Department of Health Clean Water Branch

Maui Land & Pineapple Co. Inc

Pu‘u Kukui Watershed Partnership
An Ahupua‘a Approach to Watershed Best Practices in West Maui, HI

Fiscal Year 2023
Quarter 1
January 01, 2023 – March 31, 2023

Aerial view of PKW’s reforestation efforts at Waokele o Honolua.

Overview:

Maui Land & Pineapple Company (ML&P) is an established advocate of watershed management. The largest privately-owned nature preserve in the State of Hawai‘i, created in 1988 by Maui Land & Pineapple Company, transferred 8,600+ acres into a conservation easement, thus creating Pu‘u Kukui Watershed Preserve. The easement is held by The Nature Conservancy (TNC) and managed by the conservation department within Maui Land & Pineapple. In July of 2017, Maui Land & Pineapple signed its fourth contract with the State of Hawai‘i Natural Area Partnership Program (NAPP) to continue management of the Pu‘u Kukui Watershed Preserve. Implementation projects under this contract are outlined in the Pu‘u Kukui Watershed Preserve Long Range Management Plan. This plan details management of the upper watersheds of four streams listed as impaired in the 2016 State of Hawaii Water Quality Monitoring and Assessment Report: Honokōwai, Kahana, Honokahua, and Honolua Watersheds. List of impairments are different for each watershed, but all have critical water quality issues of turbidity, Total Suspended Solids, and nutrients.

Pursuant to existing efforts by Pu‘u Kukui Watershed Preserve and identified in the 2016 West Maui Watershed Plans the crucial progressive needs include addressing storm water at multiple levels within the ahupua‘a. The goal of this project is to prevent, stabilize, and treat sediment inputs and storm water from entering the stream, being mobilized by heavy rains, and entering the nearshore environment affecting human health, native biota, and precious coral reef ecosystems.

Outcome: Ma uka (mountains side) and ma kai (ocean side) connectivity through Ahupua‘a scale management and implementation of Best Management Practices will treat stormwater at multiple levels within the ahupua‘a, known as a treatment train, will allow these individual projects to act synergistically to improve water quality.

Project Effectiveness Monitoring Plan and Activities

Summary:

In the first quarter (Q1) of Fiscal Year 2023 (FY23), the Puʻu Kukui Watershed (PKW) Preserve staff continued successful efforts to fulfill PKW's Best Management Practices. During the reporting period 1.13 acres of land that was previously identified, GIS mapped, and continued to be cleared for push pile sediment stabilization. PKW's native plant nursery and seed bank increased its inventory to include 2,062 koa *(Acacia koa)*, 22.6 ounces of milo *(Thespesia populnea)*, 10.6 oz. of kou *(Cordia subcordata)*, 35 maile *(Alyxia stellata)*, and 42 huli (taro slips) of the Kapaʻaloa variety from stock seeds collected from Waokele o Honolua and Kaʻulalewalewa Ma Kai. The staff and field crew participated in the Maui Rapid ʻŌhiʻa Death Resistance Project, ʻŌhiʻa Seed Conservation Workshop where they grew their skills in ʻōhiʻa monitoring and seed collection. 1.6 acres of our ma kai restoration site at Waokele o Honolua was cleared of invasives to forward our progress in achieving our Landscape Restoration program goals. Additionally, 54 ʻaʻaliʻi *(Dodonaea viscosa)* were planted on site. Progressing in our Loʻi Restoration program, roughly 30 feet of ʻauwai was restored. In total, approximately 29 acres of invasive plant management was conducted by PKW staff this quarter. PKW field crew successfully checked four Boundary Fence lines (BF), monitoring a total of 3,775 meters around the preserve including BF sections in the Arboretum, Kahana, Kaluaui, and Honokōwai. Nine feral ungulate snare groups were checked in Kahana Valley, Kahana Ridge, Anakaluahine, the Arboretum, Kaulanakola, Honokōhau, Māhinahina, Honolua Valley, and Transect 1 (T1). A total of 668 snares were checked and a total of 16 feral pigs *(Sus scrofa)* were captured. In Q1, PKW committed 284 staff hours to education and outreach events and attained 771 volunteer hours of community engagement; totalling 1,056 hours dedicated towards outreach and education. PKW staff facilitated 7 outreach trips with the community in the field, hosted 4 outreach booths for the purpose of education, and dedicated time to mentor one local high school student as part his Senior Project. At the completion of this quarter, PKW engaged with over 760 participants through our education and outreach program. A historic achievement accomplished this quarter was the native hydroseeding that occurred over half an acre. 32,000 ʻaʻaliʻi and 9,000 ʻōhiʻa were hydroseeded over Waokele o Honolua; totaling roughly 41,000 native seeds spread across the landscape. The work accomplished during Q1 continues to propel PKW's efforts forward with promising success to achieve our intended Best Management Practices outlined in this report.

Best Management Practices (BMPs)

1. Push Pile Stabilization
2. Establishment of Native Plant Nursery and Seed Bank
3. Landscape Restoration
4. Stream and Gulch Bank Restoration
5. Loʻi Restoration
6. Conservation Fence Maintenance
7. Feral Ungulate Management
8. Invasive Plant Management

Push Pile Stabilization:

PKW field staff opened the 2023 fiscal year by expanding the push pile stabilization site cleared in the previous quarter of FY22. The field crew identified, GIS mapped, and cleared an additional acre of land dedicated towards sediment stabilization along Papua Gulch and Honolua Stream, totaling 1.13 acres. Invasive weed and tree species consisting of Guinea grass *(Megathyrsus maximus),* Formosan koa (*Acacia confusa),* Monkeypod *(Pithecellobium saman),* and the common guava *(Psidium guajava)* were removed from the project site utilizing machine-operated, gas chainsaws and weed whackers. During this reporting period, PKW committed efforts towards expanding the push pile stabilization sites and cleared the landscape in preparation for the eventual native out planting anticipated to occur in the area. In the upcoming quarters, PKW staff will continue to remove the targeted invasive species that dominate the landscape and will replace the non-native vegetation with native plants that possess high tensile strength capable of stabilizing the streambank to withstand forthcoming erosion.

The push pile stabilization site along Papua Gulch before (pictured left) and after (pictured right) PKW staff cleared the landscape of invasive species.

Establishment of Native Plant Nursery and Seed Bank:

During the reporting period, PKW's native plant nursery and seed bank increased its inventory with the inclusion of 2,062 koa *(Acacia koa),* 22.6 ounces of milo *(Thespesia populnea),* 10.6 oz. of kou *(Cordia subcordata),* 35 maile *(Alyxia stellata)*, and 42 huli (taro slips) of the Kapa'aloa variety. These seeds were collected from various sites within PKW's preserve, including Waokele o Honolua and Ka'ulalewalewa Ma Kai. The koa seeds were potted into dibbles, while the other native seeds collected during the quarter were potted into larger gallon pots to be grown out in PKW's native nursery. In addition to the increased acquisition of native seeds and plants accumulated during the quarter, PKW staff continued careful maintenance and upkeep of the plants currently housed in the native nursery. Consistent watering, monitoring, and repotting of acquired plants and seeds within the nursery conducted by staff throughout the quarter, assures that the plants grow to proper maturity suitable for out planting initiatives and reforestation efforts.

Over a dozen trays of ʻaʻaliʻi and koa seeds sprouting in PKW's native nursery (pictured left). A vast variety of native plants outgrown in the nursery (pictured right).

While the acquisition of native seeds and the upkeep of the nursery is essential in order to meet the goals of this Best Management Practice, the *Establishment of Native Plant Nursery and Seed Bank*, an equally paramount part of this work also includes time dedicated to regular monitoring and surveying of native flora species in site-specific locations. The ability to monitor and survey plants relying on the crew's ability to track both the health and optimal time to collect its seeds is a proactive approach that PKW employs in order to grow the desired native plant nursery and seed bank. In particular to ʻōhiʻa *(Metrosideros polymorpha),* PKW's field crew and staff grew our capacity for development in ʻōhiʻa species identification and gathering protocols this quarter in efforts to build a heightened competency in ʻōhiʻa seed acquisition and seed monitoring. ʻŌhiʻa has been observered within Honolua Valley and other areas throughout the preserve as a keystone species whose prescence is often the first species to sprout over eroded areas. ʻŌhiʻa's seed germination rate, in particular to the landscape at PKW's restoration work in Honolua, is valued for its ability to seed quickly and present high rates of regrowth along the barrien soil of eroded areas. PKW staff's ability to develop ourselves in monitioring and collecting ʻōhiʻa seeds will help to further our restoration efforts throughout our preserve.

In February of this quarter, PKW participated in the Maui ROD (Rapid ʻŌhiʻa Death) Resistance Project, ʻŌhiʻa Seed Conservation Workshop. This workshop training was hosted by the Maui Nui Botanical Garden with the intent to strengthen participants' knowledge base regarding ʻōhiʻa and conservation practices. The workshop training was facilitated by Dr. Marian Chau, the head of seed banking for Terraformation. During the workshop, PKW field crew sharpened their skills in species identification, proper gathering protocols, seed collection, labeling, and storage methods. The skill set gained during this workshop will help propel PKW's work in protecting, preserving, and populating more ʻōhiʻa within Puʻu Kukui Watershed, and subsequently, Mauna Kahālāwai (West Maui Mountain) and the island of Maui as a whole. Being that ʻōhiʻa makes up 80% of a native rainforest, and is noted as a fundamental, key species responsible for capturing and retaining 80% of the water within a watershed, PKW's ability to identify, collect, and propagate varieties of ʻōhiʻa ensures that a vital component of Maui's natural water retainers will continue to proliferate so that water will continue to flow abundantly.

PKW staff identifying subspecies of ʻōhiʻa as part of the Maui ROD Resistance Project.

Landscape Restoration:

During this quarter, PKW continued to maintain and upkeep the existing 25 acres of dry-mesic forest restored by the field crew in the previous years. Utilizing gas-powered weed whackers and at times, hand-sickles, the crew dedicated time during the quarter to thin out and clear overpopulated areas of invasive Guinea grass *(Megathyrsus maximus)* and Formosan koa (*Acacia confusa)* that have regrown since last having cleared the area. In addition to maintaining the existing 25 acres restored, an additional 1.6 acres was cleared at Waokele o Honolua during the quarter. PKW contracted services to operate heavy machinery in order to doze and grade the landscape, ridding the highly dense area of invasive tree and weed species such as, Formosan koa, Ironwood *(Casuarina equisetifolia)*, and Guinea grass. Work to reforest the newly cleared expansion of Waokele o Honolua with native plant species will commence in Quarter 2.

Aerial view of the 1.6 acres cleared at Waokele o Honolua.

In March of this quarter, PKW facilitated an educational field trip to Waokele o Honolua with Nāhiʻenaʻena Elementary students enrolled in the Kaiapuni Hawaiian Language Program. PKW hosted these students and their families for the day at Waokele o Honolua where they gained a glimpse into PKW's Landscape Restoration efforts and deepened their understanding of the active reforestation efforts taking place in Honolua. As part of the learning experience, the students and their families worked alongside PKW crew and out planted 54 ʻaʻaliʻi *(Dodonaea viscosa)* at Waokele o Honolua. The plants were spaced 3-feet apart from one another in order to create a shaded canopy when the ʻaʻaliʻi grow to maturity. The shaded canopy will help to suppress sunlight and deter invasive weeds from growing below its canopy. Each plant was hand watered, mulched, and fed vermicast to enhance the soil structure and fertility of the plant's growth. Continued reforestation and out planting efforts will progress in the upcoming quarters.

PKW crew and Nāhiʻenaʻena Elementary Hawaiian Language students reforest Waokele o Honolua by planting native ʻaʻaliʻi.

Stream/Gulch Bank Restoration:

PKW made monumental achievements this quarter by successfully hydroseeding the eroded ridge and slopes of Honolua, referred to as Waokele o Honolua "Scar." During the beginning months of the quarter, PKW crew carried out the necessary preparations essential to hydroseed the project site successfully. The crew surveyed and mapped the project area, prepared the native seeds that would be incorporated into the hydroseed mix, and transported the required equipment to the site; including, Fiber Tackifier–a wood mulch and high grade organic tackifier mix, water pumps, hoses, specified hydroseeding spray nozzles of varying gauges, the Turbo Turf Hydroseeder machine, and other necessary material integral to the project. In order to ensure that hydroseeding on the project site would run efficiently without flaw, PKW field crew tested the equipment and performed several test runs at the base yard prior to transporting the equipment onto the field. Each crew member was trained on how to operate the hydroseeding machine properly and versed themselves on the nuances of the machine.

The eroded ridge and slopes of Waokele o Honolua "Scar."

Site-specific seed stocks that originated from Waokele o Honolua that were collected from years prior were prepared and readied into pre-made packages based on the carrying capacity the hydroseeder machine could effectively disseminate per load. For this initial hydroseed spraying, ʻaʻaliʻi and ʻōhiʻa were the seeds of choice. The native plants that still exist on the eroded ridge and hillside where the hydroseeding will occur, primarily consist of ʻaʻaliʻi and ʻōhiʻa. These native plant species have shown to naturally and successfully germinate well given the particulars of the landscape and climate of Honolua. The seeds that would be incorporated into the hydroseeding mix were seeds collected from the same location; and thus, it is believed will have a higher success rate having been accumulated to the environment. After determining which seeds would be best suited for this site, the crew pre-made native seed bags. 40 bags were prepared, each containing 4,000 ʻaʻaliʻi seeds and 1,125 ʻōhia seeds from stock trees originating from Waokele o Honolua. In total, roughly 160,000 ʻaʻaliʻi seeds and 45,000 ʻōhiʻa seeds were bagged for hydroseeding.

Over 200,000 seeds of ʻaʻaliʻi and ʻōhiʻa prepared for hydroseeding.

For this project, PKW utilized the Turbo Turf 55-gallon Hydroseeder. This particular machine has an area coverage rate of 650 square feet per load. After transporting the equipment to the project site, PKW field crew ran a 100-foot hose from the 300-gallon water totes staged on the field last fiscal year. Since staging these totes and having built the water catchment system for them, the two 300-gallon water totes were both filled with rainwater, ready to be used for hydroseeding. The crew connected the hose to the water tote and used a gas pump to siphon water from the tote into the hydroseeder. The appropriate amount of Rainier Fiber Tackifier, mulch, and the native seed mix of ʻaʻaliʻi and ʻōhiʻa were added to the hydroseeder and sprayed across the eroded ridge of Waokele o Honolua "Scar", as well as the hillside and slopes on both the Papua and Honolua sides of the valley.

(Pictured from left to right): Fiber Tackifier prepared for hydroseeding; the Turbo Turf Hydroseeder and equipment assembled on site; PKW field crew adding the hydroseeding components to the machine.

PKW field crew hydroseeding a mix of ʻaʻaliʻi and ʻōhiʻa along the eroded hillside.

Over half an acre of landscape was hydroseeded across the project site during this first spraying. With an average coverage rate of 650 square feet per spraying load, approximately eight native seed species were disseminated per square foot. This rate exceeds our aspired goal of attaining germination rates of one seedling per square foot. 32,000 ʻaʻaliʻi and 9,000 ʻōhiʻa were hydroseeded over Waokele o Honolua; totaling roughly 41,000 native seeds spread across the landscape. Over time, PKW field crew will continue to monitor and survey the germination rates of these seeds and the stabilization efficiency this tactic provides. The successful completion of hydroseeding that occurred this quarter is but one phase of the project. PKW will commence with additional spraying of organic tackifier mix and mulch to increase erosion protection and enhance the seed germination rates of the area in the upcoming quarters. PKW will also progress with hydroseeding this area and other priority areas across the preserve.

Waokele o Honolua "Scar," and the hillsides descending into Papua and Honolua Valley after hydroseeding

Loʻi Kalo Restoration:

Access to the loʻi kalo restoration site in Honolua was limited during most of the quarter due to the heavy rainfall experienced on Maui in February that caused landslides, restricting vehicle transportation and induced hazardous stream flooding. During the first month of the quarter before the storm had hit, PKW crew maintained and cared for the food crops, kalo *(Colocasia esculenta)*

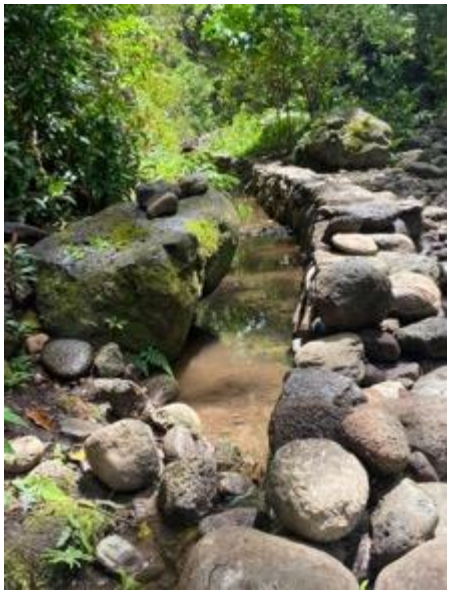
and ʻuala *(Ipomoea batatas)*, planted in the terraces that were restored in the previous year. The patches were weeded, mulched, and continue to thrive prosperously. During this first month, PKW field crew also progressed in rebuilding the historic ʻauwai (irrigation), that when complete, will channel water from the stream into the loʻi. 16 feet of the ʻauwai was restored during the first month of this quarter.

Kalo and ʻuala growing abundantly in Honolua Valley after restoring the loʻi terraces.

In February, heavy rainfall and high winds hit West Maui and caused landslides to occur on two separate occasions in Honolua Valley. The sheer cliffs that run alongside the access road descending into the valley experienced areas of erosion that sent trees, boulders, and large volumes of sediment down into the road. PKW crew worked to clear the road blockage utilizing chainsaws, handsaws, pickaxes, and shovels. Chainsaws were used to cut the large trees into smaller pieces that could be handled easily and moved to the side. The handsaws, pickaxes and shovels were used to remove smaller stands of trees, branches, and soil. The crew successfully cleared a large majority of the landslide, creating sufficient space for an ATV (All-terrain vehicle) to transport the crew in and out of the valley for field operations. The debris that remains will need heavy machinery to remove. Operational details to carry out the removal of what remains of the landslide will be planned out in the next quarter.

Before and after pictures of the landslide in Honolua Valley.

Once PKW staff managed to clear a portion of the landslide to allow safe access into the valley, the field crew continued to carry out restoration work at the loʻi sites. During the last day of the quarter, another five feet of ʻauwai was restored and another six feet of foundation was set in preparation for restoring more of the ʻauwai.



Progress of the stone-walled ʻauwai in Honolua Valley.

Conservation Fence Maintenance:

In Quarter 1, the PKW field crew successfully checked four Boundary Fence lines (BF), monitoring a total of 3,775 meters around the preserve. These fence checks consist of walking and observing the 8-foot tall boundary fence sections of the preserve, and inspecting for various types of damage that could have occurred such as pig ingress, vandalism, tree fall, etc. The BF is PKW's initial line of defense against ungulates into the pristine habit that is enclosed by the fence. This quarter we maintained BF sections in the Arboretum, Kahana, Kaluaui, and Honokōwai. These locations correspond to BF sections; 3, 5, 8, and 9. Upon the fence inspection conducted by the crew, all but one section was in good condition. BF5 located in the Arboretum was the only section checked this quarter that required minor repairs. A large tree had fallen onto the fence line causing minor damage to the fence. PKW field crew utilized gas chainsaws to remove the fallen tree and repair the fence section.

Before and after repairs to the Arboretum Boundary Fence section, BF5.

Feral Ungulate Management:

In Quarter 1 of this year, PKW crew successfully checked nine feral ungulate snare groups through various locations within the preserve. Snare groupings checked during this quarter included: Kahana Valley, Kahana Ridge, Anakaluahine, the Arboretum, Kaulanakola, Honokōhau, Māhinahina, Honolua Valley, and Transect 1 (T1). A total of 668 snares were checked and a total of 16 feral pigs *(Sus scrofa)* were captured, dispatched, and removed. The areas that presented signs of feral pig activity and where they were captured were the following: Kaulanakola with 7 kills, Honokōhau with 6 kills, Anakaluahine with 2 kills, and Kahana Valley with 1 kill. The other snare groups checked this quarter showed zero signs of ungulate activity; an encouraging conclusion to the success of PKW's Feral Ungulate Management Program and the other programs that support this work.

Invasive Plant Management:

During Quarter 1, PKW regularly maintained the 25 acres of Guinea grass in the Waokele o Honolua ma kai restoration site. In addition to the 25 acres where the crew regularly manages invasive species, another 1.6 acres was cleared, and invasive species removed during the quarter. 1.13 acres of invasive weed and tree species growing in the designated push pile stabilization site was removed and the 1 acre of loʻi kalo was actively managed as well. In total, approximately 29 acres of invasive plant management was conducted by PKW field crew and staff over the duration of this first quarter. The primary invasive plant species managed throughout the quarter include, Guinea grass *(Megathyrsus maximus),* formosan koa *(Acacia confusa*), ironwood *(Casuarina equisetifolia),* monkeypod *(Pithecellobium saman),* the common guava *(Psidium guajava),* ginger *(Zingiber zerumbet),* shoebutton ardisia *(Ardisia elliptica),* Christmas berry *(Schinus terebinthifolius),* and Indonesian cinnamon *(Cinnamomum burmannii).* Methods used for

conducting our invasive plant management include the use of hand sickles, weed trimmers, weed whackers, chainsaws, pickaxes, and contracted services for the use of bulldozers.

Before and after PKW crew managed the growth of invasive weed species around the native koa and ʻaʻaliʻi planted at Waokele o Honolua

Education and Outreach:

During this quarter, PKW committed 284 staff hours to education and outreach events and attained 771 volunteer hours of community engagement. In total, 1,056 hours was dedicated towards outreach events with the community, general public, and partners. PKW staff facilitated seven outreach trips with the community in the field, hosted four educational outreach booths, and also dedicated time to mentor one local Lāhainaluna High School student as part of his Senior Project. At the completion of this quarter, PKW engaged with over 760 participants through our education and outreach program. Participants who joined PKW staff in these educational field opportunities during Quarter 1 were participants affiliated with our program partners such as, Lāhainaluna High School Hawaiian Language Program, Nāhiʻenaʻena Elementary Hawaiian Language Program, the Hyatt Regency Maui, the Andaz Maui Wailea Resort, Kamehameha Schools ʻAʻapueo Campus, Kamehameha Schools Hālau ʻo Kapikohānaiākamālama, Kanaeokana, and Kapalua Sentry Tournament of Champions. The work accomplished with the help of these outreach participants, and the topics shared by the PKW staff ranged from native seed collection, native nursery work, loʻi restoration, invasive species control, sediment erosion prevention, stream and bank restoration, and native reforestation.

PKW opened the fiscal year with an outreach event partnered with Kapalua Golf. PKW has maintained a long-standing relation with Kapalua and throughout the years, has been invited to hold an outreach booth as part of the Sentry Tournaments of Champions (TOC) golf tournament. This year, the Sentry TOC celebrated their 25th year and PKW played part in the opening ceremony of the event. As part of the opening ceremony, PKW staff facilitated the planting of four koa trees alongside the reigning golf champions. During this weekend event, PKW field crew maintained a booth where they engaged with approximately 150 participants where visitors learned

of PKW's restoration management work and were encouraged to commit to planting legacy koa trees as part of helping to forward PKW's reforestation efforts.

PKW Conservation Manager, Kainoa Pestana in the Sentry Tournament of Champions opening ceremony

PKW also participated in several outreach events at local schools on Maui. PKW's Conservation Land and Assets Director, Pōmaikaʻi Kaniaupio-Crozier visited Kamehameha Schools ʻAʻapueo High School Campus to speak with students regarding the field of conservation in Hawaiʻi. Shedding light into PKW's work and the Hawaiʻi centric and cultural foundation our organization stands upon; students gained a deeper understanding of what a career in conservation can aspire to be like here in Hawaiʻi when environmental and cultural consciousness is placed at the forefront.

PKW's Conservation Land and Assets Director, Pōmaikaʻi Kaniaupio-Crozier attending the outreach event at Kamehameha Schools ʻAʻapueo Campus alongside other conservationists.

During the quarter, PKW also made a school visit to Nāhiʻenaʻena Elementary. Field crew members visited Nāhiʻenaʻena Elementary and conducted an educational native seeding event with

Kindergarten-Fifth graders enrolled in the Kaiapuni Hawaiian Language program. PKW engaged with roughly 100 students, teachers, and their families during this event. Conducting the outreach in Hawaiian, PKW crew spoke to these aspiring, young students of the significance of our native rainforests and our role as Kānaka ʻŌiwi (Native Hawaiians) in caring for these storied places and natural resources. Together, the students helped to pot 392 koa seeds into dibbles which will be outgrown in PKW's native nursery and will increase our native plant inventory for furthering reforestation work.

Nāhiʻenaʻena Elementary students join PKW staff in potting koa seeds.

PKW field crew facilitated outreach work trips with community partners and volunteers to various restoration sites. PKW staff led groups to participate in loʻi restoration work at the loʻi kalo referred to as, Pilikāmau. During the quarter, two site visits to Pilikāmau were led by PKW's field crew where participants helped in managing invasive species in the restored loʻi terraces, as well as assisting in the reconstruction of the ʻauwai. PKW's program partners from the Hyatt Regency, the Andaz Hotel, and Lāhainaluna High School Hawaiian Language Program partook in these educational field trips to the loʻi restoration site this quarter. Together with staff and volunteers, the 1 acre of loʻi was cleared of weeds and approximately 30 feet of ʻauwai was restored during the quarter.


PKW staff share with Lāhainaluna High School students the tactics of dry-stacking and the function and significance of ʻauwai to loʻi kalo.

In addition to educational trips to our loʻi restoration site, PKW staff also led educational trips with our community patterns and volunteers to work in our other restoration project sites such as, the Papua Push Pile Stabilization project, the Landscape Restoration work at Waokele o Honolua, and the Stream and Bank Stabilization Hydroseeding project on the "Scar." Regarding our Push Pile Stabilization program, PKW led volunteers in the removal of invasive tree species that dominated the landscape. Staff and volunteers removed stands of trees from the project site cut in the previous quarter. Volunteers learned of the effects of soil erosion and PKW's efforts to create native vegetation to stabilize the soil in order to mitigate the potential of sediment runoff into the adjacent Papua and Honolua streams.


Volunteers from the Hoʻolana program assist in clearing the push pile stabilization site in Papua.

In other outreach days throughout the quarter, PKW field crew led volunteers in work at Waokele o Honolua. During the quarter, volunteers assisted the crew in invasive species management by weeding around the native vegetation planted in Honolua. Volunteers also helped to collect and pot various seeds such as koa, milo, and kou, and learned of PKW's mitigation strategies to hydroseed the eroded ridge and slopes of Honolua.

Volunteers assist in invasive species management and native seed collection at Waokele o Honolua

In March, PKW facilitated an educational field trip to Waokele o Honolua with Nāhiʻenaʻena Elementary fourth and fifth graders. PKW hosted these students and their families for the day at Waokele o Honolua where they learned of the active reforestation efforts taking place in Honolua and were given the opportunity to contribute to the necessary work. As part of the learning experience, the students and their families worked alongside PKW crew and outplanted 54 ʻaʻaliʻi at Waokele o Honolua and helped to pot 392 koa into dibbles. Throughout the day, the students become versed in native plant identification and practices to steward and restore our native rainforests.

Nāhiʻenaʻena Elementary fourth and fifth graders engage with PKW staff in restoration efforts in Honolua.

PKW staff also worked with Lāhainaluna Hawaiian Language High School students in educating them about native seed banking and the benefits of creating a native nursery. During this outreach event, local high school students helped to pot 882 koa seeds into dibbles, 1 tray of maile, and 42 Kapaʻaloa huli.

Lāhainaluna High Schools help pot native koa into dibbles.

As part of PKW's partnership, PKW also spent the quarter mentoring a young Lāhainaluna senior as part of his Senior Project Internship graduation requirement. The student spent time with PKW's field crew to understand the scope of our restoration work within the preserve. The student spent time shadowing and partaking in work with both PKW's Ma Uka field crew, exploring the upper watershed, as well as the Ma Kai field crew, learning of the work in the lower watershed region. In whole, PKW mentored the student sharing with him the significance of interconnectivity of a watershed and the important role we as stewards must uphold in protecting these precious native resources. As a conclusion to his internship with PKW, the student presented to his teachers and fellow students the valuable lessons learned and the

Lāhainaluna senior shadowing PKW staff in the field

During the month of February, PKW participated in an outreach event held throughout the State celebrating Hawaiian Language, referred to as *Ola Ka ʻĪ*. Recognized by the State as Māhina ʻŌlelo Hawaiʻi, or Hawaiian Language Month, February kicked off the celebration of Hawaiian Language through various events and programs. Held at Kaʻahumanu Shopping Center, PKW worked an outreach booth to engage with other Hawaiian Language speakers and the general public. Similar to other outreach events, PKW shared with the community the significance of our native rainforests, native and endemic species, as well as the natural and cultural resources connected to our land and oceanscapes. PKW engaged with roughly 300 community participants and together planted 392 koa into dibbles. PKW's presence during this event, specific to the celebration of ʻŌlelo Hawaiʻi, was valued in helping to (re)connect Native and local residents to the ʻāina of which our native language originates.

PKW ʻohana celebrates Mahina ʻŌlelo Hawaiʻi by educating community members of the important work of the watershed and the interconnectedness of language, culture, and ʻāina.