



# Planning for Community Resilience Through Watershed Restoration on Moloka‘i

WaterSMART Cooperative Watershed Management Program Phase I Grant Application  
State of Hawai‘i, Department of Land and Natural Resources Proposal

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## Executive Summary

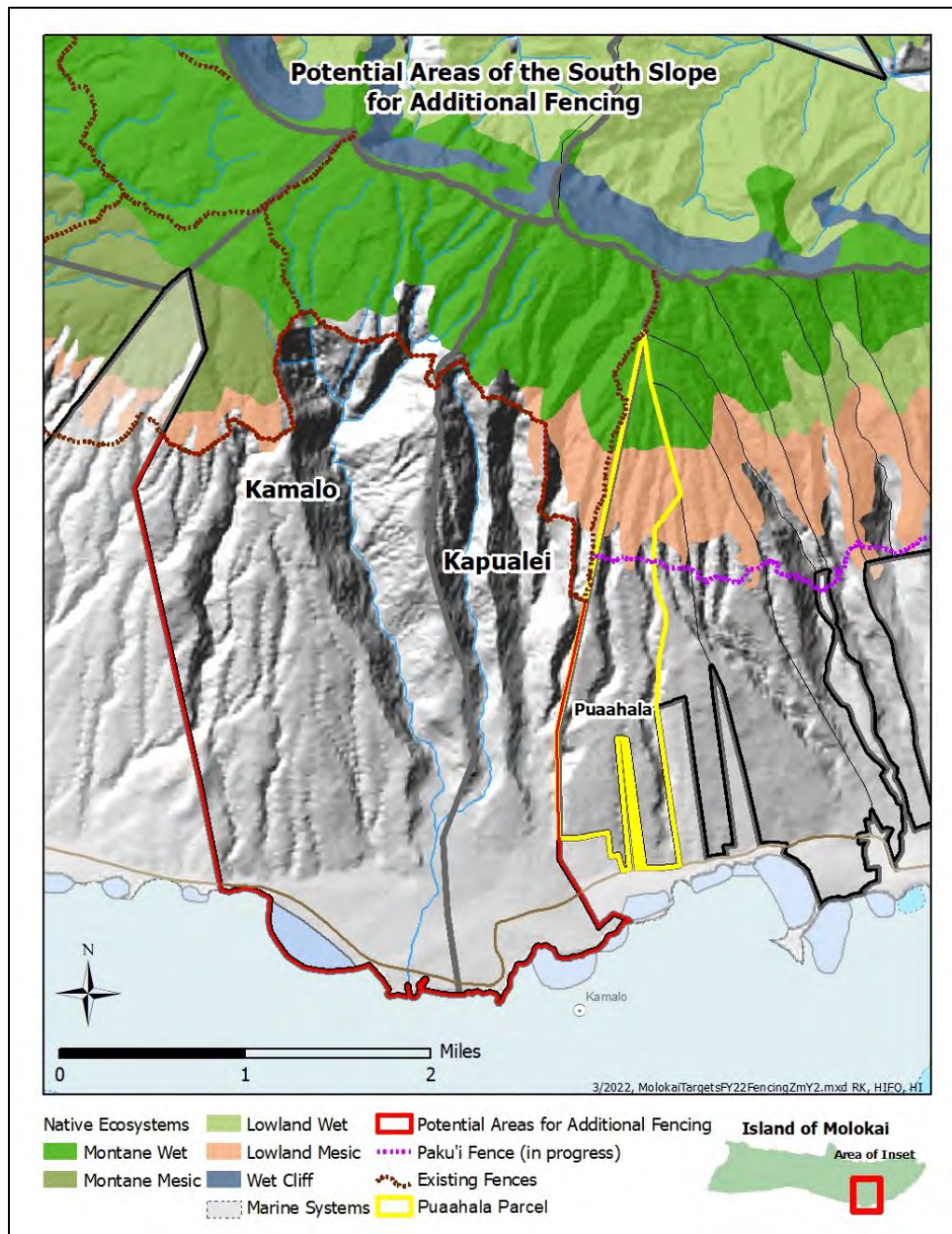
Date: March 31, 2022

Applicant: Hawai‘i Department of Land & Natural Resources, Division of Forestry & Wildlife  
Location: East Moloka‘i, County of Maui, State of Hawai‘i

The State of Hawai‘i, Department of Land and Natural Resources (DLNR), Division of Forestry and Wildlife (DOFAW) will create a plan for management for priority areas in East Moloka‘i. This effort is part of a larger vision to care for East Moloka‘i’s remaining native forests and realize holistic watershed management from mauka (mountain) to makai (ocean). These forests sit atop and help recharge Moloka‘i’s “sole source” aquifer – the source of residential water supplied by the County of Maui. Protecting forest watersheds is the most cost effective and efficient way to absorb rainwater and replenish ground water.<sup>1</sup> Forests also absorb water into the ground faster, which prevents the water from running off and causing erosion and water quality issues along the coast. Moloka‘i’s forests are threatened by non-native feral deer, pigs and goats, which roam wild and trample and devour vegetation, and spread weeds. Protecting what is left of the island’s native forests, in addition to restoring degraded areas across the landscape, is critical in building and maintaining island-wide water supply. The proposed project will focus on two specific components to East Moloka‘i’s long-term planning efforts: (1) amend the existing “East Moloka‘i Watershed Partnership 2030 Management Action Plan” to include new fence plans for Kamalō-Kapualei and (2) draft the Pua‘ahala watershed management plan for the recently acquired 800-acre property. Existing partnerships are key to the success of this project. Since 1999, the East Moloka‘i Watershed Partnership (EMoWP), coordinated by The Nature Conservancy (TNC) of Hawai‘i, has united landowners and managers across East Moloka‘i with the goal to protect the forests, which, in turn, protects the quantity and quality of Moloka‘i’s<sup>2</sup> water supply. This planning project will benefit from the existing long-standing relationships across multiple landowners and agencies, ensuring that the project is a collaborative planning effort that is accepted by the Moloka‘i community.

## Project Location

The project is located on the island of Moloka‘i (USGS Hydrologic Unit 20050000), on the east side of the island. The areas of Kamalō, Kapuālei, and Pua‘ahala, are prioritized because they contain some of the largest watershed areas in East Moloka‘i, including the headwaters of perennial streams and intact native forest, which is vital to water collection and storage. These areas are also threatened by expanding populations of invasive axis deer, which has been declared a state of emergency in Maui County.<sup>3</sup>



*Map of project area.*

## Technical project description

### **Applicant Category:** Existing Watershed Group

The State of Hawai‘i, DLNR, DOFAW is applying as a partner of the East Moloka‘i Watershed Partnership (EMoWP). This innovative partnership was established in 1999 and now consists of 27 major landowners and land managers in East Moloka‘i. Watershed partnerships are voluntary organizations which pool resources and seek to manage watershed priorities across the entire landscape, rather than based on landownership boundaries. The partners are united by a Memorandum of Understanding that outlines their shared goals and relationships.

Members of the EMoWP pool funding for a full-time, 4-person natural resource team led by a watershed coordinator. Collectively, this partnership has been able to protect over 55,000 acres, and has conducted large invasive plant removal, non-native feral animal control, wildfire prevention, and outplanting projects to improve forest health. The actions of the partnership are guided by the “East Moloka‘i Watershed Partnership 2030 Management Action Plan” that was approved by all members of the partnership in 2020. The first plan was drafted in 1999 and contained conceptual goals for a few specific areas in East Moloka‘i. The plan was updated in 2015 and 2020 with much more refined identification of natural resource priorities, including future areas to manage and fence. While conceptual agreement exists for the proposed fencing at Kamalō-Kapualei, this proposal would fund the technical scoping to determine the exact fence location and outreach to private landowners and stakeholders in the community. In addition, this proposal would fund a separate watershed plan for the 800-acre Pua‘ahala property, which was acquired by DOFAW in 2020. This property extends from the top of the mountain down to the coast and is in the center of a contiguous network of protected areas that are managed by the partnership. The Pua‘ahala management plan is needed to direct the implementation of specific natural resource actions in this area that will protect water supply. Prior to DOFAW acquiring, the property sat unmanaged by the private landowner. It will also be the first mauka (mountain) to makai (ocean) watershed plan in the entire state, serving as an example of holistic watershed planning for others to replicate.

### **Eligibility of Applicant**

The State of Hawai‘i, DLNR, DOFAW is a listed eligible applicant. The State of Hawai‘i is able to significantly affect the quality and quantity of water in these watersheds by improving forest health. The State of Hawai‘i is a member of the East Moloka‘i Watershed Partnership, which is a grassroots, non-regulatory legal entity that is coordinated by The Nature Conservancy (TNC) of Hawai‘i.

### **Goals**

The primary goal of this project is to increase the water supplies of this region by maintaining the remaining native forest on the mountain.<sup>4</sup> Numerous studies have indicated that native forests significantly increase water recharge as compared to alien forest, grassland, or barren areas.<sup>5</sup> 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, furthering recharge

compared to barren areas which can infiltrate up to 15 times slower than forests, greatly increasing runoff and erosion.<sup>6</sup> Furthermore, a common non-native weed that inhabits areas in East Moloka‘i 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.<sup>7</sup> For example, on Hawai‘i Island invasive plants have already reduced estimated groundwater recharge by 85 million gallons a day.<sup>8</sup> Another comprehensive statewide study concluded that forests that are fenced and free of hoofed animals like axis deer have 25.5% faster infiltration rates than adjacent unfenced forests.<sup>9</sup> Not surprisingly, in areas that become barren due to hoofed animal damage and invasive plants, infiltration is less which can exacerbate erosion and sedimentation.



*Native forest in East Moloka‘i collects rain and slows down the flow of water to the coast.*

Forest loss is the primary threat to water quality and many of Hawaii’s most important coastal ecosystems. The reef on the southeastern shore of Moloka‘i is the most extensive in the Hawaiian islands. The largest threat to that reef is sedimentation, primarily from conversion of forests to barren areas due to hoofed animals.<sup>10</sup> The U.S. Geological Survey has conducted a long-term study<sup>11</sup> of the southeastern slope, revealing that sediment is eroding 100 times faster than historical rates before the hoofed animals had impacted the landscape. Additionally, after hoofed 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.<sup>12</sup>



*Native forest of East Moloka'i resembles a giant sponge, with 'ōhi'a trees, mosses, shrubs, and ferns absorbing water.*

Fencing these forests and removing non-native animals like axis deer has been a proven strategy to provide long-term protection for these forests.<sup>13</sup> Native Hawaiian forests have evolved without defenses to hooved animals, losing protections such as thorns and poisons. Hooved animals are the main cause of the loss of native forest statewide.<sup>14</sup> Less than half of Hawaii's original forest remains.<sup>15</sup> Not only do hooved animals devour, uproot, and trample forests, they spread invasive weeds and are now known to spread an alarming fungal disease called rapid 'ōhi'a death.<sup>16</sup> This disease has caused the death of over a million 'ōhi'a trees, which are the keystone tree species in Hawaii's native forests.

Without fences, it is not feasible to continuously reduce animal populations.<sup>17</sup> Their populations can quickly rebound, even after being reduced by 40%<sup>18</sup>-70%.<sup>19</sup> Specifications for hooved animal removal projects have been approved by the DLNR<sup>20</sup> which will guide fence construction, ongoing maintenance, and hooved animal removal.

Statewide, approximately 270,000 acres are fenced from hooved animals. Approximately 7,800 acres in East Moloka‘i are fenced and protected, or have fences under construction. In terms of acres protected, East Moloka‘i has fewer areas protected from hooved animals than other places in the state. This is partially attributed to community disagreement about the value of hooved animal removal and fences. This project will provide much needed outreach to stakeholders in the community prior to fence construction and create a fencing plan for Kamalō-Kapualei, protecting thousands more acres. In addition, the project will draft a comprehensive mauka (mountain) to makai (ocean) watershed management plan for adjacent lands at Pua‘ahala. The property includes some of the last remaining native forest in East Moloka‘i and Moloka‘i’s largest freshwater pond (Paialoa). Holistic management from the top of the mountain, down to the coast has never been done before. A management plan will help direct management activities, so they align with partnership natural resource goals and community interests.



*Hoofed animals such as axis deer, eat and trample native Hawaiian forests creating barren areas devoid of vegetation. Kawela, Moloka‘i.*



*Impacts from hoofed animals and forest loss along Moloka'i's southeastern slope is causing 100 times the natural rate of erosion.*



*This fence line, which runs diagonally across the photo, allows a fenced forest to survive. The unfenced area has been decimated by hoofed animals. Leeward Haleakala, Maui.*



## **Approach**

The project will focus on two specific components to East Moloka‘i’s long-term planning efforts: (1) amend the existing “East Moloka‘i Watershed Partnership 2030 Management Action Plan” to include new fence plans for Kamalō-Kapualei and (2) draft the Pua‘ahala watershed management plan for the recently acquired 800-acre property.

These planning efforts involve the following approach:

- Meetings and outreach to private landowners and community stakeholders
- On-the-ground reconnaissance of proposed fence route

These proposed activities fall into the following categories of Task Areas:

### ***Task B – Watershed Restoration Planning:***

*Completing a watershed restoration plan, improving existing restoration plans, or conducting water quality or quantity studies needed to provide baseline information about the watershed.*

*Improving existing restoration plans* - In 2020, EMoWP finalized the “East Moloka‘i Watershed Partnership 2030 Management Action Plan”. Goals of the plan include “propose and complete new fence projects to protect native forest systems.” A future fence at Kamalō-Kapualei is not mentioned in the action plan but in the last year has become a priority because of expanding populations of axis deer and other hooved animals. A fence will reduce pressure from hooved animals moving into upper elevation areas that contain native forest. It will also minimize the need to aerial shoot (currently the most cost-effective way to remove large populations of hooved animals from this landscape) because the fence will create a barrier to contain hooved animal migration so they can be permanently removed from these areas. Other fences exist in East Moloka‘i, however other fences are not high enough and deer can easily jump over them. Most of Molokai’s remaining native forest is almost completely unprotected from deer. Creating new fence plans will include the specifications necessary to exclude deer.

*Completing a watershed restoration plan* - In 2020, DOFAW acquired the 800-acre Pua‘ahala property. Without acquisition, it would be a missing link in the protection of the entire region. Now that the property is secured, DOFAW and the partnership want to implement natural resource management actions across the entire watershed from the top of the mountain to the ocean. However, no management plan exists to direct the focus of this work. The Pua‘ahala property contributes water to the ‘Ualapu‘e Aquifer – part of the “Moloka‘i Sole Source Aquifer”. This aquifer sits below Pua‘ahala and supplies water to East Moloka‘i residents for domestic (drinking) and agriculture use. The aquifer is entirely replenished by rainfall. Protection and management of Pua‘ahala’s 800 acres will ensure the protection of the intact upland forests that help capture and store this rainfall, replenishing the underground aquifer and restoration of the low lands. The property is also threatened by expanding populations of axis deer that eat native vegetation and cause widespread erosion. A management plan will complement the Kamalō-Kapualei fence planning efforts and outline the goals for axis deer removal and help reduce erosion into the State’s longest fringing coral reef. In adjacent areas that have been protected through fencing and hooved animal control, the recovery of native species and water capture has been dramatic. This type of response could occur in the lower elevation sections of the Pua‘ahala property, underscoring the importance of developing a management

plan to direct the scope of natural resource management for the whole watershed, including wetland areas that are home to endangered water birds. The Pua‘ahala watershed management plan will identify strategies and actions for restoration in the watershed that will help with water capture and storage.

*Conducting mapping and other technical analyses, including obtaining data, performing modeling, or developing goals and benchmarks for the restoration plan.*

This project will involve initial axis deer population surveys to inform management planning at Pua‘ahala and fence plans for Kamalō-Kapualei,.

In 2021, the Governor of Hawai‘i issued an emergency proclamation related to the axis deer overpopulation in Maui County. Axis deer were introduced to Moloka‘i more than a century ago and cause significant environmental damage. Like pigs, goats, and other hooved animals, axis deer eat native vegetation and destroy native forests. Axis deer are very elusive and thus will be hard to manage should they become established in the upper forest systems. Currently, they are found primarily in the lower elevation areas from the coastline to about 1,000 feet elevation. The actual number of axis deer on Moloka‘i is unknown, although some unofficial estimates have put the number above 60,000. Aerial surveys to determine the official total number of axis deer in East Moloka‘i will inform the location of the Kamalō, Kapualei fence and the feasibility of management measures (i.e.: public hunting, aerial shooting) inside the new fences and at Pua‘ahala.



*An aerial survey of Moloka‘i axis deer will illustrate the extent of overpopulation and inform management planning.*



*Areas in East Moloka'i are completely devoid of vegetation due to browsing by axis deer. Fencing is the first line of defense to protect areas from degradation and allow for recovery.*

*Interviewing watershed group members and stakeholders to gain an idea of projects that would improve the watershed.*

While conceptual agreement among natural resource managers exists for the proposed fencing at Kamalō-Kapualei, this proposal would fund the technical scoping and outreach to private landowners and stakeholders in the community. Similarly, the community is excited about the State's acquisition of the Pua'ahala property but after two years of waiting are eager to participate in a dialogue with DOFAW and the partnership about what management will look like for this 800-acre area. The importance of outreach and stakeholder meetings cannot be understated. Moloka'i is a rural island with a population of approximately 7,400 people, but the community is very outspoken and participatory. Well intentioned projects can be stopped if the community does not feel like their voices are heard. Community outreach activities will enhance awareness, strengthen support and engage the Molokai community in management actions necessary to protect water resources.

#### ***Task C - Watershed Management Project Design:***

*Completing site-specific project design and engineering.*

This project will rely on analysis of aerial imagery and topographic data, as well as aerial reconnaissance and ground site visits to determine the design and location of the Kamalō-Kapualei fence. In addition to determining the total length of fence needed, these surveys will also determine what types of fencing will be needed (since different fence types are needed for different topographic features and slopes). This project will also design other factors, such as

how many stream crossings will be needed, and locations where step overs and gates may be necessary to allow public access. There will also be other reconnaissance targets – such as viewing areas where hooved animals are likely to congregate and where trapping efforts should be focused, as well as sites where helicopter landing zones and camps could be located.

Similarly, management planning for Pua‘ahala will rely heavily on analysis of aerial imagery and topographic data, biological studies, as well as aerial reconnaissance and ground site visits. One potential fence route for Kamalō-Kapualei could intersect with the upper portion of the Pua‘ahala property and connect to the Pāku‘i fence (construction in process).

*Developing project timelines and milestones.*

This plan will also create timelines and milestones for the fence construction and the sequence of management actions at Pua‘ahala – from the top of the mountain extending down to the coast. This will enable the future implementation phase of the project to be divided into manageable sections.

*Researching what type of site-specific environmental compliance will be necessary to implement a project, particularly if the applicant intends to seek Federal funding to implement the project in the future (e.g., under Phase II of this program).*

The main compliance task will be consultation with the State Historic Preservation Division to determine what archeological surveys will be required once the fence lines have been delineated. The other compliance requirements are straightforward for the fencing. DOFAW is in the process of designating the mauka (mountain) portions of the Pua‘ahala property as State Forest Reserve. The makai (ocean) lands are already designated as a State Wildlife Sanctuary. Previously, DOFAW received funding from the U.S. Fish and Wildlife Service, Coastal Wetlands Grant to begin restoration (mangrove removal) of the makai lands. Environmental compliance was initiated, but restoration was delayed due to COVID. Future management on the makai lands will require additional permitting and DOFAW is ready to initiate compliance once the suite of management actions is clearly identified in the Pua‘ahala management plan.



*The project area has difficult and steep terrain. Locating feasible fence routes will require site visits and helicopter transport.*

## Evaluation criteria

### ***E.1.1. Evaluation Criterion A— Watershed Group Diversity and Geographic Scope***

The partners that represent this application have a wide diversity of interests:

#### Governmental agencies:

*State of Hawaii, Department of Land and Natural Resources* (applicant): The State provides funding – both for the watershed partnership, as well as its own natural resource management staff - to protect forested watersheds, as well as streams and marine resources. The State is also responsible for monitoring and managing the groundwater and surface water withdrawals from aquifers and streams.

*County of Maui, Department of Water Supply*: This agency provides funding for the watershed partnership, monitors water levels, and manages multiple wells in the project area.

*U.S. Fish and Wildlife Service*: Over fifty listed endangered species exist across the mountain, which is largely designated critical habitat for these species. A vast majority of these species are plants, whose main threat is hooved animals. The listed animal species are dependent on a healthy native forest for habitat. This agency provides funding for habitat protection and develops species recovery plans.



***E.1.2. Evaluation Criterion B — Addressing Critical Watershed Needs***  
***B1. Critical Watershed Needs or Issues.***

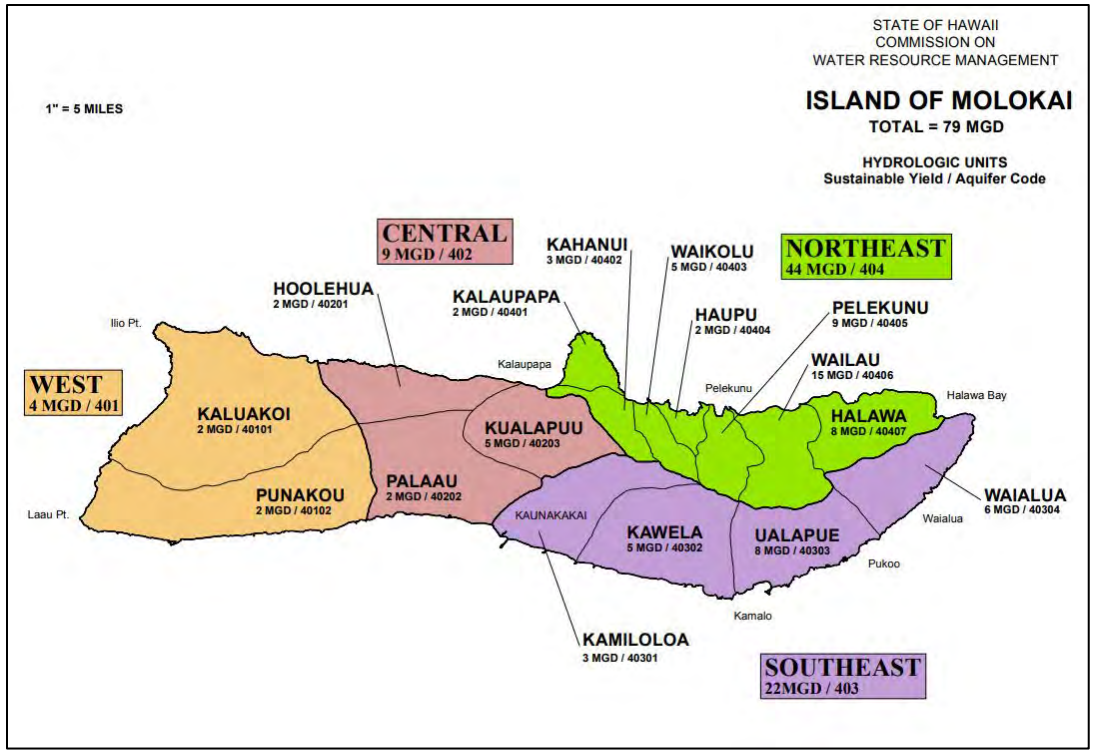


*A view of the project area looking east. The Pua ‘ahala property can be seen on the far left, extending from the top of the mountain down to the coast.*

The project will complete key components of a landscape-level restoration and protection effort that the Moloka‘i community has prioritized and progressively developed over the past 20 years. It will address the critical issues of water supply, conflicts over water supply, ecological resiliency, endangered species, sedimentation, as well as human health issues from degraded water quality.

Moloka‘i is one of the eight major islands of Hawai‘i. Roughly 7,400 people reside on this 260 square mile island, mostly of native Hawaiian ancestry. Moloka‘i is the only other island besides O‘ahu that is designated as a ground water management area.<sup>21</sup> This designation occurs when the water resources of an area are determined to be threatened by existing or proposed withdrawals of water. It also establishes greater administrative control over the withdrawals of ground water to ensure reasonable-beneficial use of the water resources in the public interest while protecting those resources. The legal and regulatory battles over water allocation are only set to intensify as climate change is predicted to bring hotter and drier conditions to this region.<sup>22</sup>

The majority of Moloka‘i’s domestic and agricultural water is sourced from wells in East Moloka‘i. The Kawela and ‘Ualapu‘e aquifer systems are directly fed by the forests in the project area. These aquifer units are part of the Moloka‘i Sole Source Aquifer – an aquifer that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer. As drought conditions persist on Moloka‘i, and climate scenarios predict hotter and drier conditions, East Moloka‘i will depend even more heavily on the availability of water coming from the mountains.



*The project will support ground water recharge for the Kawela and 'Ualapu'e aquifer systems.*

The location of the proposed fencing is strategic because it includes unprotected native forest and areas threatened by expanding populations of hooved animals. Protecting remaining native forest from loss is highly cost-effective compared with restoring areas after degradation. Protection – and restoration – of native forest is not possible in the presence of hooved animals such as goats, and pigs, which roam wild across this mountain range.<sup>23</sup>





Many additional benefits will occur due to the location of this project. This area contains several Federally listed endangered plant and animal 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 hooved animal removal as a top priority for the delisting of these species. Rare species – fewer than 50 individuals remaining in the wild – are found in the proposed Kamalō-Kapualei fence area. The fence will protect these species from extinction. There are also plans to outplant endangered species in these areas once the fences are complete.



*Loulu (Pritchardia munroi), also known as “the Kamalō pritchardia”, is a rare species of palm. Only two individual plants exist in the wild.*

Healthy watersheds in this region are also important for preventing widespread erosion, which damages Moloka‘i’s fringing reef – known as the longest continuous fringing reef tract in the nation. This fringing reef serves as the basis for the community fishery – stretching 30 miles. Furthermore, historic fishponds along the shore provide significant cultural assets to the Moloka‘i community. In East Moloka‘i from Kapualei to Kawela, seasonal rainstorms erode the denuded landscape and deposit tons of sediment onto the fringing reef tract. Sediments are re-suspended on a daily basis as the predominant trade winds stir up the inner reef areas.<sup>24</sup>

The same sedimentation that damages coral reef health also is a threat to human health. Statewide, 85% of waterbodies sampled by the Department of Health are classified as impaired, and turbidity was by far the largest cause of the substandard sampling results.<sup>25</sup> Erosion from barren slopes is a main cause of turbidity. In addition to causing forest loss, the feral hooved animals mentioned in this proposal also spread lethal diseases, such as non-tuberculous mycobacterial (NTM) lung disease and leptospirosis.<sup>26</sup> Hawaii has the highest prevalence of age-adjusted NTM lung disease mortality in the U.S.<sup>27</sup> Pig wastes also spread fecal bacteria (enterococcus).<sup>28</sup> While the State Department of Health has not yet set Total Daily Maximum Load limits for East Moloka‘i, it is anticipated that the streams within the project area could eventually have TMDLs set due to their consistently impaired status.



*by forest loss and hooved animals.*

Finally, these forests are revered for their spiritual and material importance to the Hawaiian culture.<sup>29</sup> Ancient Hawaiians understood well that their source of water depended on the forest – as evidenced by the saying “hahai nō ka ua I ka ulu la‘au” (the rain follows the forest).

## **B2. Developing Strategies to Address Critical Watershed Needs or Issues**

### **Task B -Watershed Restoration Planning**

The Kamalō-Kapualei fencing and Pua‘ahala management plan will address critical watershed issues. The process begins by considering the following inputs to prioritize issues:

1. Water recharge: the U.S. Geological Survey has provided spatial data on recharge areas, which are created using an equation considering rainfall, evapotranspiration, runoff, landcovers, and other factors.<sup>30</sup>
2. Water quality: Data of impaired water bodies from the Department of Health and other partners such as Maui Nui Marine Resource Council, as well as priority reefs identified by the National Oceanic and Atmospheric Administration and the National Fish and Wildlife Foundation will be considered.
3. Native forest and endangered species habitats: This project will consider data from comprehensive landcover assessments identifying where native forest exists, as well as endangered species locations from U.S. Fish and Wildlife Service, the University of Hawai‘i, Bishop Museum, and the DLNR. Site visits will also be used to confirm these resource values.

These factors are presented to the community and stakeholders along with the general natural resource goals for the area. No conflicts are anticipated. However it is important to create a forum for community opinions and input. If there are conflicts, staff will meet individually with the community member to talk about their concerns. Conflicts will also be minimized by the execution of Right-Of-Entry agreements that formalize long-term relationships with landowners whose properties will be fenced and managed.

These proposed plans builds on previous efforts. As mentioned prior, the partnership has undergone multiple plans. However they do not provide the prioritization and feasibility studies that are needed for these specific areas. These plans have demonstrated the past accomplishments of the partnership in protecting over 55,000 acres of the mountain uplands and provide a track record of success. These plans have also already established that hooved animal removal in the uplands is the first step towards protection of water resources and other major values. This conclusion has also been reached by many other organizations managing Hawaii's natural resources. The Hawai'i Conservation Alliance,<sup>31</sup> a collaboration of 26 major conservation leaders representing government, cultural, educational and non-profit organizations, has published a white paper identifying hooved animal removal as the first step toward native Hawaiian forest protection.<sup>32</sup>

### **Task C -Watershed Management Project Design**

This task comprises the main focus of this plan: comprehensively designing a fencing plan for Kamalō-Kapualei and watershed plan for Pua'ahala.

The project area contains rugged terrain of convoluted valleys, with multiple streams. Each stream crossing represents a challenge for the fence design as flash floods often threaten to blow apart these fences. Instead, expert fencers try to find areas with waterfalls, deep pools, or other natural barriers that can be used to exclude hooved animals. Finding these natural barriers is a main task that will dictate where the fence will be feasible to construct. The staff will analyze geospatial aerial imagery data and topographic maps to identify where barriers will exist, and then visit those potential sites via field trips and overflights. Expert fencers will design the stream crossings and other technical aspects of fencing in the difficult terrain.

As natural resource managers visit these potential fence lines, they will be conducting botanical surveys to ensure no rare or endangered species will be impacted by construction, and to re-locate the fence line if these resources are found.

This plan will also create timelines and milestones for the fence construction and the sequence of management actions at Pua'ahala. This will enable the future implementation phase of the project to be divided. This will be helpful for the hooved animal removal.

Once the fence and management plan has been drafted, the DLNR will conduct environmental compliance. This involves consulting with the State Historic Preservation Division which will determine whether archeological site inspections will be needed. If a large portion of the project requires those inspections, additional funding beyond what is in the budget may be required, and the DLNR will fundraise for those inspections.

The DLNR will also apply for approval for the other required compliance requirements, such as gaining a Conservation District Use Permit (pursuant to Chapter 183C, Hawai'i Revised Statutes), and completing an environmental review to satisfy Ch. 343, Hawai'i Revised Statutes. No Federal funding has been identified, however if a Federal agency provides funding for the future implementation phase of fence construction, the DLNR has experience working with multiple agencies to complete Federal compliance.

*Evaluation Criterion C— Implementation and Results*

**C1—Project Implementation**

A scope of work for this project is outlined below:

**TABLE 1. FEDERAL FUND REQUEST – SCOPE OF WORK, COST, TIMELINES**

<b>Major Tasks</b>	<b>Sub Objective</b>	<b>Milestones</b>	<b>Start Date</b>	<b>End Date</b>	<b>Cost</b>
1. Conduct meetings to gain input from stakeholders and experts on proposed fences and the most important management actions for water resource protection	Fence planning discussions will occur with the members of the East Molokai Watershed Partnership (EMoWP), community, and private landowners	Multiple meetings with partnership to provide updates and gain input	2/28/2023	2/28/2024	\$40,000
2. Conduct meetings to gain input from stakeholders about Puaahala management plan and the most important management actions for water resource protection	Puaahala management planning discussions will occur with community and stakeholders, including some members of the EMoWP	Multiple meetings with partnership to provide updates and gain input	2/28/2023	2/28/2024	\$30,000

3. Conduct on-the-ground scoping to design fence lines	Visit areas identifying by GIS analysis to confirm they are feasible, flag locations, and conduct surveys to confirm no endangered species will be impacted.	An estimated 4 miles of potential fence line will be scoped	6/1/2023	7/1/2024	\$25,000
4. Conduct initial surveys of axis deer populations in project area	More surveys needed to understand full extent of axis deer population island-wide	5 hours helicopter surveys	6/1/2023	9/30/2023	\$5,875
4. Coordinate landowner approvals	Draft, negotiate, and arrange for signatures of a legal instrument providing fence construction access.	Executed Right-Of-Entry with private landowners to allow fence construction	1/1/2024	9/30/2024	\$2,500
5. Develop and communicate project timelines and milestones	Write a report that compiles recommendations, prioritization, and reconnaissance findings for Kamalo-Kapualei fence	Finalize an addendum to the EMoWP 2030 management plan that includes specific fence lines	3/1/2024	11/30/2024	\$3,500
6. Draft Puaahala management plan	Compile input from community meetings	Sub-contract planning firm to write management plan	3/1/2024	11/30/2024	\$70,000
7. Indirect charge	8.60% of direct costs	n/a	n/a	n/a	\$15,211
				TOTAL	\$ 192,086

**TABLE 2. APPLICANT CONTRIBUTION – SCOPE OF WORK, TIMELINES**

Major Tasks	Sub Objective	Milestones	Start Date	End Date	Hours
Finalize Right-of-Entry agreements	Liaison with Attorney General to finalize signatures	Executed Right-Of-Entry with private landowners to allow fence construction	1/1/2024	9/30/2024	8
Managing other procurement	Developing purchase orders and contracts	Executed Purchase Orders, contracts and final invoices paid	2/28/2023	9/30/2024	35
Providing technical support	Attending meetings and providing recommendations	Documents contain DLNR data and recommendations	2/28/2023	9/30/2024	50
					93 Hours

*The Project Manager is a State of Hawai‘i civil service employee and is not seeking Federal funding from this grant. Table 2 demonstrates the additional in-kind contribution that the applicant will provide to complete this project.*

**C2—Building on Relevant Federal, State, or Regional Planning Efforts**

The proposed activities of planning for the fencing and hooved animal removal in this region complements the following goals:

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 hooved animals.<sup>33</sup>
2. Fish and Wildlife Service Recovery Plans: the recovery plans for multiple endangered species that exist in the project area prioritize hooved animal removal.<sup>34</sup>
3. Hawai‘i State Water Resource Protection Plan: this plan prioritizes native forest protection for water recharge.<sup>35</sup>
4. Ocean Resources Management Plan: this plan prioritized hooved animal removal and native forest protection for erosion reduction targets.<sup>36</sup>
5. Hawai‘i Drought Plan: This plan prioritizes hooved animal removal and native forest protection for securing water supplies.<sup>37</sup>
6. Hawai‘i Forest Action Plan: This plan prioritizes hooved animal removal and native forest protection for securing water supplies and many other benefits.<sup>38</sup>
7. Hawai‘i State Wildlife Action Plan: This plan identifies multiple endangered species that exist in the project area and prioritizes hooved animal removal.<sup>39</sup>

8. Department of Health, Non Point Source Management Plan: This plan prioritizes hooved animal removal to reduce sedimentation and pollution of animal wastes into waterways.<sup>40</sup>

***Evaluation Criterion D— Department of the Interior and Bureau of Reclamation Priorities***

*Utilize science to identify best practices to manage land and water resources and adapt to changes in the environment;*

This project will draw on scientific data derived from the U.S. Geological Survey (recharge and landcover), Department of Health (water quality monitoring), and the U.S. Fish and Wildlife Service (rare species location and biology) to identify priorities and best practices.

*Review DOI water storage, transportation, and distribution systems to identify opportunities to resolve conflicts and expand capacity;*

This project will draw on scientific data derived from the U.S. Geological Survey (recharge and landcover), to design a project that will significantly improve the watershed health and secure water supplies. This will benefit the many conflicting constituents who seek the water supplied by the mountain forests.

*Foster relationships with conservation organizations advocating for balanced stewardship and use of public lands;*

This project will include multiple organizations that promote both forest conservation as well as improvement of marine waters. Improving water quality will make ocean recreation safer and more enjoyable.

*Restoring trust with local communities*

*Expand the lines of communication with Governors, state natural resource offices, Fish and Wildlife offices, water authorities, county commissioners, Tribes, and local communities.*

The plans will be reviewed during meetings and other communication with State natural resource offices, the U.S. Fish and Wildlife Service, and the Maui County Department of Water Supply. It also will be reviewed by non-profit groups such as The Nature Conservancy of Hawai‘i and other landowners in the partnership.

*Bureau of Reclamation Priorities*

*Increase Water Supplies, Storage, and Reliability under WIIN and other Authorities to Benefit Farms, Families, Businesses, and Fish and Wildlife*

This project is a main strategy to improve water supplies and reliability, which will be used to benefit agricultural, industrial, and municipal uses, as well as improve habitat for fish and other wildlife that rely on these streams and forests.

*Leverage Science and Technology to Improve Water Supply*

This project will use various scientific studies produced by Federal and State agencies to prioritize project locations for water supply improvements.

*Address Ongoing Drought*

The project location is currently in a period of extreme drought.<sup>41</sup> These conditions are anticipated to be exacerbated by climate change. Drought is already limiting the amount of agricultural uses in this region. This project will improve water supplies.

*Improve Water Supplies for Tribal and Rural Communities*

This project would increase water supplies for all users, including rural communities dominated by native Hawaiian residents.

Project Budget

Budget Proposal

**TABLE 3. FEDERAL FUND REQUEST – BUDGET PROPOSAL**

Budget Item Description	Computation		Quantity Type	Total cost
	\$/Unit	Quantity		
<b>Contractual/Construction</b>				
Helicopter services	\$ 1,175/hr	20	hours	\$23,500
Management planning contract (including outreach)				\$147,500
Equipment				\$5,875
<b>Total Direct Costs</b>				<b>\$176,875</b>
<b>Indirect Costs</b>				
NICRA	8.60%		direct charges	\$15,211
<b>Total Estimated Project Costs</b>				<b>\$ 192,086</b>

**TABLE 4. OVERALL PROJECT BUDGET**

Total Project Cost Table	
Source	Amount
Costs to be reimbursed with the requested Federal funding	\$ 192,086.00
Costs to be paid by the applicant	\$0.00
Value of third-party contributions	\$0.00
<b>TOTAL PROJECT COST</b>	<b>\$ 192,086.00</b>

Budget Narrative

**Contractual**

*Federal Request*

Helicopter time – helicopter transport will be required for staff to access the project sites and conduct aerial surveys of potential fence lines. Currently, the State’s negotiated helicopter rate per hour is \$1,175. This cost is anticipated to be incurred throughout the reconnaissance phase of the project beginning 2/28/23 and ending 7/1/2024. This will be essential for the project as certain areas are so steep and rugged that they cannot be accessed on foot.

**Environmental and Regulatory Compliance Costs**



### *Federal Request*

The proposal only includes site visits so is not anticipated to require complex or time-consuming compliance with Federal regulations.

### **Indirect Costs**

#### *Federal Request*

The State of Hawai'i, Department of Land and Natural Resources, has a NICRA of 8.60% for FY22.

## Environmental and Cultural Resources Compliance

The project will occur in offices/meeting settings, and site visits will consist of hiking through remote locations and helicopter overflights.

The proposed project will not impact the surrounding environment and will not have any earth-disturbing work or other impacts.

There is designated critical habitat for multiple species, however these species will not be affected by any activities of the proposed project.

No water delivery system will be constructed.

No irrigation systems will be modified.

This project does not include any modifications to irrigation districts.

No known archeological sites are in the proposed project area, and no additional compliance is necessary for this planning project as it will not result in any ground-disturbing activities.

## Required Permits or Approvals, Letters of Support, and Official Resolution

No permits or approvals are anticipated to be needed to implement this planning project.

Letter of support and official resolution are attached to application.

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<sup>1</sup> Commission on Water Resources Management, Department of Land and Natural Resources, 2019. Water Resources Protection Plan 2019 Update.

[https://files.hawaii.gov/dlnr/cwrp/planning/wrpp2019update/WRPP\\_AppL\\_201907.pdf](https://files.hawaii.gov/dlnr/cwrp/planning/wrpp2019update/WRPP_AppL_201907.pdf)

<sup>2</sup> See <http://hawp.org/partnerships/east-molokai-watershed/>

<sup>3</sup> See [https://governor.hawaii.gov/wp-content/uploads/2022/01/2201018-ATG\\_Supplemental-Proclamation-Related-to-the-Axis-Deer-distribution-signed.pdf](https://governor.hawaii.gov/wp-content/uploads/2022/01/2201018-ATG_Supplemental-Proclamation-Related-to-the-Axis-Deer-distribution-signed.pdf)

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- <sup>14</sup> Reeser, D. et al. 2009.
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- <sup>16</sup> Department of Land and Natural Resources, State of Hawai'i. 2020. Rapid 'Ohi'a Death Strategic Response Plan 2020-2024. <https://gms.ctahr.hawaii.edu/gs/handler/getmedia.ashx?moid=66598&dt=3&g=12>
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March 23, 2022

Bureau of Reclamation  
Water Resources and Planning Office  
P.O. Box 25007  
Denver, CO 80225

Notice of Funding Opportunity No. R22AS00163

SUBJECT: Letter of Support for "Planning for Community Resilience Through Watershed Restoration on Moloka'i"

On behalf of the East Moloka'i Watershed Partnership (EMoWP), I am writing in support of the Department of Land and Natural Resources, Division of Forestry and Wildlife's grant proposal for the protection and restoration of forests in East Moloka'i. EMoWP was established in 1999 and now consists of 27 major landowners and land managers in East Moloka'i. Partners are united by a Memorandum of Understanding that outlines their shared goals and relationships – most notably, the protection of water resources.

The project will complete key components of a landscape-level restoration and protection effort that the Moloka'i community has prioritized and progressively developed over the past 20 years. Specifically, funding will provide for much needed outreach to stakeholders in the community prior to fence construction and create a fencing plan for Kamalō and Kapualei.

EMoWP has work tirelessly since its establishment to protect water resources for the people of Moloka'i. New fencing will protect many more millions of gallons of water and ensure resiliency for this small island community.

Thank you for considering this proposal.

Aloha,



Russell Kallstrom  
Program Manager, East Moloka'i Watershed Partnership, The Nature Conservancy

BOARD OF TRUSTEES

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**STATE OF HAWAII**  
**DEPARTMENT OF LAND AND NATURAL RESOURCES**

POST OFFICE BOX 621  
HONOLULU, HAWAII 96809

March 24, 2022

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

**SUBJECT: Official Resolution: Planning for Community Resilience Through Watershed Restoration on Molokai**

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 Hawaii. As the applicant, the Division of Forestry and Wildlife will work with Reclamation to meet established deadlines for entering into a grant or cooperative agreement.

For further questions, please contact Katie Roth, Watershed Planner at [Katie.C.Roth@hawaii.gov](mailto:Katie.C.Roth@hawaii.gov) or (808) 208-0317.

Sincerely,

A handwritten signature in black ink, appearing to read "D. Smith".

---

David G. Smith, Administrator  
Division of Forestry and Wildlife

## References: “Planning for Community Resilience Through Watershed Restoration on Moloka‘i”

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<sup>30</sup> Mair, A. et al. 2019.

<sup>31</sup> Reeser, D. et al. 2008.

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<sup>33</sup> See <https://governor.hawaii.gov/wp-content/uploads/2017/01/Sustainable-Hawaii27i-Initiative-Brochure.pdf>

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