.

- *Quarterly Timeline*

Fiscal Year/ Quarter	Summary of Action and Deliverable
2017/3	Design materials for K-12 school presentations; begin to contact teachers to participate.
2017/4	Complete outreach materials; presentations to 3 classrooms
2018/1	Complete K-12 presentations; begin seed propagation in classrooms. Begin to advertise within the community for additional volunteer opportunities.
2018/2	Lead 2 volunteer outplanting trips – goal of 350 plants (from Objective 1)
2018/3	At this point classroom-grown seedlings should be mature enough for outplanting; coordinate school outplanting activities on-site. Lead 2 volunteer outplanting trips – goal of 450 plants (from Objective 1)

**Quarterly reporting for 2017: 3 = Sept. 1 – Sept. 31, 4 = Oct. 1 – Dec. 31; for 2018: 1 = Jan. 1 – Mar. 31, 2 = Apr. 1 – Jun. 30, 3 = Jul. 1 – Sep. 31.*

Objective 3: Establish a Hawaiian Cultural Garden.

- *Approximate budget for this activity: \$13,895*

Included in the Ala Mahamoe Site Restoration Plan is a 2.0 acre Hawaiian cultural garden. This garden, planted with traditional native plants, will be established to help people understand and appreciate the unique environmental and cultural resources of our native dryland forests. This information is essential to developing informed stewards who will protect and preserve the native forests that are so essential in groundwater capture and recharge. In addition to providing an educational opportunity, the cultural garden will provide cultural practitioners with plant material for la‘au lapa‘au, or traditional Hawaiian medicine.

During Year 1, KMWP will control invasive weeds and clear a 0.5 acre garden site. DOFAW partners will work with the Hawaiian Elder’s Council to identify culturally appropriate plants to be sourced, grown and planted at the site. Based on discussions with the Hawaiian Elder’s Council, KMWP will collect available seed on site and have plants propagated at the DOFAW Makiki Baseyard. If the appropriate seed is not available on-site, DOFAW partners will source seed on-island, if possible, and grow in the Makiki greenhouse. The goal for Year 1 is to have the garden site controlled and prepped, and to begin the outplanting of 100 plants. These plants, when ready, will be made available to cultural practitioners through a permit system that will be administered by DOFAW.

- *Quarterly Timeline*

Fiscal Year/ Quarter	Summary of Action and Deliverable
2017/3	Weed control, site clearing; consultation with Hawaiian Elder’s Council; prepare site design
2017/4	Seed collection, weed control, site preparation
2018/1	Seed propagation
2018/2	Site weeding; seed propagation
2018/3	Planting (100 plants)

**Quarterly reporting for 2017: 3 = Sept. 1 – Sept. 31, 4 = Oct. 1 – Dec. 31; for 2018: 1 = Jan. 1 – Mar. 31, 2 = Apr. 1 – Jun. 30, 3 = Jul. 1 – Sep. 31.*

Measureable benefit of volume of water re-charged, reused, or conserved

Measureable benefits from this project will include the total number of acres restored, the number of native plants outplanted, the volume of water recharged as a result of our actions, and the number of community members and volunteers engaged through outreach activities. A final report will summarize the methods and results of our activities.

We will estimate changes to aquifer recharge as a result of our management activities by using data generated by Engott (2011) in “A Water-Budget Model and Assessment of Groundwater Recharge for the Island of Hawai‘i.” This publication shows the estimated mean annual groundwater recharge as a percentage of water input for baseline conditions and provides a mechanism for evaluating potential recharge in similar landscapes throughout the island chain. The section of Hawai‘i Island most similar to the O‘ahu Ala Mahamoe site in the amount of rainfall it receives is from northeast Mauna Loa, which is comprised of the Hilo and Keeau aquifers. Using the water-budget for northeast Mauna Loa as our model along with the total number of acres converted from alien and mixed alien/native forest to open native forest, we will calculate an estimate of the overall change in aquifer inputs resulting from our restoration efforts.

Project sustainability, longevity, and operation and maintenance strategy

The goal of any restoration effort should be a restored native area that is healthy, viable, and self-sustaining, requiring a minimum amount of active management in the long-term. After the initial 3 to 4 year investment on the part of the state DOFAW and KMWP, it is hoped that these restored areas will be adopted and that these projects will be sustained in the long-term by residents of the surrounding community and local schools.

By the end of Year 1 we hope to have at least 2.7 acres of the 5.1 acre site treated, cleared and outplanting initiated. During Year 2 we will continue to expand control and clearing efforts to complete the entire 5.1 acres. Year 3 will largely be spent planting, with maintenance weeding and control. Year 4 will be dedicated to site maintenance. At that time, we should have an established volunteer base that is willing to take on the majority of the maintenance weeding and future inputs from KMWP and DOFAW will be limited. At that point, we will prepare a long-term management plan for the area and determine whether or not to expand our efforts beyond the 5.1 acre site.

DOFAW has committed to sustaining the project by providing KMWP with approximately \$12,000 annually for the foreseeable future, as well as providing up to \$5000 in plant materials/year. KMWP will continue to actively pursue funding to leverage these resources toward this project.

Experience and Capabilities

KMWP has been working actively since 1999 to protect the forested watershed areas of the Ko‘olau Mountains to secure the island’s supply of freshwater in perpetuity. The 10 staff employed by KMWP are the action arm of the organization, and spend the majority of their time protecting the forest from threats to the watershed such as feral ungulates, invasive non-native plants, insects, disease, and fire.

KMWP staff are adept and trained for working under challenging field conditions and all are knowledgeable about native plant identification, as well as non-native plant detection and treatment. While much of the work that we do occurs in the remote forested mauka regions of the watershed, we also have a large presence in more road accessible areas where we conduct volunteer-based restoration projects.

In 2013, KMWP hired its first full-time Outreach Specialist. Over the past four years our outreach program has grown steadily through multiple funding sources, enabling us to implement several volunteer projects and expand our community engagement activities. In the past year, 285 volunteers joined KMWP staff in the field, removing invasive weeds and planting native plants during 25 forest restoration work trips.

In 2014, KMWP began a project to replace weedy vegetation at Pali Lookout with native species that make up a healthy Hawaiian watershed forest. Pali Lookout is one of the most high-profile state parks in Hawai‘i, attracting over a million visitors a year. Volunteer trips to the Pali Lookout site started in June 2014 with the planting of kupukupu fern, ‘ōlapa, ‘ūlei, and the swaying grass kāwelu. Through various funding streams, we have been able to keep this effort ongoing since 2014, expanding the garden site considerably and planting a diversity of native species. KMWP leads monthly volunteer trips to assist with planting and maintaining this demonstration native forest site. In 2016, we installed interpretive signs to inform visitors about watershed protection. As a result of these successes, KMWP has developed a long-term strategy to maintain this project as a key component of our outreach program.

In 2014, we began a cooperative project with the state DOFAW to treat a large paperbark (*Melaleuca quinquenervia*) infestation along the Mānana Trail, O‘ahu. This invasive weed has undergone prolific dispersal and root sprouting across a 10 acre area and is rapidly displacing native species and moving into the native forest. Funding for this project has been continuous since its initiation in 2014. With the help of volunteers (totalling ~900 volunteer hours to date), we have been able to control paperbark in approximately half of the 10 acre focal area. We have developed a 5 year containment plan for the area, with goals outlined for both control and restoration. This plan calls for allowing native regeneration to occur naturally across much of the area, but we are supplementing this regrowth with outplantings of native koa whose seed we collected on site. Our arrangement with the DOFAW Makiki greenhouse staff to propagate seed for outplanting is similar to the one outlined in this proposal.

Literature Cited:

Burnett, K. and Wada, C.A., 2014. Optimal groundwater management when recharge is declining: a method for valuing the recharge benefits of watershed conservation. *Environmental Economics and Policy Studies*, 16(3), pp.263-278.

Engott, J. A. 2011. *A water-budget model and assessment of groundwater recharge for the Island of Hawai'i* (No. 2011-5078, pp. i-53). US Geological Survey.

Gingerich, S. B., & Oki, D. S. (2000). *Ground water in Hawaii* (No. 126-00). Geological Survey (US).

Figure 1. Map of the Moanalua watershed area, central O‘ahu, owned by the State of Hawai‘i Division of Land and Natural Resources (DLNR), located within the KMWP management boundary.

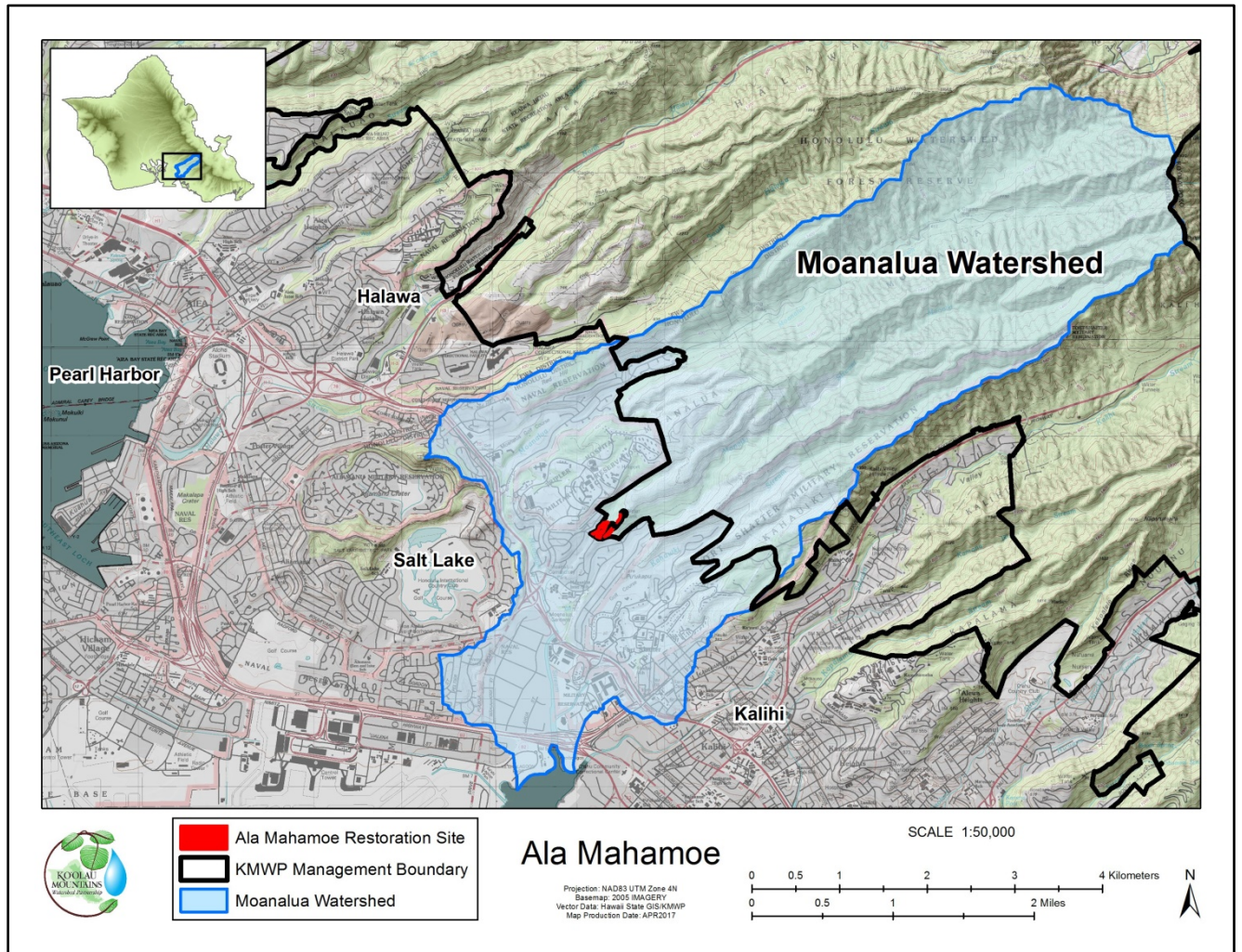


Figure 2. Map of the project Ala Mahamoe project site.

