



Protecting Forests for Water Supply Sustainability in Kohala, Hawai‘i

Phase 1

WaterSMART Environmental Water Resources Project Grant Application
State of Hawai‘i, Department of Land and Natural Resources Proposal
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The forests directly supply water to reservoirs in Kohala, Hawai‘i. Photo: Pictometry

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Executive Summary

November 29, 2021

Applicant: State of Hawai‘i, Department of Land and Natural Resources, Division of Forestry and Wildlife (Category A Applicant)

Location: Central Kohala Mountains, County of Hawai‘i, State of Hawai‘i

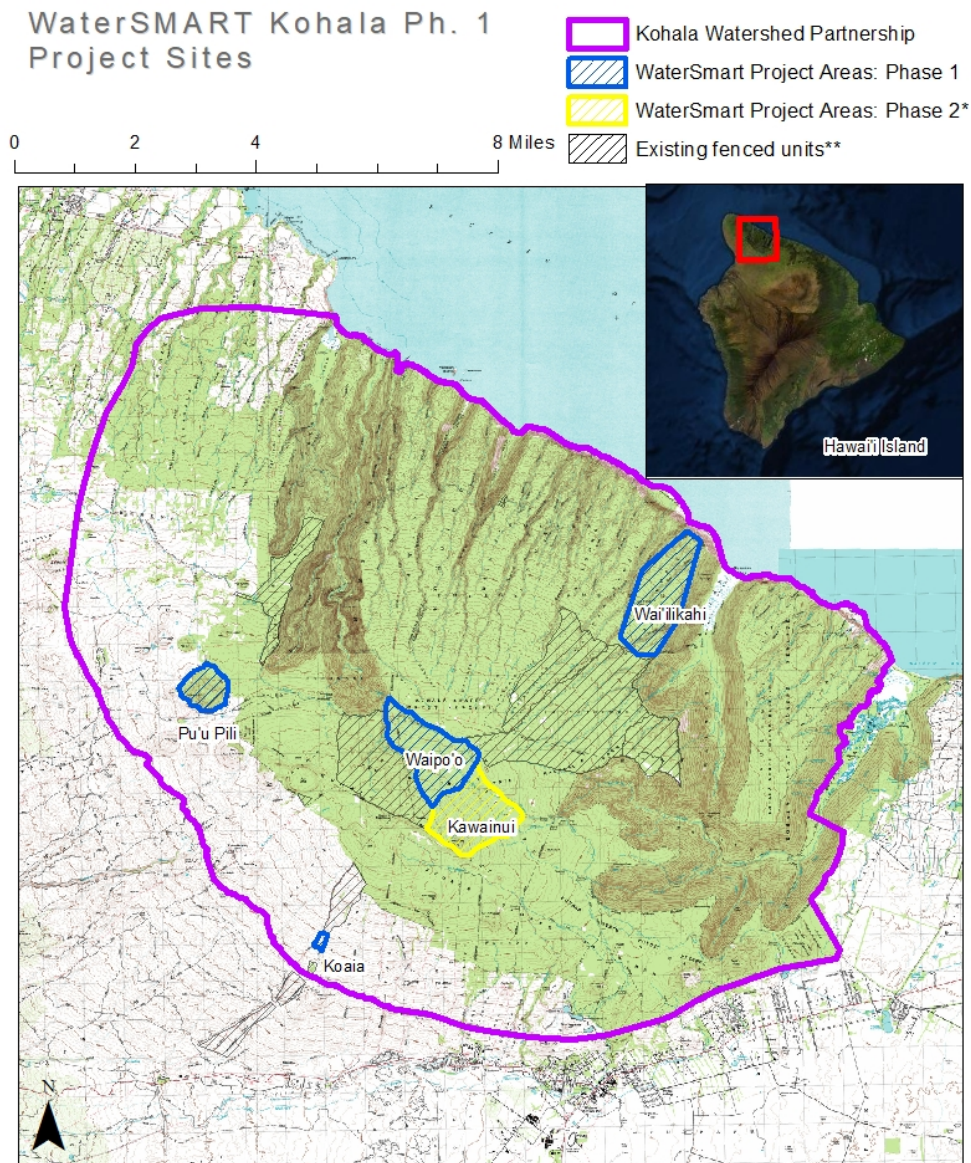
The Kohala Watershed Partnership, a watershed group including multiple state, county, and private organizations, proposes to protect 1,900 acres of forested and wetland habitat from high priority threats of invasive species and disease, and replant in riparian corridors. Forest protection will significantly improve the quantity and quality of water supplies in Kohala, a disadvantaged community where current withdrawals are near current or future sustainable yield limits.¹ The project sites supply both surface and ground water sources for municipal and agricultural users, and will directly benefit seven species of endangered plants and two endangered waterbird species. Restoring forests will reduce erosion that is a top priority threat for high-value stream habitats and coral reefs, and will also increase carbon sequestration. This project will have wide-ranging benefits across the 68,000-acre watershed partnership by improving coordination among the watershed group for collaborative planning and project implementation. This is a vetted and well-supported priority project of the Kohala Watershed Management Plan, and will involve and educate community volunteers.

The background and benefits of this project are similar to the “Phase 2” application also submitted for the FY22 EWRP. This Phase 1 application would provide a solid foundation for the management of the Kohala forests, including fencing and feral pig removal across 1,900 acres, watershed coordination, and outreach. The Phase 2 application would build on the Phase 1 project by adding a new 800-acre fenced unit to remove feral pigs. During discussions with the Bureau of Reclamation about these projects, it was suggested that they be separated to provide the Bureau more flexibility.

The project’s duration is October 1, 2022 until September 30, 2025. The project is not located on a Federal facility.

Project Location

The project is located on the island of Hawai'i (USGS Hydrologic Unit 20010000), in the island's northern mountain range. The locations range from 3 to 10 miles west and north of the nearest town of Waimea in the high-rainfall mountains that supply the entire region's water (155°42'23.241"W 20°5'51.849"N). The project sites are designated critical habitat and includes native Hawaiian mesic and wet forest, perennial streams, and wetland habitats: Freshwater Forested/Shrub Wetland habitat (PF03B), Freshwater Emergent Wetland habitat (PEM1B).² This project also includes some of Hawai'i's most important streams for native fish and invertebrate habitat.³



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DLNR DOFAW - September 2021

*Phase 2 is requested in a separate grant application.
**These are not part of either grant application, but included to show overall status of watershed protection on Kohala.

1 Four priority project sites across the Kohala Mountain will benefit from the Phase 1 of this proposal: Pu'u Pili, Koaia, Waipo'o, and Wai'ilikahi. This project would construct the Waipo'o and Wai'ilikahi units, and remove feral pigs within the fences. Pu'u Pili is already fenced, but feral pigs need to be removed. Koaia is a small fenced area where tree planting would occur.

Technical project description

The Department of Land and Natural Resources (DLNR), Division of Forestry and Wildlife, is applying as a partner of the Kohala Watershed Partnership. This innovative partnership was established in 2003 and consists of 11 major landowners and the County of Hawai'i Department of Water Supply. Watershed partnerships are voluntary organizations which pool resources to manage watershed priorities across the entire mountain range, rather than based on landownership boundaries. The partners are united by a Memorandum of Understanding that outlines their shared goals and relationships. Unlike the other partnerships across the state, Kohala is in a transition phase and lacks a coordinator and field crew that can plan and implement projects across landowner boundaries. This project would jump-start this capacity by hiring a coordinator and field staff to accomplish top-priority needs of the watershed, such as feral pig removal. With the capacity established by this grant, the partnership will then be poised to continue coordinating and planning into the future, following the successful model of the other partnerships.

The partnership has an approved management plan from 2007 that identifies feral pigs as a top threat to the forests in Kohala. This project will remove feral pigs from 1,900 acres. Fencing these forests from pigs has been a proven strategy to provide long-term protection for these ecosystems.⁴ Native Hawaiian forests have evolved over millions of years without defenses to hoofed animals, losing protections such as thorns and poisons. Hoofed animals are the main cause of the loss of native forest statewide.⁵ Less than half of Hawai'i's original forest remains.⁶ Feral pigs eat and trample native plants and endangered ground-nesting birds, uproot soil, spread invasive weeds, and spread diseases such as Rapid 'Ōhi'a Death. This disease has caused the death of over a million 'Ōhi'a trees, which are the keystone tree species in native forests.

The Hawai'i Conservation Alliance,⁷ a collaboration of 26 major conservation leaders representing government, cultural, educational and non-profit organizations, has published a position paper identifying fencing and hoofed animal removal as the first step toward native



2 Native forests recharge groundwater and streams, improving the consistency of water supplies.

Hawaiian forest protection.⁸ This project follows the established steps outlined by that paper to achieve the goal of complete and long-term feral pig exclusion. The State is contributing matching funding for fence construction, which provides a long-term solution for the exclusion of feral pigs from 1,900 acres. Bureau of Reclamation funds are requested for the labor, supplies, and transport costs associated with removing all the feral pigs from these fenced units, which involves shooting, trapping, and monitoring in rugged, dense forests that are almost entirely accessible by helicopter.

Without fences, it is not feasible to continuously reduce pig populations.⁹ Their populations can quickly rebound, even after being reduced by 40%¹⁰-70% per year.¹¹ Specifications for hoofed animal removal projects have been approved by the DLNR¹² which will guide fence construction, ongoing maintenance, and hoofed animal removal. These include building fences that cannot be burrowed under by pigs, trapping and hunting pigs, and installing game cameras and pig activity transects to determine the presence of pigs remaining in the fenced unit.



3 A new fence constructed in the Kohala forests. Note how moss covers all the trees and ground. The forest functions like a "sponge," capturing cloud water.

This project location is strategic because it primarily protects remaining native forest from loss, which is highly cost-effective compared with restoring areas after degradation. Protection – and restoration – of native forest is not possible in the presence of pigs, which roam wild across this mountain range.¹³

“By protecting the forests, we are protecting the “sponge” that allows rain, fog drip, and water to be captured and stored to replenish our aquifers and streams.”
- Hawai’i State Water Projects Plan 2020

A small portion of the project involves planting native trees in the Koaia corridor, which is an accessible riparian area that is ecologically important and provides an opportunity for community involvement. Additionally, a small request is included for removing priority invasive plants,

particularly ginger (*Hedychium gardnerianum*). These plants can be removed if found opportunistically during the other activities of this grant, so is efficient to include this item in this proposal. These invasive weeds are another key threat to the overall health of these native forests.

Performance Measures

This project will track the miles of fence constructed, and the number of pigs removed from fenced units that span 1,900 acres. Once pigs are removed from these units, it will be possible to estimate a reduction in pounds of fecal matter and carcasses that result from this project. Models have been developed that quantify the water recharge and the tons of aboveground carbon (Mg C) that these forests currently store. Native forest protection is also associated with an estimated 840 acre-feet per year of increased water recharge that will be maintained compared to a no action alternative (see Evaluation Criteria for explanation). This project's success at maintaining these forests can be mapped during the future landcover surveys conducted by the U.S. Geological survey. These would be most strategically conducted after the three-year performance period of this project. Other performance measures include the number of native trees planted, acres of invasive plants removed, and number of community members involved through volunteer trips and partnership meetings.

Evaluation criteria

E.1.1.1. Sub-Criterion A.1—Benefits to Ecological Values

The project increases water supply reliability for both human use and ecological values. This project improves both timing and quantity of water available, improves stream and riparian conditions for the benefit of plant and animal species, fish and wildlife habitat, riparian areas, and ecosystems. This project benefits multiple sectors for ecological, agricultural, and municipal water uses, as well as human health issues from degraded water quality, and carbon sequestration. The State regularly maintains and replaces fences so the project is anticipated to last longer than 35 years - the anticipated useful life of the fence. However, by keeping forests from converting into barren areas or non-native vegetation, the project also prevents an irreversible loss of a forest that has evolved on the mountain for many millions of years. Thus, this project could be considered to have much longer-term benefits.

The first ecological benefit is stopping pigs from eating and trampling large tracts of montane wet rainforest, including the endangered plant species found in this unit. Pigs also eat ground-nesting seabirds. While seabird nests are currently not known in the project sites, the forest could be repopulated by endangered seabirds. A population of the highly endangered 'ua'u (Hawaiian petrel, *Pterodroma sandwichensis*) is known from similar habitat approximately half a mile from one of the project sites (Wai'ilikahi), and this cryptic bird species may be prospecting and inhabiting Wai'ilikahi undetected. Many additional benefits will occur due to the location of this project. This area contains seven Federally listed endangered plant species, some of which are only found in this region. The Fish and Wildlife Service has drafted Recovery Plans for many of these endangered species, which consistently rank hoofed animal removal as a top priority for

the delisting of these species. Two wetlands are designated as “supporting” to endangered waterbird habitat– Waimanu valley, and the Kohala-Mauna Kea Ponds and Streams.¹⁴

Secondly, when feral pigs disturb large expanses of forest, they cause erosion and sedimentation which is a top threat to native stream fishes and invertebrates. After the forest degrades into barren pig wallows, its ability to capture cloud water also diminishes, causing less water replenishing streams and groundwater sources, which are needed both for habitat for the native stream ecosystems as well as human uses. Additionally, the barren land infiltrates water slower, and is more prone to flooding. Like pigs, these floods damage native vegetation and wildlife found within streams and stream banks, such as native *Megalagrion* (damselflies) species whose naiad life stage relies on intact streamside vegetation.

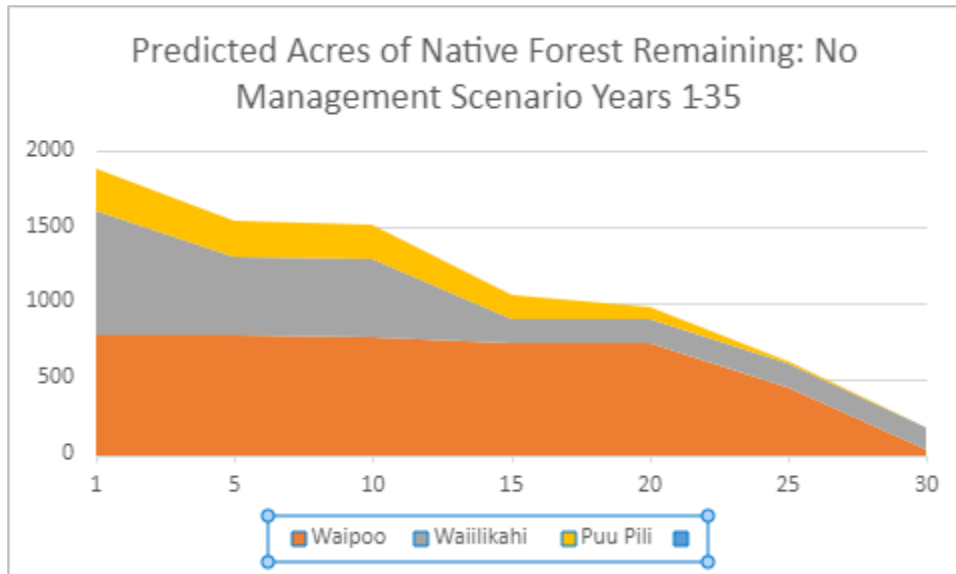
In the subsequent section, additional information is provided on how this project results in higher levels of carbon sequestration, as well as improved human health outcomes due to reduced pollution from feral pigs entering waterways and spreading lethal diseases.

E.1.1.2. Sub-Criterion A.2—Quantification of Specific Project Benefits by Project Type

Project Benefits for Drought Resiliency Projects Related to Fish and Wildlife

Protecting forest watersheds is the most cost effective and efficient way to absorb rainwater and replenish ground water.¹⁵ Numerous studies have indicated that native forests significantly increase water recharge as compared to alien forest, grassland, or barren areas in these high elevation sites.¹⁶ Native Hawaiian forests are highly complex, with canopies, mid-levels, and a well-developed understory and ground cover of ferns and mosses. These are well-adept at capturing fog moisture compared to monotypic alien forests, or grassland, or barren areas. Additionally, the well-vegetated ground cover of a native forests increases water infiltration rates, improving recharge compared to barren areas.¹⁷ Further, the most common non-native weed that inhabits this mountain is *Psidium cattleianum*, a small, fast-growing tree that has exhibited the ability to evapotranspire 27%-53% more water than native forests, causing extensive water loss across landscapes.¹⁸ For example, in East Hawai‘i invasive plants have already reduced estimated groundwater recharge by 85 million gallons a day.¹⁹ Feral pigs eat the fruits of *P. cattleianum*, and are a main vector that spreads this invasive plant.

This project will result in 840 acre-feet per year of increased water supplies. Currently, the five project sites provide 6.64 million gallons per day (7,437 acre-feet per year) of freshwater recharge.²⁰ If landcovers change as predicted under a “no management” scenario, within 35 years it is predicted that recharge would decrease by 840 acre-feet per year, as the native forest would eventually degrade into landcovers that are inferior at capturing and infiltrating groundwater.²¹ Alternatively, with this project maintaining the native forest cover, the lands are anticipated to remain able to recharge at current rates in the future. This data was modeled by a study conducted by the University of Hawai‘i Economic Research Organization and funded by the Hawai‘i County Department of Water Supply.



4 Over 30 years, the amount of native forest modeled to remain in these units decreases to zero without protection.²²

With the surface area of the vegetation capturing more cloudwater, the increased recharge will go both to improved water supplies for the forest plants and animals, increased stream flows, as well as increased infiltration to groundwater sources. The groundwater is either are tapped by wells for municipal uses, or can emerge in lower elevation springs that are critical habitat for unique native species that require spring-fed ecosystems such as native *Lymnaea* snails.²³

This project benefits two large river systems that are important riparian habitat. Portions of the streams that originate in the proposed Waipo‘o fenced unit are diverted for human uses, however another portion drains into the 12-mile long Wailoa river. This river has been ranked 10 out of 10 for its high native stream animal diversity (50 species documented shown in table below), and was also ranked as a High Quality Stream by the U.S. Fish and Wildlife.²⁴ The State of Hawai‘i Division of Aquatic Resources has ranked the Waimanu river that is fed by the Wai‘ilikahi unit 9 out of 10 for overall importance from a biological, topographical, and stewardship criteria.²⁵ This stream was also ranked by the U.S. Fish and Wildlife Service as a High Quality Stream, and contains twenty-nine native species of wildlife.²⁶ Protection of these fish species requires restoration of riparian vegetation to help decrease instream heating and reduce sediment loads, as well as increase the consistency of stream flows.²⁷ This project directly addresses those needs by improving water recharge which improves consistency and volume of streams, and reducing the erosion from feral pig diggings, which are more prevalent alongside stream banks.

Species List

Native Species

Crustaceans	Amphipod sp. <i>Atyoida bisulcata</i> <i>Macrobrachium grandimanus</i> <i>Macrobrachium sp.</i>
Fish	<i>Awaous guamensis</i> <i>Eleotris sandwicensis</i> Gobiid sp. <i>Kuhlia sandvicensis</i> <i>Kuhlia xenura</i> <i>Lentipes concolor</i> <i>Mugil cephalus</i> <i>Sicyopterus stimpsoni</i> <i>Stenogobius hawaiiensis</i>
Snails	<i>Neritina granosa</i> <i>Neritina vespertina</i> <i>Oxychilus cellarius</i>
Worms	<i>Myzobdella lugubris</i> unidentified worm

Native Species

Insects	<i>Anax junius</i> <i>Anax strenuus</i> <i>Chironomus hawaiiensis</i> <i>Chloropid sp.</i> <i>Dasyhelea hawaiiensis</i> <i>Eurynogaster sp.</i> <i>Hyposmocoma sp.</i> <i>Limnoxenus semicylindricus</i> <i>Limonia grimshawi</i> <i>Limonia jacobus</i> <i>Limonia sp.</i> <i>Limonia stygipennis</i> <i>Megalagrion blackburni</i> <i>Megalagrion calliphya</i> <i>Megalagrion hawaiiense</i> <i>Megalagrion sp.</i> <i>Microvelia vagans</i> <i>Orthocladus sp.</i> <i>Procanace acuminata</i> <i>Procanace constricta</i> <i>Saldula exulans</i> <i>Scatella cilipes</i> <i>Scatella clavipes</i> <i>Scatella hawaiiensis</i> <i>Scatella mauiensis</i> <i>Scatella oahuense</i> <i>Scatella sp.</i> <i>Scatella warreni</i> <i>Sigmataneurum sp.</i> <i>Telmatogeton sp.</i> <i>Telmatogeton torrenticola</i> <i>Tethina variseta</i>
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5 Native wildlife of the Wailoa River, which is fed by the Waipo'o unit.

The fence units also drain into the Waimanu wetland. The U.S. Fish and Wildlife Service has prioritized this habitat improvement action in the Recovery Plan for two endangered waterbirds that use Waimanu: the Hawaiian stilt or ae'o (*Himantopus mexicanus knudseni*) and the Hawaiian duck or koloa maoli (*Anas wyvilliana*).²⁸ This project will increase water supplies in the wetland habitat that these species depend on.



6 This project improves habitat for the endangered Hawaiian Stilt.



7 This project improves a wetland important for waterbirds.

The project will both make more water available, and make water available at a more advantageous time through increased groundwater recharge. Additionally, preventing the native forests from conversion to degraded landcovers will increase rates of water infiltration, which decreases flooding. As streams and wetlands diminish due to climate change and reduced water capture, these endangered bird species lose their aquatic food resources and loafing habitat. Conversely, large floods can damage nests and also wash away aquatic organisms that these birds feed on, so increasing infiltration rates will significantly benefit the habitat for these species.



8 Waterfalls originating from the Wai‘ilikahi Unit supply and purify water for wetlands that support water bird habitat.

The coastal areas that receive the runoff from these watersheds of the Pu‘u Pili and Koaia units have been prioritized by the National Oceanic and Atmospheric Administration as focal areas for reef protection and restoration, with land-based sources of sediment pollution having been prioritized as the main threat to these reef systems.²⁹

Project Benefits for Watershed Management Projects

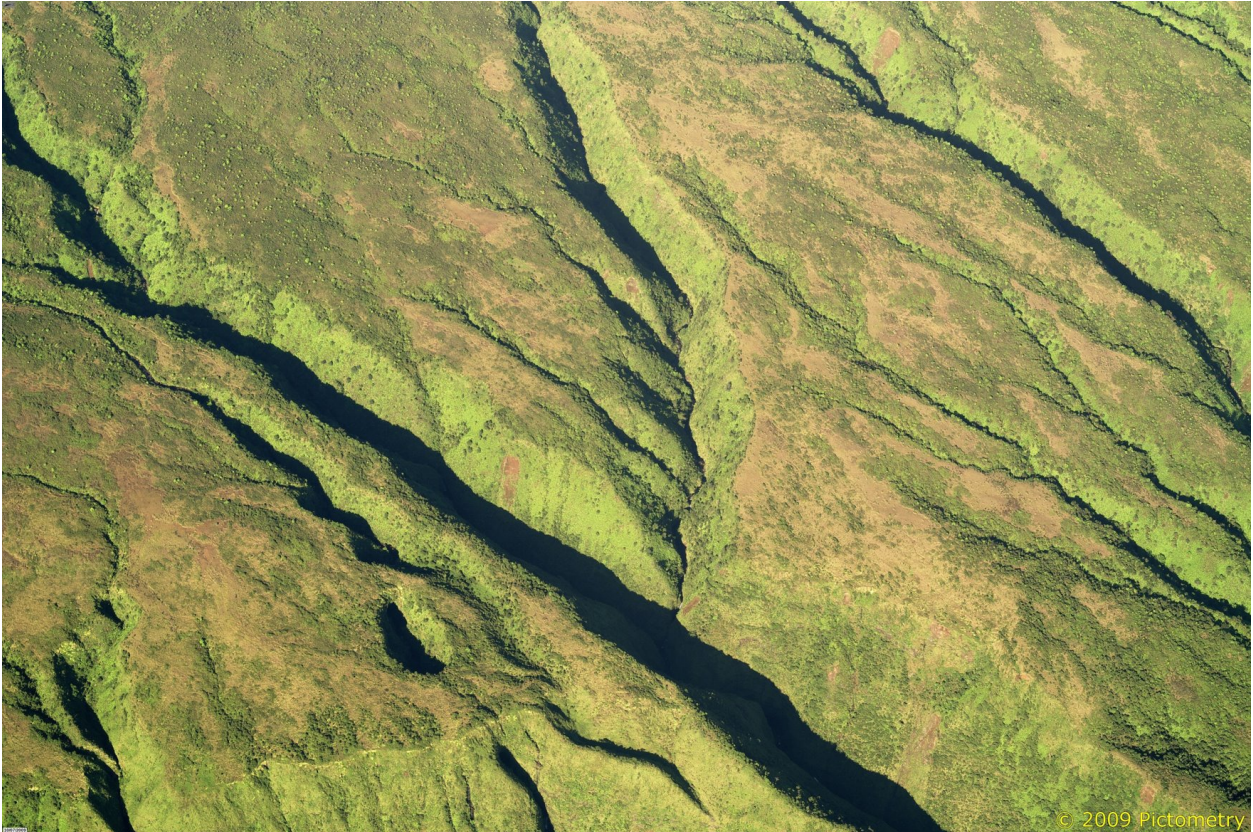
The project will result in long-term improvements to water quantity and quality by decreasing sediment and nutrient pollution. Studies have shown approximately 20-70% of the ground in a Hawaiian rainforest converted to bare soil due to pig digging.^{30,31,32,33,34} Potentially hundreds of acres within the 1,900 acre project are being exposed by pigs. Bare ground in Hawai‘i is exponentially more erosive than forests. When these areas recover after feral pig exclusion, the response is likely to change from annual erosion rates removing up to 0.5 mm of soil per year, versus undisturbed forested areas which have 0.01-0.05mm per year.³⁵



9 Widespread pig digging is evident in this ground-level view of a native forest.



10 Pigs have uprooted native Kohala forests, and converted them to muddy, barren areas.



11 Across the Kohala mountain, brown and tan-colored areas are where forests have been converted to pig wallows. The area represented by this photo includes approximately 150 acres, and includes part of the Wai‘ilikahi unit proposed by this project.

The U.S. Geological Survey has conducted a long-term study³⁶ of the south slope of Moloka‘i, revealing that sediment is eroding 100 times faster than historical rates before the hooved animals had impacted the landscape. Additionally, after hooved animals were significantly reduced, vegetation cover rebounded from 0% to 70% within 5 years. Preliminary results demonstrated a 10-fold reduction in erosion in that period.³⁷

As indicated above, this project reduces drought impacts, however it also reduces the likelihood of flooding. A main metric to measure flood risk is the rate a certain type of landcover infiltrates precipitation. Studies have demonstrated that native forests can infiltrate 4 times faster than grassland, and 15 times faster than bare ground.³⁸ Another comprehensive statewide study concluded that native forests that are fenced and free of hooved animals have 25.5% faster infiltration rates than adjacent unfenced forests.³⁹ Thus, feral pigs are already having a significant impact on infiltration rates in the existing forest, and if the forest continues to be converted to bare ground, the impacts will be magnified.

Hydrologists have analyzed other Hawaiian watersheds and determined that forest loss greatly increases the threat of floods. In the Kawela watershed of Moloka‘i, models predict that if the

forested landcover converted to shrubs, shrublands went to grasslands, and grasslands became barren, the top ten peak floods will increase in volume by 42.6%.⁴⁰

While some native stream animals are well-adapted to high water, some native insects are particularly negatively affected by floods because they lay their eggs in streamside vegetation or rocks which become dislodged during floods.⁴¹ Additionally, the increased sedimentation caused by flooding events is a threat to most native aquatic animals, as well as marine ecosystems.⁴² This project, which occurs in the headwaters of Wailoa stream and Waimanu, will reduce flooding and sedimentation for approximately 14 miles of river.

As mentioned earlier, this project will also protect seven endangered plant species from feral pigs which could eat, uproot, or trample individuals:




Species	Status
<i>Gardenia remyi</i>	Endangered
<i>Pritchardia lanigera</i>	Endangered
<i>Cyanea tritomantha</i>	Endangered
<i>Clermontia drepanomorpha</i>	Endangered, Designated Critical Habitat
<i>Stenogyne cranwelliae</i>	Endangered
<i>Nothoestrum breviflorum</i>	Endangered, Designated Critical Habitat
<i>Achyranthes mutica</i>	Endangered, Designated Critical Habitat

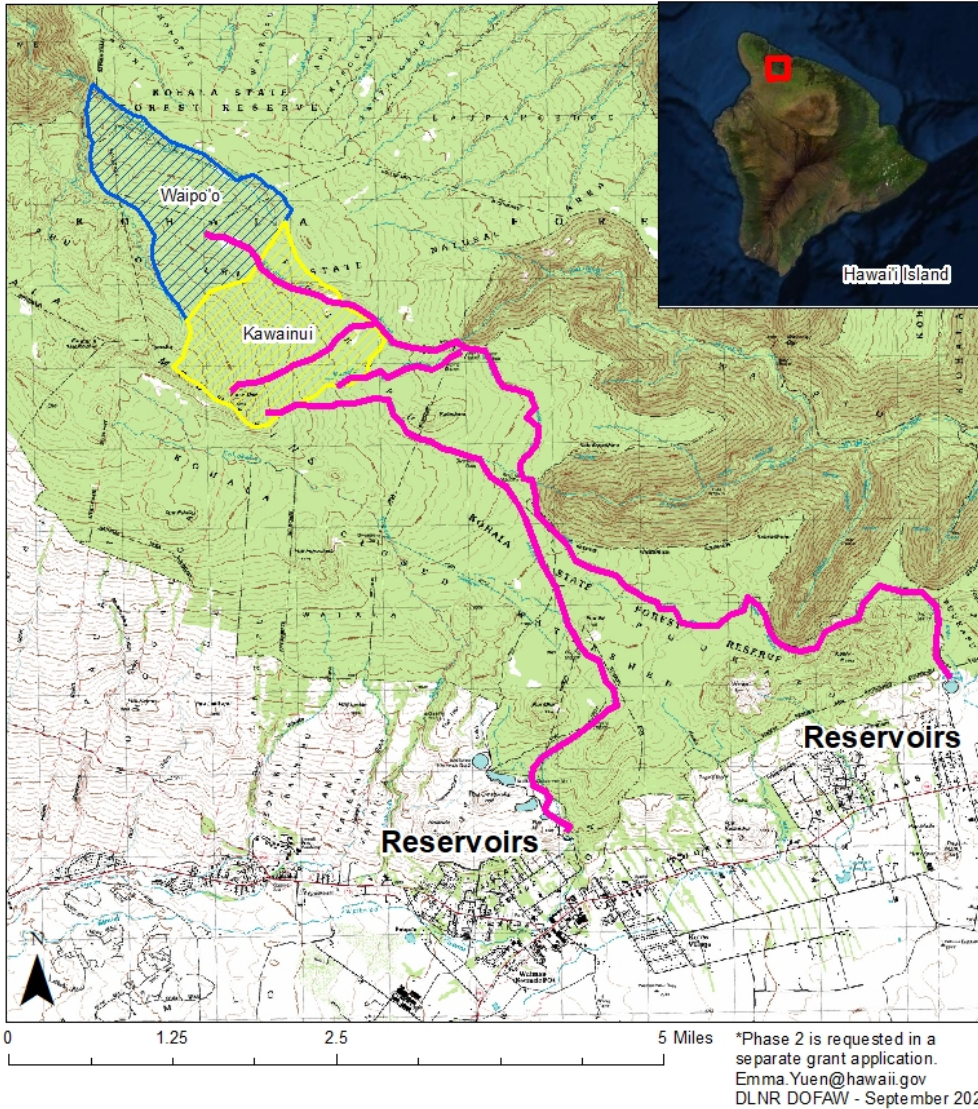
The recovery plans developed for the endangered species identify feral pigs as a top priority threat, and prescribe fencing and pig removal as a major management need that could support the future delisting of these populations. The Waipo‘o unit is approximately 15% of the designated critical habitat for *Clermontia drepanomorpha*, the Wai‘ilikahi unit is 37% of the critical habitat designated for *Nothoestrum breviflorum*, and the Koaia unit is 1% of the critical habitat designated for *Achyranthes mutica*.⁴³

Project Benefits for Multi-Benefits Projects:

The surface and ground water recharge benefits will serve the municipal and agricultural users of Kohala. Much of Kohala’s municipal water comes from this project area, including the main town of Waimea. This target aquifer also services agricultural uses critical for Hawai‘i’s current and future economic self-sufficiency and food sustainability. A network ditches from this area drains from these watersheds and feeds municipal uses and agricultural lowlands below. As the leeward Kohala region is predicted in all climate scenarios to become hotter and drier,⁴⁴ this vital agricultural region will depend even more heavily on the availability of water coming from the mountain forests.

Reservoirs Supplied by Waipo'o and Kawainui Fence Units

-  Waterways to Reservoirs from Fence Units
-  WaterSmart Project Areas: Phase 1
-  WaterSmart Project Areas: Phase 2*



This small restoration component is ecologically strategic as the stream from the Koaia unit flows into one of the most important coral reef areas in the State (Pelekane Bay). As mentioned earlier, forest protection reduces erosion, which has benefits to coral reef health as well as the economy. Tourism is the main economic driver of Kohala. Marine tourism is estimated to account for \$800 million per year for the State's economy.⁴⁵

In addition to causing forest loss, pigs also spread lethal diseases, such as non-tuberculous mycobacterial (NTM) lung disease and leptospirosis.⁴⁶ Hawai'i has the highest prevalence of age-adjusted NTM lung disease mortality in the U.S.⁴⁷ Pig wastes also spread fecal bacteria

(enterococcus).⁴⁸ As this area is one of the few places in Hawai‘i that uses surface waters for municipal uses, it is particularly important to reduce contaminants.

Pig population estimates range widely.⁴⁹ The proposed project could contain between 19-370 pigs.⁵⁰ The average wild pig produces 10 pounds of feces per day which are producing approximately 190-3,700 pounds of feces daily. To put this into perspective, this is equivalent to roughly 190-3,700 humans polluting the watershed with untreated feces on a per-weight basis.

Finally, these forests have spiritual and material importance to the Hawaiian culture.⁵¹ This project feeds the Wailoa river, which supplies the community of Waipi‘o valley with water. This valley supports the largest community of taro farmers in Hawai‘i island. Taro is the most important food in native Hawaiian culture and farming requires terraces irrigated from canals that divert water from streams. Ample water is critical to continue this agricultural practice and livelihood, but too much water can destroy the taro fields as well as the irreplaceable rock terraces that are still in use today. Ancient Hawaiians understood the importance of forests for their source of water – as evidenced by the saying “hahai nō ka ua i ka ulu la‘au” (the rain follows the forest). This project will help perpetuate the close connection between the forests and the native culture of Hawai‘i.

E.1.2. Evaluation Criterion B—Collaborative Project Planning

The proposed project was developed as part of a collaborative process by a watershed group, as defined in section 6001 of the Cooperative Watershed Management Act.

The Kohala Watershed Partnership is a watershed group that:

- is a grassroots, non-regulatory entity that addresses water availability and quality issues within the relevant watershed,
- is capable of promoting the sustainable use of water resources in the watershed,
- makes decisions on a consensus basis, and
- represents a diverse group of stakeholders, including livestock grazing, land development, philanthropic trusts, recreation, native Hawaiian assistance, irrigated agriculture, the environment, municipal water supplies, private property owners, state and local governments, and disadvantaged communities.

The 20-year plan addresses water quantity issues, water quality issues, and/or issues related to ecosystem health or the health of species and habitat within the watershed:

The overall goal of the plan is to maintain a healthy watershed and all its related ecosystem values and functions (e.g. ecological, economic, sociocultural). As such, management actions are directed at the major threats facing Kohala’s watershed: feral ungulates (hoofed animals such as pigs and cattle) and other non-native animals (such as rats and non-native aquatic species), invasive plant species (such as banana poka and kahili ginger), wildfire, and incompatible human activities. Primary management goals are: 1) protection of water resources; 2) prevention of new introductions and control of existing invasive plant species; 3) control of non-native animal populations; 4) native habitat and species protection; 5) wildfire management; and 6) management and promotion of compatible public uses. Major management actions related to these goals

are fencing, feral animal removal, invasive species control, outplanting and restoration, monitoring and surveys, research, and infrastructure support and maintenance (including development of new access trails).

Kohala Watershed Management Plan

One of the main purposes of the plan is to increase the reliability of water supply for ecological values, as well as human uses. The plan prioritizes where the highest-yield areas exist for fencing and hoofed animal removal, which includes the Waipo‘o, and Pu‘u Pili fence units. The plan also includes sections of high biodiversity units, including portions of the Wai‘ilikahi fence unit. Outplanting and community education are also identified as a need. Finally, this project will also fulfill management goal #7 of the plan: Provide Effective Administrative Coordination and Infrastructure. Funding will hire a watershed coordinator to implement the plan, assist partners in implementation projects, and hire a field crew. This will maintain communication among partners to facilitate information sharing, and help revise and update the watershed management plan.

The plan was developed collaboratively and with input from a diversity of interests. The members of the partnership unanimously approved the plan:

State of Hawai‘i, Department of Land and Natural Resources (applicant): The State is the landowner of this project and also provides funding to protect forested watersheds, as well as streams and marine resources. The State is also responsible for monitoring and managing the groundwater withdrawals.

Department of Hawaiian Home Lands: This agency provides homestead lots for native Hawaiians, which will benefit from the increased water availability and quality provided by this project.

County of Hawai‘i, Department of Water Supply: This agency monitors water levels, and manages multiple wells and water diversions in the project area.

Kahua Ranch, LLC: This private landowner has voluntarily protected a portion of their land by collaboratively working with the watershed partnership on the Pu‘u Pili fence unit, a priority for biodiversity and watershed function. This project seeks to remove pigs from this fenced unit.

Kamehameha Schools: This entity also recognizes the importance of a watershed coordinator and is pledging matching funds of \$60,000. This land estate was established in 1887 by the will of Princess Bernice Pauahi Pahi Bishop, and income from the trust operates an educational program for students. Their mission also includes protecting natural resources, which are inextricably linked to the Hawaiian culture.

The Nature Conservancy of Hawai‘i: The Nature Conservancy is active in terrestrial and marine monitoring and protection projects, including the working in the coral reefs that the target watersheds drain into.

Other private partners that contributed and approved the Kohala Watershed Management Plan include:

Laupahoehoe Nui, LLC, Parker Ranch, Inc, Pono holo Ranch, Ltc, Surety Kohala Corp, Queen Emma Foundation. These entities represent major agricultural and conservation-focused landowners that comprise a large part of the partnerships' land area, and are community leaders and major economic drivers in the region.

The management plan received extensive community input and involvement. Thirty entities were consulted with during the development of the plan, and community open houses were provided for input in three locations across Kohala. The plan also was sent to local hunters, hikers, volunteers, and native Hawaiian traditional practitioners.

The proposed activities of hoofed animal removal in this region complements the following collaborative plans:

1. State of Hawai'i Sustainable Hawai'i Initiative: This goal, announced by Governor Ige in 2016 to the World Conservation Congress, includes a goal to protect 30% of priority watershed forests by 2030. This measure is tracked by the acreage of native forests fenced from hoofed animals.⁵²
2. Fish and Wildlife Service Recovery Plans: The recovery plans for multiple endangered species that exist in the project area prioritize hoofed animal removal.⁵³
3. Hawai'i State Water Resource Protection Plan: This plan prioritizes native forest protection for water recharge.⁵⁴
4. Ocean Resources Management Plan: This plan prioritized hoofed animal removal and native forest protection for erosion reduction targets.⁵⁵
5. Hawai'i Drought Plan: This plan prioritizes hoofed animal removal and native forest protection for securing water supplies.⁵⁶
6. Hawai'i Forest Action Plan: This plan prioritizes hoofed animal removal and native forest protection for securing water supplies and many other benefits.⁵⁷
7. Hawai'i State Wildlife Action Plan: This plan identifies multiple endangered species that exist in the project area and prioritizes hoofed animal removal.⁵⁸
8. Hawai'i County Island Water Use & Development Plan: This plan prioritizes watershed forest protection and associated actions to maintain water supplies.⁵⁹
9. Department of Health, Non Point Source Management Plan: This plan prioritizes hoofed animal removal to reduce sedimentation and pollution of animal wastes into waterways.⁶⁰

E.1.3. Evaluation Criterion C—Stakeholder Support

As mentioned previously, a wide array of stakeholders were involved and supported the watershed management plan.

Letters of support are attached from partnership members as well as elected officials. Also included is the letter of matching funds pledged by Kamehameha Schools Bishop Estate. The same letters provide support for both the Phase 1 and 2 grant applications, which have similar goals but different locations in Kohala.

The Department of Water Supply of the County of Hawai‘i has supported the project by identifying Kohala as an important area that needs additional water recharge, and funded a study that quantifies the future of water recharge by analyzing anticipated landcover changes.⁶¹ This study provided the basis for the quantification of the water recharge benefits listed in the *Project Benefits* section. The data shows the most important areas within the watershed to maintain as forests for optimal water recharge.

This project is also supported by land managers from agricultural, environmental, and native Hawaiian assistance organizations. All these entities serve to benefit from improved forest health and increased water recharge.

The fencing and feral pig removal units does not duplicate, but rather complements other efforts on the mountain. These units are adjacent to other existing fence units. As more units are added, there are fewer boundaries exposed to feral pig pressure, improving the defensibility of all the fence units. Further, fewer weeds and diseases will spread if native forests are kept healthy in the core watershed sections. For example, the Waipo‘o unit connects two other fence units, creating one continuous corridor of forest protected from pigs. It also facilitates the construction of an additional unit to the east – the Kawainui unit – which will further expand this network of protected areas, and is requested in a second grant application (Phase 2). The watershed partnership coordinator will design plans for additional protected areas, which require careful reconnaissance of topographic barriers. These also must be limited in size, as pig removal becomes unfeasible in larger units. Gaining approval for these fences and providing the public outreach about these projects is also a critical task.

The State lands proposed to be fenced are Natural Area Reserve lands – the most protective designation for conservation. Adjacent private lands also contain similarly high-quality forests. The partnership coordinator will update the management plan to design additional fence units based on topography – rather than landowner boundaries, which is far more cost-efficient and beneficial for the environment. While the existing management plan identified regions where fencing is supported, the management plan does not specify exact fenceline locations or estimate a budget. The watershed partnership coordinator will undertake these tasks to implement the conceptual plans.

In addition to the State, there are other conservation entities working on complementary projects in Kohala. The Kohala Center, Inc., a non-profit organization that conducts research, education and land stewardship (including conservation and agriculture support) is also working to build and maintain fence units across the mountain, as well as support invasive plant control and reforestation projects. Another private organization, Terraformation, has established a pilot project in Kohala to replant forests and test solar desalination technology for irrigation. As large tracts of land in Kohala are denuded of forest, assistance from private entities will serve to augment, rather than replace, governmental efforts.

Diverse stakeholders supported the management plan, which proposed to fence approximately 13,000 acres. However, a few hunters opposed the plan in general, as it would reduce areas available to hunt pigs. This opposition was mainly targeted at proposed fence units that are closer to existing roads and trails, rather than those proposed in this application, which are extremely

difficult to access on foot. The Kohala Center is taking the lead to conduct outreach on the more accessible fence units, and will be holding small group meetings with hunters, as well as with those that may support the project. They will also be developing outreach materials such as webpage and social media posts. Outreach also involves connecting those who oppose the project with community members who can communicate their support, often from a perspective of aloha ‘āina (love of the land). This outreach shares traditional native Hawaiian values of respect for the upland forests (referred to as the “wao ‘akua” or “realm of the Gods”) and reverence and spiritual significance for individual types of plants, birds, and other forest inhabitants.

The proposed restoration portion of this grant is another key mechanism to gain support and address opposition or scrutiny of this conservation work. While the request for this activity is a very small part of the budget, it supports the entire project through outreach. Volunteers are shown the damage that pigs and invasive plants inflict on the forest, and become invested in the forest through their service. It also serves as an opportunity to answer questions and address concerns about land management. These planting trips will expand the network of community members that understand and recognize the value of forest conservation.



12 Tree planting in the Koaia corridor of Kohala with volunteers. Photo: Lara Tomov.

E.1.4. Evaluation Criterion D—Readiness to Proceed

This straightforward, shovel-ready project does not require any engineering or design work. The project sites are all on State land where land access is granted.

No additional permits or approvals needed to implement this project. The applicant has contacted the Bureau of Reclamation’s Lower Colorado Field Basin office to confirm that the regulatory

compliance for the project would be straightforward and able to be done quickly.⁶² There are no ground-disturbing components of the work nor use of heavy machinery. All activities proposed are covered under the environmental assessment completed for the Kohala Watershed Management Plan. A finding of no significant impact was completed for all these activities, which may be able to satisfy NEPA requirements as well. As part of that environmental assessment, consultation with the State Historical Preservation Division occurred pursuant to Chapter 6E, Hawaii Revised Statutes Historical Preservation Review. This may be referenced in a Section 106 consultation.

**State DLNR and Kamehameha Schools
Matching Funds
Expenditures during the grant performance
period: (10/1/22-9/30/25)**

Major Tasks	Sub Objective	Milestones	Start Date	End Date
Complete fence construction of Waip'o and Wai'ilikahi	Complete construction of fence	Feral pigs cannot enter into unit	10/1/2022	6/30/2023 (Waipo'o) 6/30/2024 (Wai'ilikahi)
Hire watershed partnership coordinator position	Re-establish partnership assist with field work, conduct planning	See budget narrative	10/1/2022	6/30/2023

Bureau of Reclamation Request

Fund labor to remove feral pigs in Waipo'o	Deploy traps; conduct ground hunts.	Pig activity transects record no fresh pig sign.	7/1/2023	9/30/2025
Fund labor to remove feral pigs in Wai'ilikahi	Deploy traps; conduct ground hunts.	Same as above.	7/1/2024	9/30/2025
Support watershed partnership coordinator	Re-establish partnership, assist with field work, conduct planning	See budget narrative.	7/1/2023	9/30/2025
Purchase helicopter transport for coordinator and field crew to access Waipo'o	Transit to remote locations via helicopter	n/a	7/1/2023	9/30/2025
Purchase helicopter transport for coordinator and field crew to access Wai'ilikahi	Transit to remote locations via helicopter	n/a	7/1/2024	9/30/2025
Purchase helicopter transport for coordinator and field crew to access Pu'u Pili	Transit to remote locations via helicopter	n/a	10/1/2022	9/30/2025
Fund labor to remove feral pigs in Pu'u Pili	Deploy traps; conduct ground hunts.	Pig activity transects record no fresh pig sign.	10/1/2022	9/30/2025

Fund labor to remove invasive plants opportunistically	Apply herbicide and/or mechanical control of invasive weeds	Incipient weed populations are reduced	10/1/2022	9/30/2025
Purchase supplies for feral pig removal	trapping supplies	n/a	10/1/2022	9/30/2025
Purchase tree seedlings and conduct volunteer restoration trips	Trees for volunteer planting trips; outreach	n/a	10/1/2022	9/30/2025
Record management actions in database	Submit data on deliverables	n/a	10/1/2022	9/30/2025

E.1.5. Evaluation Criterion E—Performance Measures

The project will monitor the progress and effectiveness of the project in multiple ways. The goal to protect 1,900 acres from feral pigs will be tracked by regularly scheduled feral pig activity monitoring transects and game cameras which are an established technique to locate and quantify levels of feral pigs remaining in a fenced unit. The State DLNR will also fund staff to routinely check fences to ensure they are still effectively blocking pigs, and have not been damaged by storms or fallen trees. This monitoring and maintenance will continue after the grant is finished, funded by State operating budgets.

The project will also be able to track improvement in water quality by reporting on how many pigs are removed from the units. This will allow the State to estimate the reduction in pounds of fecal matter and carcasses that result from this project.

State staff conduct vegetation transects on a regularly scheduled basis to determine the extent of the native forest and invasive plant threats.

The project will also track the number of seedlings planted (target: 4,000), and acres of invasive plant survey and control.

This project also includes the continued consultation and involvement of community members and agencies for planning next steps for watershed management. This involves conducting partnership meetings, as well as meetings with interested community members, and outreach events such as volunteer trips and other outreach forums that may be chosen (websites, social media, etc). Interactions will be reported as a performance measure.

Finally, the U.S. Geological Survey creates landcover and vegetation maps across Hawai'i. If new surveys are conducted in the future, the State will be able to determine success towards maintaining the native forest. This data will be compared with the modeled loss of native forest if the land remains unprotected.

E.1.6. Evaluation Criterion F—Presidential and Department of the Interior Priorities

1. Climate Change

In Hawai'i, protecting forests alleviates a wide range of threats from climate change predicted to cause hotter⁶³ and drier⁶⁴ conditions, and rising sea levels^{65,66} that infiltrate fresh water systems.⁶⁷ Forests will be even more critical for collecting fog drip with less overall rainfall.⁶⁸

Drought avoidance is particularly important in this region, which is ranked as the highest risk for agricultural drought, and a medium risk for water supply drought risk, under current and climate change scenarios.⁶⁹

This project will reduce greenhouse gas emissions by preventing deforestation. The project areas currently stores 409,412 tons of carbon (Mg C). This data is derived from the U.S. Forest Service and U.S. Geological Service⁷⁰ maps of the carbon sequestration detected during LiDAR surveys for the Hawaiian islands. If future landcover mapping exercises are conducted for these areas, their values can be compared to ensure that the aboveground carbon remains in these areas in the future. If the forests degrade further by hoofed animals and are replaced by invasive weeds, grasses, or barren areas, that existing stored carbon will be partially lost. On Hawai'i Island, some of the highest standing densities of carbon can be found in old-growth 'Ōhi'a forests.⁷¹ 'Ōhi'a forests, the dominant type of the remaining native forests, contain anywhere from 19 to 162 tons of carbon per acre; depending on climate and soil variables.⁷² Destruction of native forests by hoofed animals can reduce or practically eliminate stored carbon.⁷³ When invasive plants, such as *P. cattleianum* invade and eventually replace these forests, aboveground biomass can drop by 19-38%.⁷⁴ As mentioned previously, landcover models predict that the native 'Ōhi'a forest will transition to an invaded forest largely comprised of *P. cattleianum* and bare ground within 35 years if left unprotected from pigs.

The proposed project will contribute to climate change resiliency in other ways. Endangered Hawaiian plants are highly vulnerable to climate change as their habitats are specialized, small, and often fragmented.⁷⁵ Protecting existing habitat from loss is one of the main ways to mitigate threats from climate change on these species.⁷⁶ Controlling the spread of invasive, habitat-modifying species like feral pigs is particularly important as the climate becomes even more conducive to the spread of invasive plants, insects⁷⁷ and diseases.^{78,79}

2. Disadvantaged or Underserved Communities:

The entire Kohala region of the island qualifies as a "disadvantaged community," per the state censuses which reports that the region has less than 100 percent of the statewide annual median household income for the state.⁸⁰

The proposed project serves an underserved community as 69% of residents in Hawai'i county are non-white,⁸¹ and Hawai'i is the most diverse state in the nation.⁸² As mentioned above, this project will bring increased community benefits for water supply, as well as economic benefits (creating green conservation jobs, as well as expanded agricultural opportunities). Further, it will improve public health by eliminating water-borne diseases spread by feral pigs.

Hawai'i's native Hawaiian population particularly benefits from this project. While Hawai'i does not have any recognized tribes, the Hawaiian Homes Commission Act of 1920 set aside approximately 200,000 acres of land to establish a permanent homeland for native Hawaiians. The project area directly serves two major Hawaiian Homes communities of Pu'u Kapu and

Kawaihae which serves 940 individuals. ⁸³ The project also improves the quality of other Hawaiian Homes properties, which include the reservoirs and wetlands that collect the water from the project area. Additionally, as mentioned previously, the stream that flows from this area services a community whose main livelihood and cultural identity is tied to the ancient practice of taro cultivation, which is directly impacted by water availability and timing. The Chairperson of the Department of Hawaiian Homes has sent a letter indicating their support of this project.

Project Budget

FUNDING PLAN

The State matching funds proposed for this project are all secured and allocated by the State Legislature as part of the budget bill passed as Act 88, Session Laws of Hawai'i 2021. These funds are available during the project period.

BUDGET PROPOSAL

**State DLNR and
Kamehameha Schools*
Matching Funds**

Budget Item Description	\$/Unit	Quantity	Quantity Type	Cost
Expenditures during the grant performance period: (10/1/22-9/30/25)				
Contractual				
Helicopter support for fence construction	\$ 745.00	30	hours	\$ 22,350.00
Labor to build Waipo‘o and Wai‘ilikahi fences	\$ 28,559.67	10	months	\$ 285,596.70
Support watershed partnership coordinator	\$ 9,705.29	11	months	\$ 106,758.19
Subtotal Matching Funding for Project During Performance Period (10/1/22-9/30/25)				\$ 414,704.89

***All matching funds are from DLNR except \$60,000 of the watershed partnership coordinator position will be funded by Kamehameha Schools.**

Bureau of Reclamation Request

Budget Item Description	\$/Unit	Quantity	Quantity Type	Cost
Contractual				
Fund labor to remove feral pigs in 700-acre Waipo‘o and Pu‘u Pili Unit	\$ 28,559.67	7	months	\$ 199,917.69

Fund labor to remove feral pigs in 1,100-acre Wai'ilikahi Unit	\$ 28,559.67	8	months	\$ 228,477.36
Support watershed partnership coordinator	\$ 9,705.29	25	months	\$ 242,632.25
Purchase helicopter transport for coordinator and field crew to access Waipo'o and Pu'u Pili Unit	\$ 745.00	48	hours	\$ 35,760.00
Purchase helicopter transport for coordinator and field crew to access Wai'ilikahi Unit	\$ 745.00	60	hours	\$ 44,700.00
Fund labor to remove invasive plants	\$ 28,559.67	1	month	\$ 28,559.67
Supplies				
Purchase supplies for feral pig removal	\$ 15.96	2,889	traps	\$ 46,108.44
Purchase tree seedlings for volunteer restoration trips	\$ 5.00	4,000	trees	\$ 20,000.00
Equipment				
Vehicle	\$ 49,000.00	1	4WD Truck	\$ 49,000.00
Total Direct Costs				\$ 895,155.41
Indirect Costs				
Indirect charge	\$895,155.41	11.32	percent	\$ 101,331.59
Total Bureau of Reclamation Request				\$ 996,487.00
TOTAL ESTIMATED PROJECT COSTS				\$ 1,411,191.89

BUDGET NARRATIVE

Matching funds

Contractual

Labor to build Waipo 'o and Wai'ilikahi fences (Field Crew Labor) - The contractor is the Research Corporation of the University of Hawai'i (RCUH). The State has a cooperative agreement with RCUH to provide services that support both organizations' missions as both organizations are State entities. RCUH will employ field crew to build the Waipo'o and Wai'ilikahi fences. The costs are for four technicians and a 1 field supervisor. The costs per position per year are below.

Costs Per Year	Technician	Field Supervisor
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Salary	\$42,723.00	\$47,956.00
Fringe (35%)	\$14,953.05	\$16,784.60
RCUH Overhead	\$9,228.17	\$10,358.50
Total per year	\$66,904.22	\$75,099.10
Total per month	\$5,575.35	\$6,258.26

The cost for four technicians and a supervisor is \$28,559.67/month.

Helicopter time – helicopter transport will be required for staff to access the project sites. Currently, the State’s negotiated helicopter rate per hour is \$745/hour, which is based on the lowest price received in a competitive bidding process. This cost is anticipated to be incurred throughout the entire project period. This will be essential for the project as certain areas are so steep and rugged that they cannot be accessed on foot.

Support watershed partnership coordinator position - The contractor is the Research Corporation of the University of Hawai‘i (RCUH). The State has a cooperative agreement with RCUH to provide services that support both organizations’ missions as both organizations are State entities. RCUH will employ a coordinator to re-establish the Kohala Watershed Partnership, hire field crew, supervise field crew, train field crew and attend work trips, establish the office and baseyard and other needed infrastructure (vehicles, etc.), and organize and lead volunteer trips. The coordinator will also conduct other community outreach and landowner coordination, and update the management plan, which will include planning for additional fence units and potential other work items (invasive plant, fire, and other threat management, outplanting) and establish priorities. This will require the approval of the plan by the watershed partners in a consensus vote as well as outreach to the community. Cost per year is \$74,370 salary plus 35% fringe, and overhead costs (16%) taken by RCUH. As mentioned previously, \$60,000 of this line item will be funded by Kamehameha Schools, a member of the Watershed Partnership.



13 A network of ditches tap streams draining from the fence units to supply municipal and agricultural needs.

Bureau of Reclamation Request

Contractual

Fund labor to remove feral pigs in Waipo‘o, Wai‘ilikahi, and Pu‘u Pili, and remove invasive plants – See the “Field Crew Labor” line item above for the cost basis. The activities include scouting for pig sign, setting traps and game cameras, conducting ground hunts, and monitoring transects to record any fresh pig sign and confirm whether animals remain in the unit.

Additionally, invasive plants will be removed opportunistically as these activities are being conducted. An estimated number of months of field crew time has been assigned to reach the goal of zero feral pigs in each unit. Field trips will occur throughout the grant period - not consecutively.

Support watershed partnership coordinator – See the description above of the deliverables for this position, which is proposed to be funded both by the State and Bureau of Reclamation.

Helicopter time – See the description above for the deliverables and cost basis for this item.

Materials and Supplies

Feral pig traps – Traps are needed for pig removal, prices are based on previous low bids from competitive procurement processes.

Seedlings- Native tree seedlings will be purchased for community volunteer outplanting, prices are based on previous low bids from competitive procurement processes.

Equipment

A vehicle (4WD truck) is requested for the crew to access the project sites and helicopter landing zones. As the Kohala Watershed Partnership is just beginning to be re-established, no vehicles are available yet. This project supports the hiring of additional personnel who will need transportation arrangements. Renting is not an option as these vehicles accommodate field crews going off-road and staff would not be able to return the vehicles in the same clean condition. Car rentals on Hawai'i Island are not always available and are expensive, and cost more than the vehicle purchase over the term of the project. The estimated cost is based on based on previous low bids from competitive procurement processes.

Indirect Costs

The State of Hawai'i, Department of Land and Natural Resources, is proposing a NICRA of 11.32% for FY22.

Total Project Cost Table	
Source	Amount
Costs to be reimbursed with the requested Federal funding	\$ 996,487.00
Costs to be paid by the applicant	\$ 354,704.89
Value of third-party contributions	\$ 60,000.00
TOTAL PROJECT COST	\$ 1,411,191.89

Summary of Non-Federal and Federal Funding Sources	
Funding Sources	Amount
Non-Federal Entity: DLNR	\$ 354,704.89
Non-Federal Entity: Kamehameha Schools	\$ 60,000.00
Non-Federal Subtotal	\$414,704.89
Requested Reclamation Funding	\$ 996,487.00

Environmental and Cultural Resources Compliance and Required Permits or Approvals

As stated previously, the State environmental and cultural resources compliance processes have been completed and can be referenced when determining the Federal compliance. No additional permits or approvals are required.

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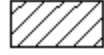
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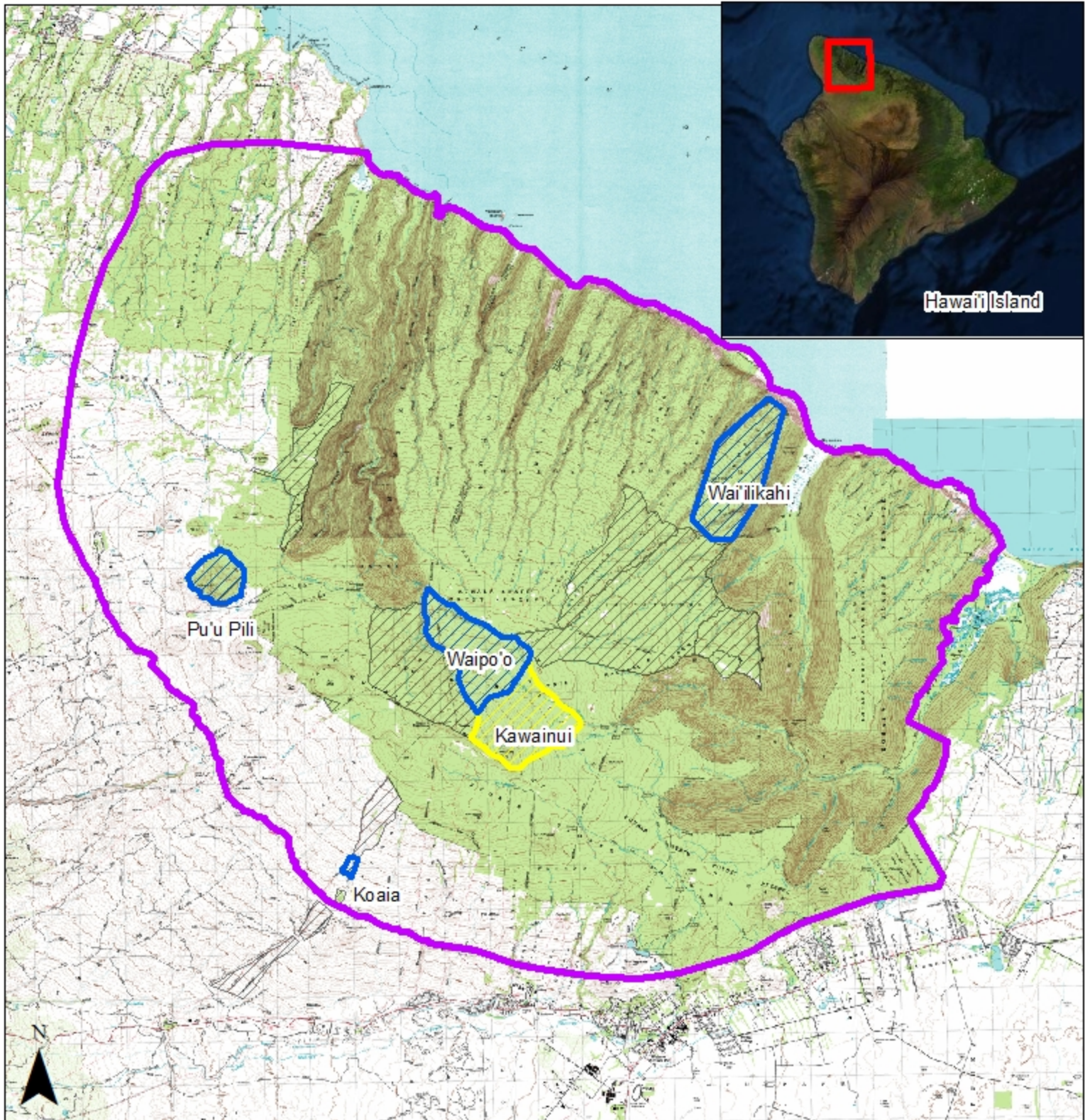
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WaterSMART Kohala Ph. 1 Project Sites

-  Kohala Watershed Partnership
-  WaterSmart Project Areas: Phase 1
-  WaterSmart Project Areas: Phase 2*
-  Existing fenced units**

0 2 4 8 Miles





KAMEHAMEHA SCHOOLS®

November 30, 2021

Bureau of Reclamation
Financial Assistance Operations
P.O. Box 25007, MS 84-27815
Denver, CO 80225

Re: U.S. Department of Interior, Bureau of Reclamation WaterSMART Project Grant

Dear WaterSmart Program Funding Review Committee:

Kamehameha Schools Bishop Estate (KSBE) strongly supports the proposal by the State of Hawai'i, Department of Land and Natural Resources, Division of Forestry and Wildlife (DLNR-DOFAW), as a member of the Kohala Watershed Partnership (KWP), to expand watershed protection in Kohala, Hawai'i Island. Hawai'i's watersheds and the native forests found within are essential to the health of our island ecosystems and the people of Hawai'i.

KSBE is a founding member of KWP, a voluntary, non-profit, public-private association of Kohala watershed landowners, organized to manage the watershed for the primary purpose of benefiting the public by, among other things, protecting water resources for the Kohala region, maintaining Hawai'i's native flora and fauna, and mitigating threats to the forested watershed, such as feral ungulates, fire, insects, diseases, and invasive non-plant species.

DLNR-DOFAW has applied for funding to further these efforts in the watershed, including to support a KWP coordinator position. KSBE has committed to providing funding of \$60,000 (\$30,000 for two years) to support the coordinator position. Without a coordinator, the partnership struggles to implement projects across landowner boundaries as most large landowners in Kohala lack the capacity (e.g. field staff, training, or financial resources) to protect their forests from threats. A watershed coordinator and crew would fill those major gaps and dramatically increase efforts.

Please note that KSBE's support is premised on the understanding that KSBE will not receive any federal financial assistance (as that term is defined in Title VI of the Civil Rights Act of 1964) under the grant. KSBE supports this proposal voluntarily and is not acting at the direction or compulsion of any governmental agency. Additionally, KSBE is not performing a public function that a government agency would otherwise be required to perform, such that KSBE could be deemed acting under color of state or federal law.

Bureau of Reclamation

November 30, 2021

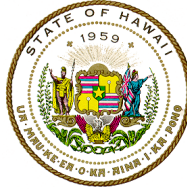
Page 2

KSBE recognizes and values the importance of DLNR-DOFAW's work, and we are pleased to support their efforts to protect the important watershed area(s) of Kohala. If you have any questions, please feel free to contact me either by phone at (808) 430-3262 or rebrowni@ksbe.edu.

Me ke aloha pumehana,

Mililani Browning

Mililani Browning
Natural Resources Manager, Natural and Cultural Ecosystems Division
Kamehameha Schools



The Senate

STATE CAPITOL
HONOLULU, HAWAII 96813

October 28, 2021

Bureau of Reclamation
Financial Assistance Operations
P.O. Box 25007, MS 84-27815
Denver, CO 80225

To Whom It May Concern,

I support the “Protecting Forests for Water Supply Sustainability in Kohala, Hawai’i” grant application.

Funding this project would expand the capacity to work across landowner boundaries to protect the watershed forests that my constituents rely upon.

The State has provided funds for watershed fencing in these areas, which will serve as grant match. Fences have been shown to dramatically reduce the spread of Rapid ‘Ohi’a Death, a major disease that threatens Hawaii’s most common tree. In a recent study, suspected ROD tree densities in neighboring areas containing pigs were two to 69 times greater than those found in fenced, pig-free zones.

The project area supplies ditches that are used for Waimea’s municipal and agricultural water supplies. Protecting the forest also is proven to dramatically increase freshwater supplies because the forests collect cloudwater moisture, and improve infiltration rates. The community of Waimea depends on these water sources, which are predicted to become increasingly drought-stricken in future decades.

This project will also provide many additional benefits, including supporting “green” jobs in our rural areas, carbon sequestration, and protection of the unique endangered species and rare ecosystems that exist only in the Kohala mountains.

I am pleased to offer my strong support for this important project.

Sincerely,

Senator Lorraine R. Inouye

Hawaii State Senate District 4 - Hilo, Hamakua, Kohala, Waimea, Waikoloa, Kona
Majority Whip; Chair, Committee on Water and Land; Vice Chair, Committee on Transportation



HOUSE OF REPRESENTATIVES
STATE OF HAWAII
STATE CAPITOL, ROOM 316
415 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96813

October 29, 2021

Bureau of Reclamation
Financial Assistance Operations
P.O. Box 25007, MS 84-27815
Denver, CO 80225

To Whom It May Concern,

I am writing in strong support of the grant application titled, "Protecting Forests for Water Supply Sustainability in Kohala, Hawai'i."

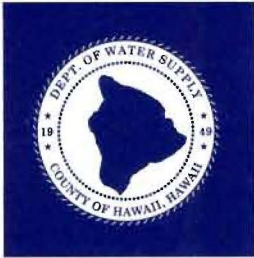
As the State Representative for House District 7, I represent the region of North and South Kohala and North Kona on Hawai'i Island. This project seeks to protect the upland forests in my district, which will improve water recharge and the resiliency of this area to climate change. Protecting these forests also improves carbon sequestration, and provides habitat for many unique and rare plants and wildlife.

Protecting these areas and providing coordination of the watershed partnership is a priority of the Kohala Watershed Partnership Management Plan. This plan was reviewed by the public and approved unanimously by all the members of the watershed partnership. This project will improve collaboration between the partners and jump-start the capacity for the partnership to take on additional projects in Kohala.

Thank you very much for your consideration of this important project.

Sincerely,

Representative David. A. Tarnas
Hawai'i State House of Representatives



DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAI'I

345 KEKŪANAŌ'A STREET, SUITE 20 • HILO, HAWAI'I 96720
TELEPHONE (808) 961-8050 • FAX (808) 961-8657

November 18, 2021

Bureau of Reclamation
Financial Assistance Operations
P.O. Box 25007, MS 84-27815
Denver, CO 80225

Dear Bureau of Reclamation:


The County of Hawai'i, Department of Water Supply (DWS), supports the "Protecting Forests for Water Supply Sustainability in Kohala, Hawai'i" grant application.

DWS has prioritized the Kohala region as an area where current withdrawals are near current or future sustainable yield limits. DWS has collaborated with the University of Hawai'i, Economic Research Organization, to model the highest priority forests within this region to protect from conversion. This model estimates the amount of fresh water recharge occurring and which areas are most likely to convert to non-native vegetation or barren areas.

This project area is in some of the highest-ranking areas for cost effectiveness, per the model. Almost all the native forests in this area are projected to disappear within the next 35 years if no action is taken to reduce threats. Once these forests are lost, they are impossible to restore back to their original composition, which is a highly efficient water-collecting structure.

Please support this project to improve water supplies in Kohala. We appreciate your consideration; and if there are any questions, please do not hesitate to contact us at (808) 961-8050.

Sincerely yours,

 Keith K. Okamoto, P.E.
Manager-Chief Engineer

smc

DAVID Y. IGE
GOVERNOR
STATE OF HAWAII

JOSH GREEN
LT. GOVERNOR
STATE OF HAWAII



WILLIAM J. AILA, JR.
CHAIRMAN
HAWAIIAN HOMES COMMISSION

TYLER I. GOMES
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS

P O BOX 1879
HONOLULU, HAWAII 96805

November 19, 2021

Bureau of Reclamation
Financial Assistance Operations
P.O. Box 25007, MS 84-27815
Denver, CO 80225

SUBJECT: Letter of Support for – Protecting Forests for Water Supply Sustainability in Kohala, Hawai'i

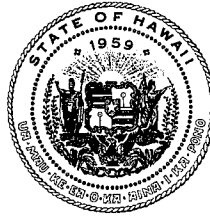
The State of Hawaii, Department of Hawaiian Home Lands (DHHL) supports this grant application by the Department of Land and Natural Resources (DLNR) to provide long-term watershed protection through fencing and feral pig removal, as well as support partnership coordination, outreach, and planning across Kohala Watershed Partnership (KWP) lands. This project directly benefits the Hawaiian Home Land Trust and beneficiary communities in the Waimea Nui area that rely on KWP lands as an important source of their municipal water.

As a KWP Partner, DHHL supports landscape scale watershed and native forest ecosystem protection and management across partnership lands and will directly benefit from increased water quantity and quality in wetland and estuary ecosystems on DHHL lands in Waimanu Valley.

Aloha

William J. Aila, Jr., Chairman
Hawaiian Homes Commission

DAVID Y. ICE
GOVERNOR OF HAWAII



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

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

ROBERT K. MASUDA
FIRST DEPUTY

M. KALEO MANUEL
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

November 23, 2021

Bureau of Reclamation
Submitted electronically via Grants.gov

SUBJECT: Official Resolution: Protecting Forests for Water Supply Sustainability in Kohala, Hawai'i Phase 1

This letter certifies that this application has been approved to be submitted on behalf of the Division of Forestry and Wildlife, Department of Land and Natural Resources, State of Hawai'i. As the applicant, the Division of Forestry and Wildlife will work with Reclamation to meet established deadlines for enter into a grant or cooperative agreement. Matching funds proposed have been secured for this project through allocations of State capital improvement project funds and general funds.

For further questions, please contact Emma Yuen, Natural Resources Management Program Specialist at Emma.Yuen@hawaii.gov or (808) 366-4788.

Sincerely,

David G. Smith, Administrator
Division of Forestry and Wildlife