

# Nā Mamo o Kāwā



**PUBLIC ACCESS, OPEN SPACE, AND NATURAL RESOURCES PRESERVATION  
MAINTENANCE STEWARDSHIP GRANT, DATED SEPTEMBER 5, 2017**

**FINAL REPORT**

**REPORTING PERIOD:  
9/5/2017 – 6/30/2018**



**SUBMITTED TO:  
HAWAI‘I COUNTY, DIRECTOR OF PARKS AND RECREATION  
ON  
JULY 30, 2018**

## **I. PROJECT STATUS REPORT**

Nā Mamo o Kāwā (“NMOK”) respectfully submits its final report on work funded by the County of Hawai‘i (“County”) Public Access, Open Space, and Natural Resources Preservation Maintenance Stewardship Grant, Dated September 5, 2017 (“PONC Grant”). The reporting period spans 10 months, from September 5, 2017 through June 30, 2018.

Original project plans submitted to the County of Hawai‘i proposed a start date of January 1, 2017; however, the PONC Grant agreement between NMOK and the County was executed on September 5, 2017. NMOK received its initial payment in PONC Grant funds in the end of September 2017. As such, major project implementation was delayed for nine months into the originally proposed project period. NMOK was granted a 6 month no-cost extension of the PONC Grant on December 31<sup>st</sup>, 2017, which amended the grant termination date to June 30, 2018.

During the reporting period, NMOK used PONC Grant funds to engage the community through a combination of monthly community work days and coordinated work days with partner nonprofits, area schools, and youth programs. For its work with area schools and youth programs, NMOK incorporates a place-based curriculum and hands-on learning into the scope of its work. NMOK has also been able to bring in community professionals from varied backgrounds to serve as guest speakers for the school groups/youth programs. NMOK has also worked to broaden its partnership network beyond Hawai‘i Island and was fortunate to host several groups from abroad. During the reporting period, NMOK conducted a review of resources, efforts, and progress thus far, which resulted in the prioritization of project focus to building out NMOK’s native revegetation, human impact mitigation, fire prevention, and access maintenance capacity.

The total volunteer work hours coordinated by NMOK during this period is an estimated 2775 hours, which equates to \$68,514.75 worth in volunteer impact.<sup>1</sup> During the project period, NMOK managed \$22,456.00 in contracts directly funded under the PONC Grant, with an output

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<sup>1</sup> Estimate of economic impact of volunteer time based on per hour valuation of \$24.69, which is the 2018 valuation reported by Independent Sector and IMPLAN.

total of 1299 hours in contracted services for native revegetation, security, access/grounds maintenance, and spring preservation/maintenance. Finally, PONC Grant funds were used to obtain added funding from the Hawai‘i Tourism Authority and the Hawai‘i People’s Fund. \$20,000 in additional funds was used to support an additional 960 hours in contracted services towards native revegetation, coastal habitat rehabilitation, spring maintenance/preservation, and outreach education. **In total, NMOK leveraged its PONC Grant award, totaling \$48,850, towards outputs with a total estimated economic value of \$110,970.75. Moreover, NMOK closed the reporting period on the PONC Grant under its allocated budget by \$4,629.19.**

### **Project Objective 1 - Initiation and Implementation of Native Revegetation Plan**

#### **Action Item 1.1: Develop Native Revegetation Plan**

##### **Status: Complete**

NMOK’s native revegetation work is its most ambitious to-date, given the immensity of the project site (785 acres) and proliferation of alien invasive species.

NMOK developed a Native Revegetation Plan (“Revegetation Plan”) to guide its work. The Revegetation Plan was based on previous studies and reports as well as consultations with stakeholders, including conservation/ecology specialists and community members. The Revegetation Plan was developed as a living document to allow NMOK the flexibility to amend its guide, as needed. Currently, the plan is drafted to address revegetation needs in and along reasonably accessible areas such as along roads and trails, near the shoreline and the highway, and near the spring area. As work continues, NMOK will amend its plans to encompass more acreage within its priority revegetation zones, eventually progressing to the point where a plan is in place for the entire Kāwā property. This progressive, incremental approach is aligned with the vegetation management strategy outlined in Section 3.3 of the County of Hawai‘i’s Kāwā Resources Management Plan. The latest version of the Revegetation Plan is attached as Exhibit A.

#### **Action Item 1.2: Identify Native Flora at Project Site**

##### **Status: Complete**

In August 2014, Geometrician Associates, LLC was contracted to conduct a flora and fauna study for the Kāwā property, which set a baseline inventory of all plant species present in the

area. The flora and fauna study is kept on record in NMOK files and used as a reference when developing and implementing the Revegetation Plan. Additionally, throughout the course of the reporting period, NMOK has conducted regular transects of its priority revegetation zones to establish a better inventory of native flora. Clarified inventory resulting from NMOK transect activity was then incorporated into the Revegetation Plan.

### **Action Item 1.3: Obtain and Propagate Native Flora**

#### **Status: In-Progress**

Over the course of the reporting period, NMOK has used a combination of volunteer work and contracted services to obtain and propagate native flora. A priority is made to, whenever practical, collect seeds, transplants, and cuttings of native species within the Kāwā property. Transplants were collected when identified to be in an area prone to flooding (in the riparian area adjacent to Hilea stream), or in area subject to human impacts (i.e. in the middle of the roads/trails) and alien invasive plant species competition. However, the diversity of the Kāwā ecosystem has been reduced as a result of decades-worth of inundation by invasive species and further compounded by human impact and prior use of the property for ranching activities. As such, NMOK also collected seeds and cutting of native species from similar ecosystems within the Ka‘ū District. Seeds and cuttings are catalogued pursuant to protocols established in NMOK’s Revegetation Plan; part of the cataloging protocol includes noting the date of collection, and identifying native species by the area from which the specimens were collected.

Native flora species collected for propagation is currently limited to what NMOK identifies as “foundational natives,” which are species of native flora that are known for their hardiness and viability in outplanting efforts. Once a healthy population of foundational natives is established on-site, NMOK will be able to incorporate native species that are more difficult to propagate and/or require closer monitoring following outplanting. NMOK’s practice of introducing foundational species first is aligned with other ecological restoration efforts across Hawai‘i. Foundational species collected from the project area for propagation include: milo (pacific rosewood, *Thespesia populnea*), kou (*Cordia subcordata*), ‘a‘ali‘i (Hawaiian hopseed bush, *Dodonaea viscosa*), alahe‘e (*Pysdrax odorata*), ‘ūlei (Hawaiian hawthorn, *Osteomeles anthyllidifolia*), ‘ākulikuli (Sea purslane, *Sesuvium portulacastrum*), and kukui (candle nut tree,

*Aleurites moluccana*). From nearby Ka‘ū ecosystems, wiliwili (Hawaiian coral tree, *Erythrina sandwicensis*), and pua kala (Hawaiian prickly poppy, *Argemone glauca*) seeds were collected. Naupaka (*Scaevola taccada*) collected on-site has been propagated via cuttings.

NMOK currently partners with both Nā‘ālehu Elementary and the Volcano School of Arts and Sciences for nursery space to raise seedlings and cuttings until ready for outplanting. NMOK also nurses plants on the Kāwā property, primarily to acclimate/harden off plants to the site prior to outplanting. Below are several examples of NMOK’s propagation and nursing activities.



[Clockwise from Top Right] VSAS students propagating seeds on-site; Nā‘ālehu Elementary students tending to seedlings; nursery space at Nā‘ālehu Elementary; students propagating seeds at Nā‘ālehu Elementary’s Explore! Science Fair.

## Action Item 1.4: Prepare Outplanting Sites

### Status: In-Progress

Using a combination of contracted services and volunteer work, NMOK continues to prepare sites within its revegetation priority zones and designated restoration sites for outplanting. Revegetation priority zones include the entrances, roads/trails, beach/coast, and spring area. Additionally, restoration sites were selected within the revegetation priority zones in areas populated by survived native plants. It is important to identify and restore the habitat surrounding these resilient individuals in hopes of fostering volunteer individuals and to provide access to seed for cultivation from parent individuals.

Generally, work involved in site preparation includes clearing invasive species and establishing buffer zones around native species currently existing on-site. Of all action items in this objective, site preparation is the most labor-intensive. Invasive species cleared are generally as follows: ekoa (lead koa, *Leucaena leucocephala*), Lantana (*Lantana camara*), Christmasberry (*Schinus terebenthifolius*), and guinea grass (*Megathyrsus maximus*). Below are examples of site preparation work.



[Right] Ekoa root systems are effectively removed by sledgehammer; [Left] Hand-clearing around a pre-existing alaha'e.

## Action Item 1.5: Outplant Native Flora and Monitor

### Status: In-Progress

Outplanting occurs as cuttings/seedlings/transplants become strong enough; time needed for a cutting/seedling/transplant to gain outplanting viability is dependent on plant species. Once

outplanted, NMOK monitors plants and waters/fertilizes as needed until the plants become established and self-sufficient. Restoration sites are selected by the availability of outplanting-ready species and utility of the site. For example, outplanting sites of naupaka are focused in sandy areas along the shoreline impacted by years of vehicular traffic to control erosion. Additionally, NMOK identified pre-existing native plant populations in its priority revegetation areas, which are also monitored. Below are examples of outplanting and monitoring.



[Left] Watering outplanted naupaka along eroded sand dunes damaged by vehicles; [Right] ‘Ākulikuli site within low rock enclosure set for monitoring.

## **Project Objective 2 - Creation and Initiation of Cultural Site Monitoring Plan**

### **Action Item 2.1: Identify Cultural Sites**

#### **Status: Complete**

An archeological reconnaissance survey was conducted by Rechtman Consulting, LLC in 2013, with a report published in July 2013. The survey report identifies archeological sites on the Kāwā property. NMOK keeps the survey report on file and uses the report as a reference for cultural sites in the area. Additionally, NMOK maintains an ongoing relationship with Rechtman Consulting, LLC; recently NMOK obtained GPS plot points of archeological sites on the property to maintain a better inventory of cultural assets on-site.

### **Action Item 2.2: Coordinate Consultations with Stakeholders**

#### **Status: In-Progress**

During the reporting period, NMOK coordinated meetings with various participants to plan and create a cultural site monitoring and management plan. Meeting participants include lineal

descendants to the area, community members, and cultural practitioners. Organizations represented at these meetings include the Edith Kanaka‘ole Foundation, Ala Kahakai Trail Association, and Kamehameha Schools. Cultural practitioners include master carvers, kumu hula, and heiau practitioners. Below are photos of a recent meeting with lineal descendants conducted on-site.



### **Action Item 2.3: Draft Cultural Site Monitoring Plan**

#### **Status: In-Progress**

Because the cultural sites at Kāwā have significant meaning to many stakeholders in the community, NMOK has taken a conservative approach to developing a cultural site monitoring plan. NMOK plans to continue engaging stakeholders to further develop plans. In the meantime however, NMOK has implemented basic interim cultural site monitoring measures, which include regular monitoring of significant sites that are readily accessible by the public [e.g. Heiau Ke‘ekū and Pāhale o Keawe]. Additionally, NMOK regularly engages in education efforts, discussing the significance of the Kāwā property and the sites therein, with visitors and volunteers. Constant oversight of such a large area is extremely cost-prohibitive; NMOK believes educational outreach efforts that boost awareness of and respect for archeological/cultural sites will ultimately be the major factor in the area’s preservation because the awareness/respect gained by those we teach proliferates beyond the limitations of the organization. NMOK is currently working with Kamehameha Schools to develop signage for culturally significant sites that will both serve as educational and human disturbance mitigation tools.

**Action Item 2.4: Finalize and Implement Cultural Site Monitoring Plan  
(Interim Measures In Progress)**

*See narrative above regarding continued consultations and development of a plan and interim measures in place.*

**Project Objective 3 - Maintain Safety/Security of Property and Access**

**Action Item 3.1: Acquire Maintenance and Security Equipment/Supplies**

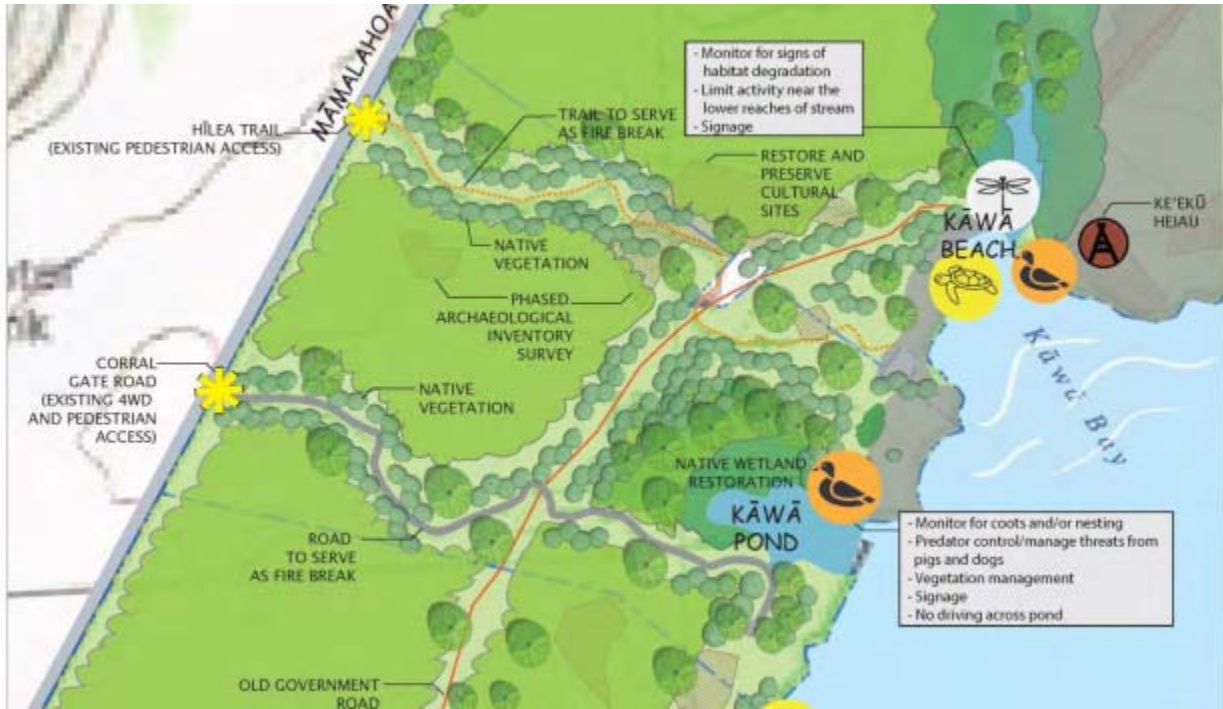
**Status: Complete**

Maintenance and security equipment and supplies were purchased throughout the reporting period with PONC Grant funds. Equipment and supplies are essential to implementation of NMOK's project objectives. A summary of equipment and supplies purchased can be found in Section II of this report.

**Action Item 3.2: Maintain Access Points (Trails/Roads) and Recreational Areas**

**Status: In-Progress**

NMOK, through contractors and volunteers, maintains the two access points running from Māmalahoa Highway to the shoreline: Hīlea Trail on the northern side of the property and Corral Gate Road on the southern side of the property. During the reporting period, focus has been on widening Hīlea Trail for the purpose of revegetation site preparation [see Action Item 1.4 above] and to create firebreaks, as proposed in the County's Kāwā Resources Management Plan. NMOK has also completed the reopening of a walking trail that runs parallel to Māmalahoa Highway, connecting Hīlea Trail to Corral Gate Road and further more on to the springs. This walking trail traverses over the Old Government Road and is also part of the County's Kāwā Resources Management Plan, as shown below.



Source: Kāwā Resources Management Plan

NMOK’s contractors and volunteers have also continuously maintained and improved areas of high use by visitors. NMOK installed wooden picnic tables at these areas, to ensure that there are designated recreational areas available to the public. Because of the maintenance and improvements installed, visitors are more likely to congregate in these areas, which in turn mitigate human impact on the remainder of the property. Designated recreational areas have been an invaluable tool to reduce the likelihood of human disturbance of cultural sites as well as negative impacts on the ecosystem. Below are photos of NMOK’s work on recreational areas and access points.



### **Action Item 3.3: Monitor Area for Illegal Activity for Reporting to Authorities**

#### **Status: In-Progress**

NMOK uses contracted services and the power of positive peer influence to provide security of the property. Provision of security service included regular monitoring during peak hours of area use to ensure that no illegal or detrimental human activity is taking place on-site. Some of the unwanted activities documented during the project period include curious visitors walking into Heiau Ke'ekū, defecation in open areas, and littering. Community members and area visitors have become aware that NMOK maintains a presence on-site almost every day; as such, NMOK has taken on the role as liaison for area concerns. Volunteers, community members, and contractors have observed a positive change in the general human environment of Kāwā during the reporting period: increased use of recreation areas by families and an increased level of respect for the place (e.g. visitors cleaning up their recreation sites before leaving and self-lead volunteer stewardship activities).

### **Project Objective 4 - Spring Preservation and Maintenance**

#### **Action Item 4.1: Draft Freshwater Spring Preservation Plan**

##### **Status: In-Progress**

NMOK is currently drafting its freshwater spring preservation plan. The scope of the plan is limited to maintaining existing spring heads and wall structures feeding the freshwater into the Ka'alā'iki fish pond. A freshwater spring preservation plan is essential because this spring system is the most accessible source of fresh water on site and is used by both NMOK and visitors. Moreover, the maintenance of the spring provides freshwater to the estuarine habitat.

#### **Action Item 4.2: Implement Freshwater Spring Preservation Plan**

##### **Status: Not Started (Interim Measures In Progress)**

Although a freshwater spring preservation plan draft is not completed, NMOK is implementing interim measures to ensure that the public is able to continue accessing freshwater on the property. Spring maintenance includes hand-dredging sand from the spring head and shoring/repairing existing retaining walls that allow the spring to flow into the pond. Below are photos of NMOK work done maintaining the spring and pond.



**Action Item 4.3: Measure Spring Discharge and Monitor Water Quality/Salinity &  
Action Item 4.4: Monitor Native Aquatic Flora/Fauna Near Spring Site**

**Status: In-Progress**

In partnership with the Volcano School of Arts and Sciences, NMOK is developing a place-based curriculum that involves students regularly collecting water quality and water flow data over time. Spring data is tracked alongside weather data/observations to gain a better understanding of the dynamics of the water system which begins at the Hilea watershed located many miles inland and ends at the spring heads at Kāwā. Additionally, flora and fauna near the spring site are monitored and observational data is incorporated into NMOK’s developing place-based curriculum.

**Additional Deliverables**

Because NMOK depends on volunteers to implement its objectives, priority was given during the reporting period to shore up policies and procedures that ensure volunteer safety. As such, NMOK developed its Emergency Response Plan and Health and Safety Plan; these plans are attached as Exhibits “B” and “C,” respectively.

**[Report Continued on Next Page]**

## **II. FINANCIAL REPORT**

The total award for this PONC Grant is \$48,850. Project plans submitted to the County proposed a start date of January 1, 2017; however, the PONC Grant agreement between NMOK and the County was executed on September 5, 2017. NMOK received its initial payment of \$24,425 from the County on September 29, 2017. Due to the funding delay, NMOK verbally requested and received preliminary approval for a no-cost extension of the PONC Grant. NMOK submitted a written request on December 8, 2017 to the County for a no-cost extension of six months. NMOK was granted the no-cost extension, amending the termination date of the PONC Grant to June 30, 2018. Two progress payments of \$9,770 each were disbursed to NMOK in May and June 2018. A final payment request for \$301.66 (\$4583.34 under its \$4885.00 final payment allotment) was submitted to the County on June 29, 2018.

During the grant term, NMOK expended a total of \$44,220.81 of its PONC Grant funds, coming in under budget by \$4,629.19. NMOK expected to come under budget, which is the reason why its final payment request was for a fraction of its final payment allotment. NMOK has not yet received its final payment \$301.66; however, a review of accounts following close of the grant term shows that NMOK will be remitting \$45.85 of the \$301.66 request back to the County following receipt of final payment.

During the PONC Grant term, NMOK was awarded a \$48,000 contract from the Hawai'i Tourism Authority (HTA) through its Aloha 'Āina program. The HTA contract term is from January 1, 2018 through December 31, 2018 and is earmarked specifically to fund NMOK's revegetation efforts. With this added funding, NMOK has been able to onboard additional contracting capacity to provide ecological restoration services. NMOK also received a \$4600 grant from the Hawai'i People's Fund to further support efforts in native revegetation; the grant term runs from June 1, 2018 through May 1, 2019.

The total volunteer work hours coordinated by NMOK during this period is an estimated 2775 hours, which equates to \$68,514.75 worth in volunteer impact.<sup>2</sup> During the project period, NMOK managed \$22,456.00 in contracts directly funded under the PONC Grant, with an output total of 1299 hours in contracted services for native revegetation, security, access/grounds maintenance, and spring preservation/maintenance. \$20,000 in additional funds from Hawai‘i Tourism Authority and the Hawai‘i People’s Fund were used during the reporting period to support an additional 960 hours in contracted services towards native revegetation and outreach education.

**Bottom Line: During the PONC Grant term, NMOK leveraged its grant amount of \$48,850, towards outputs with a total estimated economic value of \$110,970.75. This estimate is limited to service outputs and does not include the value of equipment and supplies purchased. Moreover, NMOK closed the reporting period on the PONC Grant under its allocated budget by \$4,629.19.**

Below is a comprehensive table of NMOK’s PONC Grant budget and expenditures for its entire term (9/5/2017-06/30/2018). The table is broken out by budget class (i.e. “Equipment,” “Supplies,” etc.) and budget item; the table also includes amounts remaining on NMOK’s PONC Grant budget. A narrative summarizing each budget item is also provided.

**PONC GRANT (9/5/2017 – 6/30/2018)**  
**Budget and Expenditures - Totals By Budget Class**

<b>Equipment</b>	<b>Budgeted</b>	<b>Expended</b>	<b>Remaining</b>
Truck	\$3,000.00	\$2,824.73	\$175.27
Trailer	\$1,200.00	\$1,213.43	(\$13.43)
Weed-Eaters	\$1,500.00	\$1,495.89	\$4.11
Chainsaws	\$1,000.00	\$999.03	\$0.97
Pole Saw	\$750.00	\$749.72	\$0.28
Security Cam.	\$700.00	\$479.94	\$220.06
Doc. Equip.	\$300.00	\$301.24	(\$1.24)
Water Flow Probe	\$950.00	\$950.00	\$0.00
<b>Equipment Budget</b>	<b>Budget</b> <b>\$9,400.00</b>	<b>Expended</b> <b>\$9013.98</b>	<b>Remaining</b> <b>\$386.02</b>

<sup>2</sup> Estimate of economic impact of volunteer time based on per hour valuation of \$24.69, which is the 2018 valuation reported by Independent Sector and IMPLAN.

<b>Supplies</b>	<b>Budgeted</b>	<b>Expended</b>	<b>Remaining</b>
Personal Protection	\$1,500.00	\$1,494.83	\$1,293.94
Hand Tools	\$1,500.00	\$1,499.06	\$908.04
Temporary Shelter/Tarp	\$500.00	\$492.20	\$500.00
Chains/Rope	\$200.00	\$160.10	\$137.72
Trash Cans	\$150.00	\$145.30	\$40.72
Tables	\$1,000.00	\$996.98	\$638.67
Benches/Chairs	\$800.00	\$551.69	\$800.00
Vehicle Fuel	\$2,000.00	\$2,000.00	\$1,880.00
Power Equipment Fuel/Supplies	\$1,000.00	\$990.75	\$860.27
Native Plants	\$500.00	\$469.91	\$500.00
Soil, Soil Amendments, Pots	\$1,000.00	\$1000.24	\$1,000.00
Water Hoses	\$150.00	\$150.00	\$130.58
Soil Testing Kit	\$50.00	\$46.86	\$50.00
Plastic Drum-55 Gallon	\$300.00	\$299.06	\$300.00
Incidental Expenses	\$1,800.00	\$1,595.45	\$1,700.10
<b>Supplies Budget</b>	<b>Budget</b> <b>\$12,450.00</b>	<b>Expended</b> <b>\$11,892.43</b>	<b>Remaining</b> <b>\$557.57</b>

<b>Contracted Services</b>	<b>Budgeted</b>	<b>Expended</b>	<b>Remaining</b>
Maintenance/Security	\$22,500.00	\$22,456.00	\$44.00
<b>Contracted Services Budget</b>	<b>Budget</b> <b>\$22,500.00</b>	<b>Expended</b> <b>\$22,456.00</b>	<b>Remaining</b> <b>\$44.00</b>

<b>Liability Insurance</b>	<b>Budgeted</b>	<b>Expended</b>	<b>Remaining</b>
Insurance Coverage	\$1,500.00	\$449.90	\$1,050.10
<b>Insurance Budget</b>	<b>Budget</b> <b>\$1,500.00</b>	<b>Expended</b> <b>\$449.90</b>	<b>Remaining</b> <b>\$1,050.10</b>

<b>Financial Services</b>	<b>Budgeted</b>	<b>Expended</b>	<b>Remaining</b>
Accounting Services	\$3,000.00	\$408.50	\$2,591.50
<b>Financial Services Budget</b>	<b>Budget</b> <b>\$3,000.00</b>	<b>Expended</b> <b>\$408.50</b>	<b>Remaining</b> <b>\$2,591.50</b>

<b>Total Budgeted</b>	<b>Total Expended</b>	<b>Total Remaining</b>
<b>\$48,850.00</b>	<b>\$44,220.81</b>	<b>\$4,629.19</b>

## Budget Line-Item Narrative

### Equipment

**Vehicle:** In consultation with the County, NMOK amended its use of this budget line-item from vehicle purchase to vehicle use. Following County approval for repurposing this budget allocation, NMOK used funds for vehicle rentals and vehicle fuel.

**Trailer:** A 5'x8' pivot rail trailer was purchased along with necessary connections/mounts. Additionally, funds were used to register the vehicle with the County.

**Trimmers:** 5 commercial-grade trimmers purchased; funds also used for extra trimmer heads.

**Chainsaws:** 3 commercial-grade chainsaws purchased; funds also used for extra chains.

**Pole Saw:** 2 commercial-grade pole saw/trimmer hybrids purchased.

**Security Cameras:** Two 24 Megapixel trail/game cameras were purchased, along with security casing and memory cards. Cameras are pending installation on-site.

**Documentation Equipment:** A digital camera and memory cards were purchased for use in documenting work and progress on all project objectives.

**Water Flow Probe:** A collapsible water flow probe purchased along with a digital salinity refractometer for taking spring data.

### Supplies

**Personal Protection:** Supplies purchased under this budget item include: earplugs, safety glasses, work gloves, first aid bags and refills, hydration equipment, protective gear for equipment operation (chaps and harnesses), and N95 dust masks (purchased following increased eruption activity).

**Hand Tools:** Handtools purchased include sickles, loppers, shovels, 5 gallon buckets, pruners, rakes, machete, wheel barrows, watering cans, picks, and sledge hammers.

**Temporary Shelter/Tarp:** 3 pop-up tents were purchased to host volunteer workdays; additionally, tarp was purchased to protect equipment from rain damage.

**Chains/Rope:** Purchases include ropes, chains, bungee cords, and ratchet tie-downs

**Trash Cans:** 32 gallon trash cans purchased and placed around property; additionally, thick gauge trash bags were purchased for various uses.

**Tables:** 6 wooden picnic tables were purchased and installed on the property. Additionally, collapsible tables were purchased for volunteer work days.

**Benches/Chairs:** Rather than benches, cots were purchased for easy setup when hosting volunteers.

**Vehicle Fuel:** Funds under this budget item were allocated and expended for vehicle use, which included hauling trash to the refuse transfer station over 15 miles away.

**Power Equipment Fuel/Supplies:** In addition to use of funds for fuel to power equipment, this line item was used for purchase of extra chains, trimmer line, gas cans, chain oil, and repair/maintenance service of power equipment.

**Native Plants:** Rather than purchase native plants, NMOK prioritized collection, propagation, and outplanting of native flora from the area; native plant sellers on-island do not specialize in Ka‘ū area flora. As such, funds were instead used for nursery/planting supplies such as soil mix, fertilizer, cinder, pots, seeding trays, and rooting hormone.

**Nursery/Planting Supplies:** Purchases under this line item included, pots, fire ant pesticide, neem oil, flagging tape, plant labels, potting soil, organic fertilizers, cinder, seeding trays, and pots.

**Water Hoses:** Because there is no available water spigot nearby, this line-item was used for watering cans, pressure pump sprayers, and sealable 6 gallon water jugs to transport and store in outplanting zones.

**Soil Testing Kit:** Soil testing kits were purchased along with a digital water meter to measure total dissolved solids.

**Plastic Drum – 55 Gallon:** A 55 gallon lay-flat water transport tank fitted with a water spigot was purchased; the transport tank is used for outplanting maintenance.

**Incidental Expenses:** Purchases made under this line item went towards providing food/refreshments to volunteers during work days; also purchased were other incidental items necessary for volunteer work days, including coolers, Ziploc bags, ice, plastic storage tubs, batteries, insect repellent, and sunscreen.

**Contracted Services:** Three contractors were funded with PONC Grant funds under this line item. Those contractors provided a total of 1299 hours of services mainly toward site maintenance/landscaping, NMOK’s revegetation objectives, and access maintenance. Individual contractors were Larry K. Felder and Duane Pua, who are also lineal descendants from the area. NMOK also contracted with KUPU, which administers Hawaii Youth Conservation Corps, to provide work towards NMOK’s revegetation objectives.

**Liability Insurance:** Liability insurance was purchased for the year.

**Accounting Services:** Funds under this line item were used to cover costs of accounting software subscriptions and internet-based financial services.

# **Kāwā Dryland/Coastal Revegetation Working Plan**



**Summer 2018**

**Na Mamo O Kawa**

**NMOK.org**

## I. Executive Summary

*Project Location: Kāwā, Hīlea Iki, Hīlea Nui, and Ka`alāiki, Ka`ū District;  
TMKs: 3-9-5 16:006 and 025, 3-9-5-17:005 and 007*

*This revegetation plan is a vital component of Nā Mamo O Kāwā's Stewardship Project. Since 2012, the members of this community driven organization have assumed responsibility for the stewardship and care of the diverse and fragile cultural and natural resources existing at Kāwā. There has continued to be a collaborative effort between group members, cultural practitioners, stakeholders, researchers, educators, lineal descendants and government agencies to ensure these resources are protected for the enjoyment of present and future generations.*

*The following document outlines the need, scope, objectives, actions and desired outcomes of the Kāwā Dryland/Coastal Revegetation Plan. This plan will be a "living" document as various components are changed to incorporate the input, suggestions, and concerns of consulted parties. Expert consultants with decades of ecological experience and deep connections to Kāwā will assist with plan implementation throughout the life of the project.*

*The scope focuses on a relatively small number of native species that have demonstrated their ability to resist some of the devastating impacts of alien invasive flora. Combining a healthy mix of trees, shrubs, and groundcover species, this project will reestablish a resilient native dryland/coastal ecosystem. A well-established baseline plant community it will provide a safer habitat for the eventual re-introduction of more sensitive, rare and threatened native dryland and coastal species.*

*This plan's actions will mainly occur within the bounds of the project location and will last indefinitely. This plan's fundamental objective is to initiate the restoration of the dryland/coastal ecosystems at Kāwā, beginning with a few number of foundational native species currently growing within the project location. Decades-old "volunteer" native plants currently growing in the project area will be utilized as sites for additional outplanting. This will increase the likelihood of survival for more sensitive and rare plants which will be reintroduced to their rightful habitat in the future. Plot boundaries were delineated on a site by site basis and reflect a wide array of micro-habitats existing in the project area. Data collection and analysis will guide future plan adjustments and add to the collective body of information relating to Hawai'i dryland/coastal re-forestation.*

## II. Purpose/Need

*The dryland forest habitats of Hawai'i are the most critically threatened ecosystems within our island environment. Native species that once flourished at Kāwā are struggling to maintain their existence in the face of centuries-long encroachment of invasive flora. There is a dire need for more dryland reforestation projects on the Island of Hawai'i and Ka'ū. This revegetation plan seeks to fill that void.*

*The purpose of this project is to reverse the alarming trend of ecological degradation by re-establishing hardy keystone species that have both ecological and cultural significance for the Ka`ū community. By employing a mixture of native trees, shrubs and groundcover, this project's aim is to cultivate a vibrant mixture of biodiversity both along the shoreline and in the dryland forest areas of Kāwā.*

*Sand erosion is a continuing problem at the project area due to both man-made and natural factors. Freshwater springs and nearshore marine ecosystems are negatively impacted by accelerated sand loss in Kāwā bay. The coastal outplantings will provide a vital function as erosion control mechanisms in addition to improving beach aesthetics.*

*Many dryland species are cherished cultural resources that provide materials utilized in many facets of Hawaiian culture. From religious ceremonial artifacts and medicine, to fishing gear and dishware, these plants provide the means to produce cultural artifacts and tools for daily life. Furthermore, the spiritual and religious significance of the dryland forest ecosystem and individual species growing there is paramount in Ka`ū culture. These resources must be preserved in order for future generations of Native Hawaiian descent and island residents to experience their culture in the most genuine way possible.*

*Another important goal of this project is to build community to collectively foster the restoration of our dryland and coastal environments. The love for the beach and forest – as well as the shared sense of kuleana to care for our resources – will bring young and old together to support a common vision of a pristine native ecosystem which provides valuable cultural resources for sustainable public use.*

### **III. Scope**

*The scope of this plan is limited to the locations, species, actions and timeline described in Table 1 – Outplanting Sites. Seed-collection occurs on property as much as possible, though some collection efforts will occur in other dryland regions throughout the Ka`ū district and beyond. Any actions conducted by members of the public or group volunteers not consistent with this plan are not sanctioned by Nā Mamo O Kāwā.*

#### **a. Species**

*The species selected for this project consists solely of native Hawaiian flora found in either coastal environments or dryland forests. The complete species list is provided in Appendix A – Species List.*

*The tree species included in this project are: `Alahe`e (*Psydrax odorata*); Milo (*Thespesia populnea*) a.k.a. Indian tulip tree, Pacific rosewood, Portia tree; Kou (*Cordia subcordata*); and Wiliwili (*Erythrina sandwicensis*) a.k.a. Hawaiian coral tree, Hawaiian erythrina.*

*The shrub species included: `A`ali`i (*Dodonaea viscosa*) a.k.a. Kūmakani, `A`ali`i kū ma kua, `A`ali`i kū makani, Hawaiian hopseed bush, Hopbush, Hopseed, Sticky hop bush, Woolly-fruited hopseed; `Ūlei (*Osteomeles anthyllidifolia*) a.k.a. Eluehe, U`ulei, Hawaiian hawthorn, Hawaiian rose; and Naupaka (*Scaevola taccada*) a.k.a. Aupaka, Huahekili, Naupaka kahakai, Naupaka kai, Beach naupaka.*

Two groundcover species are included: 'Ākulikuli (*Sesuvium portulacastrum*) a.k.a. Sea purslane, Sea-purslane, Seaside purslane, Shoreline sea-purslane; and 'Ilima (*Sida fallax*) a.k.a. 'Ilima holo papa

**b. Location**

The project scope is limited to the ahupua'a 'o Kāwā, Hīlea Iki, Hīlea Nui, and Ka'alāiki, Ka'ū District, TMKs: 3-9-5 16:006 and 025, 3-9-5-17:005 and 007.

There are various micro-nurseries located throughout the project area to maximize plant acclimation and survival rates. Community nurseries are located at the homes of various members of the community who raise seedlings according to this plan's protocol. Na'alehu Elementary School and Volcano School of Arts and Sciences students tend school nurseries according to this plan's protocol. Prior to transporting plants into the project area or between nurseries, plants are inspected to prevent the spread of invasive species or disease.

The only actions conducted outside of the project boundaries are collecting/acquiring seeds and seedlings, maintaining community and school nurseries, and consulting. There are also certain periodic community outreach activities which may occur off-site as well.

The following table outlines the plan's outplanting site locations and the species planted there:

<b>Table 1. Outplanting Sites</b>			
<b>Title</b>	<b>Location</b>	<b>Dimensions</b>	<b>Species</b>
A 1	North Entrance (South)	138'(South) x 48'(West) x 33'(East)	Wiliwili, Milo, Kou, 'Alahe'e, 'A'ali'I, Naupaka, Kukui
A 2	North Entrance (North)	100'(West) x 118' (North) x 10 (East) x 10' (South)	Wiliwili, Milo, Kou, 'Alahe'e, 'A'ali'I, Naupaka, Kukui
E 1	Road Corridor to Keawe Housesite	78'(West) x 80' (South)	All Species
E 2	Road Corridor to Keawe Housesite	45' (West) x 160'(South)	Wiliwili, Milo, Kou, 'Alahe'e, 'A'ali'I, 'Ūlei and Naupaka
I	Keawe Housesite	45' (West) x 43'(South)	
O	Beach Trail/Gov. Rd.	45' (West) x 119'(South)	Milo, Kou, Naupaka, 'Ākulikuli, 'Ilima
U	Beach Area	50' (West) x 122'(South)	Milo, Kou, Naupaka, 'Ākulikuli, 'Ilima
H 1	Hilea Stream/Kahawai	34' (West) x 82' (South)	
K	Intertidal Flats	~50 yards x ~25 yards	'Ākulikuli, 'Ilima, Naupaka
L	Loko I'a/Springs	n/a	'Ākulikuli, 'Ilima, Naupaka, Milo, Kou, Niu
M	Beach Road	78'(West) x 80' (South)	All Species
N	Southern Coast	Ka'alāiki to Ka'ilī'ili Bay	'Ākulikuli, 'Ilima, Naupaka
P	Beach Cross-trail	45' (West) x 119'(South)	All Species
W	Spring Cross-trail	45' (West) x 119'(South)	All Species

**c. Timeline**

*This project is one component of the ongoing efforts of Nā Mamo O Kāwā to steward and care for the native ecosystem, recreational resources, and cultural sites at Kāwā. These efforts will continually involve reforestation and revegetation actions, the scope of this plan with respect to duration is not limited. As the goals and objectives of Nā Mamo O Kāwā adapt, the long-term chronological scope of this project will be adjusted accordingly.*

*The following table outlines the cycle of each outplanting site for the first 12 months of plan implementation:*

<b>Action</b>	<b>Timeline (12 Month Period)</b>
Literature Review/Consultation	Month 1-2 (with periodic consultation for project duration)
Purchase/Collect Seedlings and Seeds	Month 2-3
Propagate	Month 2-5
Outplant	Month 2-8
Monitor	Month 2-12
Report	Month 12

**d. Consultants/Collaborators**

*In order to ensure that Nā Mamo O Kāwā is employing ethical, appropriate and scientifically sound methods in the implementation of this plan, consultation with botanists, ecologists, land-planners, cultural practitioners, stakeholders, and any other relevant entities will be conducted throughout the duration of the project. This will undoubtedly enhance the integrity of the plan and lead to increased success in achieving the project objectives.*

*The following individuals and organizations have provided and continue to provide advice and consultation to Nā Mamo O Kāwā during the course of this plan’s execution:*

- i. Dr. Ron Terry
- ii. Dr. Patrick Hart
- iii. Dr. Susan Cordell
- iv. George Akau
- v. Kama Dancil
- vi. Palikapu Dedman
- vii. Don Goo
- viii. Nohea Ka’awa
- ix. John Replogle
- x. Nature Conservancy
- xi. Ka Ohana O Honuapo
- xii. Ka Ahahui O Ka Nahelehele
- xiii. Hawaii Island Seed Bank
- xiv. Townscape, LLC

**IV. Objectives/Actions**

**a. Propagate Native Plants**

**i. Collect Seeds/Seedlings**

*Through consultation with expert botanists, cultural practitioners and ecologists, seeds will be collected in a manner that optimizes genetic strength and is consistent with traditional Hawaiian cultural protocol. Seeds may also be obtained from seed banks and parties interested in donating or selling genetically appropriate seeds and seedlings/saplings. All seeds will be labeled in order to determine, origin, date of collection, and other information relating to specific phenotypes and varieties. Seeds will be appropriately stored until pretreatment and germination.*

*Sanitary transport protocols implemented by field workers and the revegetation specialist sufficiently address the potential of potted plants acting as vectors. These measures include careful visual inspection, ant bait sticks, washing, and sanitation.*

**ii. On-Site Cultivation**

*Seedlings will be acclimated and seeds will be germinated at or in close proximity to their respective outplanting sites to maximize survival rates. Currently established native and non-invasive trees will provide shading for germination and for wind-protection. As they grow seedlings will be transplanted into the appropriate size containers and medium will be amended with dirt and soil found at the site. This will optimize acclimation and potentially ensure that microbiological organisms found in the site’s soil familiarize with seedling root-systems prior to outplanting.*

**b. Invasive Species Control**

*Invasive species eradication efforts will be focused at outplanting sites, along the shoulder of the access road, and in areas where native plants are being most impacted by the negative effects of alien flora. Some areas will have the invasive species merely controlled through mowing/pruning. Whenever feasible, complete removal through the use of hand-tools and power tools will be conducted. Volunteers and maintenance contractors will be trained to identify the target invasive species and distinguish them from their native counterparts.*

*Table 2 – Target Invasive Species outlines the species of most concern and the preferred removal/control method:*

<b>Table 2. Target Invasive Species</b>	
<b>Species</b>	<b>Method of Removal/Control</b>
Guinea Grass ( <i>Panicum Maximum</i> )	Pickaxe, Hand-Pull/Weedwacker, Sickle
Christmas-Berry ( <i>Schinus terebinthifolia</i> )	Chainsaw/Lopper
Haole Koa ( <i>Leucaena leucocephala</i> )	Chainsaw/Lopper, Sledge Hammer, Pickaxe
Lantana ( <i>Lantana Camara</i> )	Pickaxe/Lopper
Misc. Alien Species	Appropriate Method for Plant Type and Size

*Upon removal, larger trees and branches will be mulched utilizing a wood-chipper and resulting waste matter will be appropriately disposed of and spread within the project area. Extreme care will be taken to ensure the mulch and waste is used in a beneficial manner and does not spread disease or negatively impact the ecosystem and plantings.*

**c. Outplanting**

i. Select Locations

*Site selection was conducted through the utilization of an archaeological survey map to ensure no outplanting is conducted in areas with sensitive cultural sites or burials. Consultation with literature and experts as well as on-site inspection and analysis determined optimum site preparation and soil amendments. All sites were selected to maximize survival rates and viability. When possible, currently established native flora already flourishing in the area determined site selection.*

ii. Amend/Prepare Sites

*Each outplanting site is amended appropriately and is appropriately landscaped to ensure adequate lighting and soil drainage. Fertilizer is applied according to the needs of each species and hard-packed soil is loosened using hand tools.*

iii. Outplant

*Seedlings/saplings are planted in their respective outplanting sites, fertilized and watered in accordance with best practices for each species. Community groups and volunteers are involved during outplanting in order to provide genuine educational experiences and establish more profound personal connections between community members and the native ecological resources and sacred geography of Kāwā.*

**d. Monitoring and Maintenance**

*Monitoring and maintenance is conducted by the revegetation specialist, Nā Mamo O Kāwā volunteers, community members and other contractors working through the Kāwā Stewardship Project.*

i. Watering

*Watering is conducted by Nā Mamo O Kāwā volunteers, the revegetation specialist and contractors procured through the Kāwā Stewardship Project. Watering will mostly be conducted using a 55-gallon water tank on the back of a truck or trailer. Water pails will be hauled by hand to the planting sites that are not reachable by hose from the water tank and truck.*

*Watering is performed in a manner specific to the needs of each species and watering schedules are developed by following expert consultation and literature review.*

ii. Feeding

*Feeding is conducted by Nā Mamo O Kāwā volunteers, the revegetation specialist and contractors procured through the Kāwā Stewardship Project. Feeding consists of dry fertilizers and supplemental periodic liquid foliar feeding. Feeding is performed in a manner specific to the needs of each species and feeding schedules and nutrient ratios are developed by following expert consultation and literature review.*

iii. Data Collection

*Data collection is conducted by Nā Mamo O Kāwā volunteers, the revegetation specialist and contractors procured through the Kāwā Stewardship Project. Data sheets and methodology will eventually be drafted in a manner consistent with the recommendations of professional ecologists, scholars and land managers. The data sheets include collection location and date of seed and or saplings being out-planted, nursery location and growth rates, date of out-planting, size and abundance, and date of maturity. Size and abundance of out planted plants will be measured once per quarter. The following data points are of particular importance: (1) founder plant locality (for tracing genetic lineage) and time of harvest, (2) date of out planting, and (3) health (size) and population size (abundance) of native species (out-plants, established plants, and volunteers).*

## Appendix A- Species List

Species*	Habitat	Family
Wiliwili ( <i>Erythrina sandwicensis</i> )	Dry Forest	Fabaceae (Pea or Legume Family)
'Alahe'e ( <i>Psydrax odorata</i> )	Dry Forest	Rubiaceae (Coffee Family)
'Ā'ali'i ( <i>Dodonea viscosa</i> )	Dry Forest	Sapindaceae (Soapberry Family)
Milo ( <i>Thespesia populnea</i> )	Coastal/Dry Forest	Malvaceae (Mallow Family)
'Ūlei ( <i>Osteomeles anthyllidifolia</i> )	Dry Forest	Rosaceae (Rose Family)
Kou ( <i>Cordia subcordata</i> )	Coastal/Dry Forest	Boraginaceae (Borage Family)
Naupaka ( <i>Scaevola sericea</i> )	Coastal	Goodeniaceae (Goodenia Family)
Akulikuli ( <i>Sesuvium portulacastrum</i> )	Coastal	Aizoaceae (Fig-Marigold Family)

\*No species included in the Kāwā Native Revegetation Plan are listed under the Endangered Species Act

## Appendix B- General Growth Requirements

Species	Germination Soil Mix	Feeding	Watering (Mature)
Wiliwili ( <i>Erythrina sandwicensis</i> )	3:0.5 – Perlite: Mix	8-8-8 NPK (6 Months)	Only During Drought
'Alahe'e ( <i>Psydrax odorata</i> )	3:1 - Perlite: Mix	8-8-8 NPK (6 Months)	Monthly
'A'ali'i ( <i>Dodonea viscosa</i> )	3:1 - Perlite: Mix or Fine Black Cinder	None	Only During Drought
Milo ( <i>Thespesia populnea</i> )	3:1 – Perlite: Mix	8-8-8 NPK (3 Months)	Monthly
'Ūlei ( <i>Osteomeles anthyllidifolia</i> )	3:1 – Perlite: Mix	8-8-8 NPK (3 Months)	Monthly
Kou ( <i>Cordia subcordata</i> )	3:1 – Perlite: Mix	8-8-8 NPK (3 Months)	Monthly
Naupaka ( <i>Scaevola sericea</i> )	3:1 – Perlite: Mix	None	Only During Drought
Akulikuli ( <i>Sesuvium portulacastrum</i> )	3:1- Perlite: Mix	None	Only During Drought

The above table was compiled using information found in Lilleeng-Rosenberger, Kerin E. *Growing Hawai'i's Native Plants: A Simple Step-by-step Approach for Every Species*. Honolulu, Hawai'i: Mutual Pub., 2005. Print.

## Appendix C – Outplanting Sites



A2 - Northern Entrance (North) – Volunteer 'Alahe'e (*Psydrax odorata*), Noni (*Morinda citrifolia*), and Monkey pod tree (*Albizia saman*) growing among controlled Haole Koa (*Leucaena leucocephala*); Guinea Grass (*Panicum Maximum*) and Christmas Berry (*Schinus terebinthifolia*)



A2 - Northern Entrance (North) – Volunteer 'Ā'ali'i (*Dodonea viscosa*) growing among controlled Haole Koa (*Leucaena leucocephala*); Guinea Grass (*Panicum Maximum*) and Christmas Berry (*Schinus terebinthifolia*)



O – Beach Trail/Gov. Rd. (North) – Volunteer stand of 'Alahe'e (*Psydrax odorata*) growing among controlled Haole Koa (*Leucaena leucocephala*); Guinea Grass (*Panicum Maximum*) and Christmas Berry (*Schinus terebinthifolia*)



Exhibit A



Exhibit A



Exhibit A



Exhibit A



Exhibit A



Exhibit A

**NĀ MAMO O KĀWĀ  
(NMOK)**

**EMERGENCY RESPONSE PLAN  
(January 2018)**

## **Emergency Response**

The intention of this document is to provide all the involved parties a clear and precise outline of the necessary courses of action in the case of an emergency. This response plan entails the procedures necessary for an emergency at Kāwā, which is approximately ten miles away from an emergency medical care facility (Ka‘ū Hospital). The entire emergency response includes not only maintaining care for the victim, but assuring the immediate safety for remaining participants and leaders, communicating an effective evacuation plan, communicating the incident to appropriate parties, including families, school/organization administrators, and emergency rescue personnel.

All designated project/work leads and appropriate administration and faculty must be familiar with the procedures in this outline. In the event of an emergency, determine the type of emergency and follow the procedures described in this section. Types of emergencies include death, life threatening, serious injury/illness, or minor injury/illness. A specific response plan will accommodate the type of emergency as determined by the project/work lead and communicated to emergency response services.

NMOK-designated leads must be aware of the realities regarding injuries and illness while they are at Kāwā (both serious and minor) in order to deal with them effectively. Due to the relatively remote location of Kāwā, professional medical assistance, while ten miles away, may be required to access the accident site via off-road vehicle, by foot, or helicopter, depending on the level of emergency and location of accident site. NMOK-designated leads must maintain leadership in these situations and provide for the physical and emotional safety of all participants. NMOK-designated

leads must not in any way endanger themselves physically or emotionally on behalf of the injured parties thereby decreasing the safety of the rest of the group.

NMOK-designated leads must remain calm and confident during emergencies. Failure to do so will increase the level of anxiety within the group. NMOK-designated leads should be in clear control of the situation, yet listen to any suggestions that other participants may have – ultimately final decisions rest with the NMOK-designated lead.

Since each situation is unique, NMOK-designated leads must remain flexible in their response. The key to properly responding to an emergency is to remain calm, assess the situation carefully before acting, and continue to reassess your strategy throughout. There are two basic things to be done: care for the injured party, and care for the rest of the group. The more severe the situation, the more both populations will need the care and support of the NMOK-designated lead.

NMOK-designated leads are responsible for constructing an action plan for treatment and evacuation. NMOK-designated leads will develop a plan for treatment and, if necessary, evacuation. NMOK-designated leads are also responsible for communicating the necessary information to emergency services. The communication protocols are discussed later. It is important to note that NMOK-designated leads make the decision in the field and do not rely upon consultation from outside sources, unless explicitly presented by emergency services or the NMOK Executive Director.

**Types of emergencies:**

**Death** – Typically, the utilization of outside resources and agencies will be for the recovery of the deceased's body and moving it to a proper facility. The group should not undertake this procedure, as it must be left to the appropriate authorities, who may

conduct a criminal investigation and submit an official report regarding the cause of death. A team from the appropriate authority will be required to remove the body. The NMOK-designated leads must be present with documentation to convey the details of the incident.

**Life Threatening Illness/Injury** – Injured party has a condition which requires immediate evacuation and advanced life care. In the case of an expedited evacuation, an outside agency may commit resources including motorized vehicles (4WD, Helicopters, etc...). Only patients needing immediate evacuation and advanced care will proceed via the limited motorized means. The evacuation of the remaining group should only occur according to the policies listed below under Group Evacuation Policy, and with the supervision of the NMOK-designated lead. The speed of the evacuation is ultimately determined by the responding organization, who may choose an alternative plan than requested by NMOK-designated lead.

**Serious Injury/ Illness** –Injured party has a condition which will need advanced medical treatment. The patient will need to visit a hospital or advanced medical center immediately upon exit from Kāwā. A hasty evacuation is necessary, as the patient’s condition may become life threatening if not treated in an advanced care facility. In the case a group can not perform a safe and hasty evacuation; the notification team will request assistance of an outside agency or group.

**Minor Injury/ Illness** - Injured party has a condition which may require advanced medical treatment, yet does not immediately present a serious threat to the patient’s life. Typically, life and limb are safe for an extended period. Injured party, if capable, can exit Kāwā on their own or with the assistance of the group. Only when an

injured party or NMOK or any other participant is unable to offer any power to their evacuation, should outside assistance be notified. An evacuation will be necessary only if the group is unable to safely transport the injured party.

The key medical leader (member of the participating team with the most medical training and experience, to be designated prior to trip; not necessarily the NMOK-designated lead) is to accompany the patient until s/he is in the care of medical personnel.

If a search and rescue team is required, contact the local Fire Department.

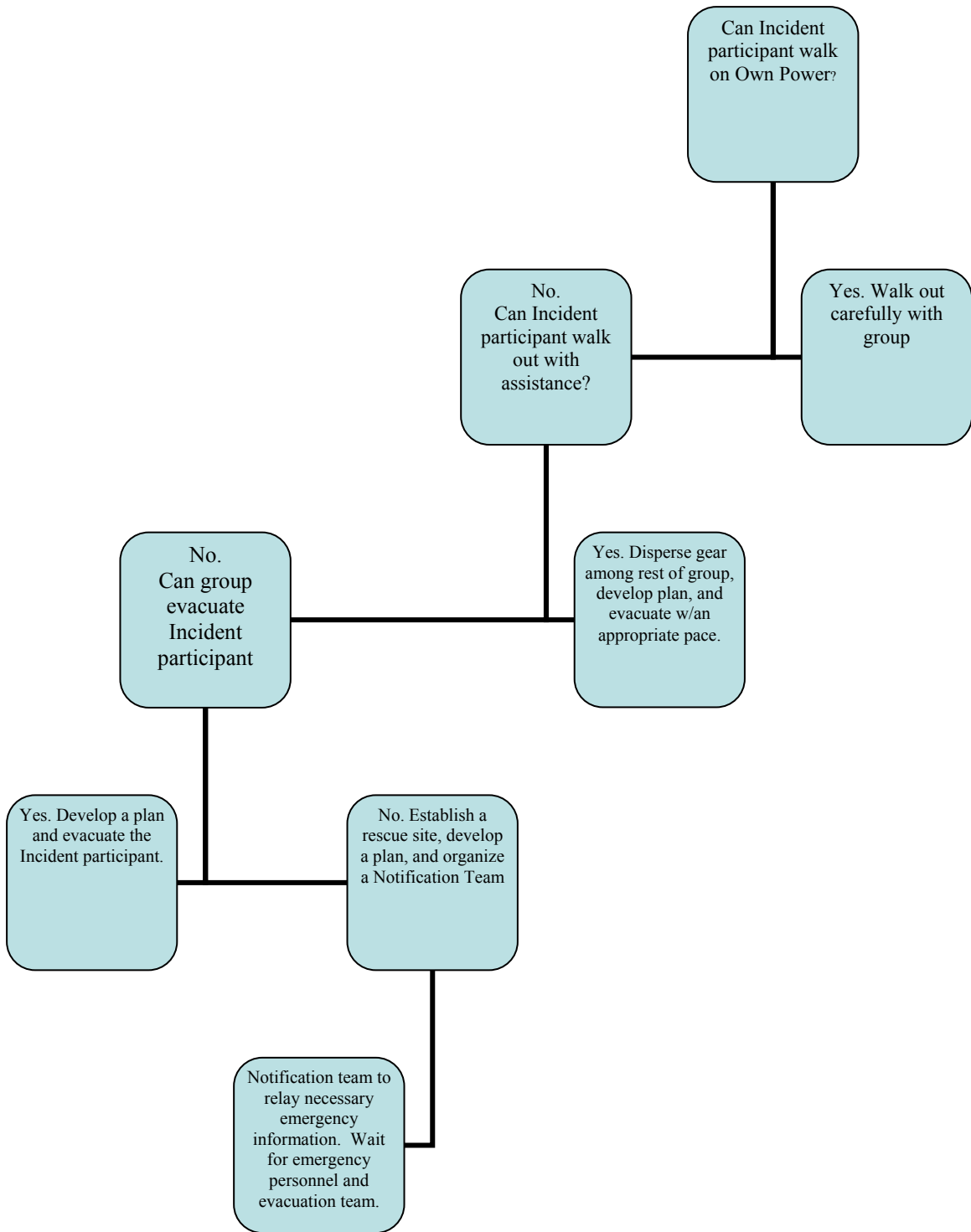
### **Emergency Call Guide**

**Red Call** – Life Threatening Emergency, response time Immediate

**Yellow Call** – Urgent Medical or behavioral situation, response time 1-2 hours

**Green Call** – Concerning ‘stable’ situation,  
response time 1-4hrs

**Evacuation Decision** – to be determined by NMOK-designated leads; a notification team should only be assembled in the case of **Red Call** when an evacuation utilizing outside assistance/resources is needed. The type of emergency and the available resources will determine the type of response and evacuation options. The NMOK-designated leads must determine the plan based on what the victim’s condition entails and what is available to them.



### **NMOK-Designated Leads**

NMOK-designated leads are typically participants who have been designated by their participating organization/school as the leader; NMOK-designated leads are also participants who have been evaluated by NMOK and determined suitable for the role. NMOK-designated leads may also be members of NMOK. NMOK-designated leads assume responsibility for the project, beginning in the planning stages and following through until evaluation. In the case of an emergency, NMOK-designated leads assume leadership of the group and delegate responsibility: group members should assist in patient care if needed, locate positions on the map, prepare rescue sites, etc. NMOK-designated leads will have in their possession or on-site copies of each participant's waiver and medical history.

### **Notification Team**

The Notification Team is comprised of members of the work project who have the ability to reach emergency services via technology or are capable of reaching a location where they can contact emergency services.

### **NMOK Emergency Contact**

The NMOK Emergency Contact will be the NMOK Executive Director unless otherwise determined prior to the work project that a default will be used. In the case that the NMOK Executive Director is not available to act as the NMOK Emergency Contact, an NMOK member/volunteer/coordinating contractors will be designated as the NMOK Emergency Contact. The Default NMOK Emergency Contact will be designated prior to work project and indicated within the work project plan as the Primary NMOK Emergency Contact to be contacted by the NMOK-designated lead and/or Notification

Team. The NMOK Emergency Contact will have a list of the attending participants and the signed waivers. The list will be handed to the NMOK Emergency Contact or placed in a designated location. The NMOK Emergency Contact assumes the role of an Emergency Coordinator, serving as liaison between the work group, response team/emergency services and any other party. The NMOK Emergency Contact may choose to override the treatment/evacuation plan of the NMOK-designated lead only in the case of any apparent oversight by the NMOK-designated lead.

NMOK Emergency Contact: James J. Akau

Default: Ryan Kanakaole

### **Work Project Representative (WPR)**

The WPR is an individual that represents participating organization/school administration and assumes the role of providing information to the appropriate institutional representatives. This person will be designated prior to an outing and indicated within the specific work project plan as the Primary person to be contacted by the NMOK Emergency Contact. The NMOK Emergency Contact will provide the WPR, with work project plans include a list of activity locations/routes and a list of the attending participants and trip leaders. The WPR is contacted at the discretion of the NMOK Emergency Contact, depending upon the scope of the emergency. Not all incidents need to be immediately reported to the WPR, but should be reported in a timely manner. Any time a **Red Call** is initiated and emergency services outside of NMOK are utilized, the NMOK Emergency Contact will automatically contact the WPR.

## **Communication Protocol**

It is important to understand that all information regarding a catastrophic incident or injury is sensitive, particularly for the incident victims and their families. NMOK is sensitive in providing information and support in response to this type of incident. Only acknowledged representatives of NMOK or the participating organization/school should speak in an official capacity to the media, family members, or others who may inquire about the incident. The purpose of this communication protocol is to consolidate information about the incident in a localized place, where it can be sorted and used to provide support to the incident participants, their families, and the community.

If emergency medical attention or search and rescue are required, the following protocols will be initiated:

**Step 1: NMOK-designated leads** will contact the appropriate emergency response system in the county where the injury/accident occurred to initiate an evacuation. Emergency services can be contacted from the field using either a cell phone or the two-way radio on-site that is equipped with an emergency signal. If trip leaders are unable to contact emergency services directly from the field, a notification team will be assembled to return to the last known location where a signal is available.

**Step 2: The Notification Team** will contact the appropriate emergency services and/or contact the NMOK Emergency Contact notifying them that they are receiving a **Red Call**. NMOK-designated leads and/or the notification team only need to contact the NMOK Emergency Contact first if they are not able to directly contact emergency services.

Initiation of emergency services will start from the group in the field in order to provide the most direct line of communication between the incident participants and the services that will provide support.

**NMOK-designated leads and/or Notification team will provide the following information to both Emergency Services and the NMOK Emergency Contact:**

- Description of incident and involved participants
- Participants' condition and treatment plan as initiated at site by NMOK-designated leads
- Group location
- Notification team's location
- Specific instructions from the NMOK-designated leads
- Gear needs
- Medical needs
- Site considerations
- Evacuation plan
- Communication plan between notification team and emergency services  
(this may best involve the NMOK Emergency Contact)

**Step 3: NMOK Emergency Contact** will initiate an administrative emergency response plan by first notifying search and rescue that NMOK is aware of the situation and offer assistance; depending on the situation the NMOK Emergency Contact may choose to serve as liaison between emergency services and the NMOK-designated leads; typically, it is best for emergency services to interact directly with the NMOK-designated leads in the field at the accident. The NMOK Emergency Contact will then notify the WPR that

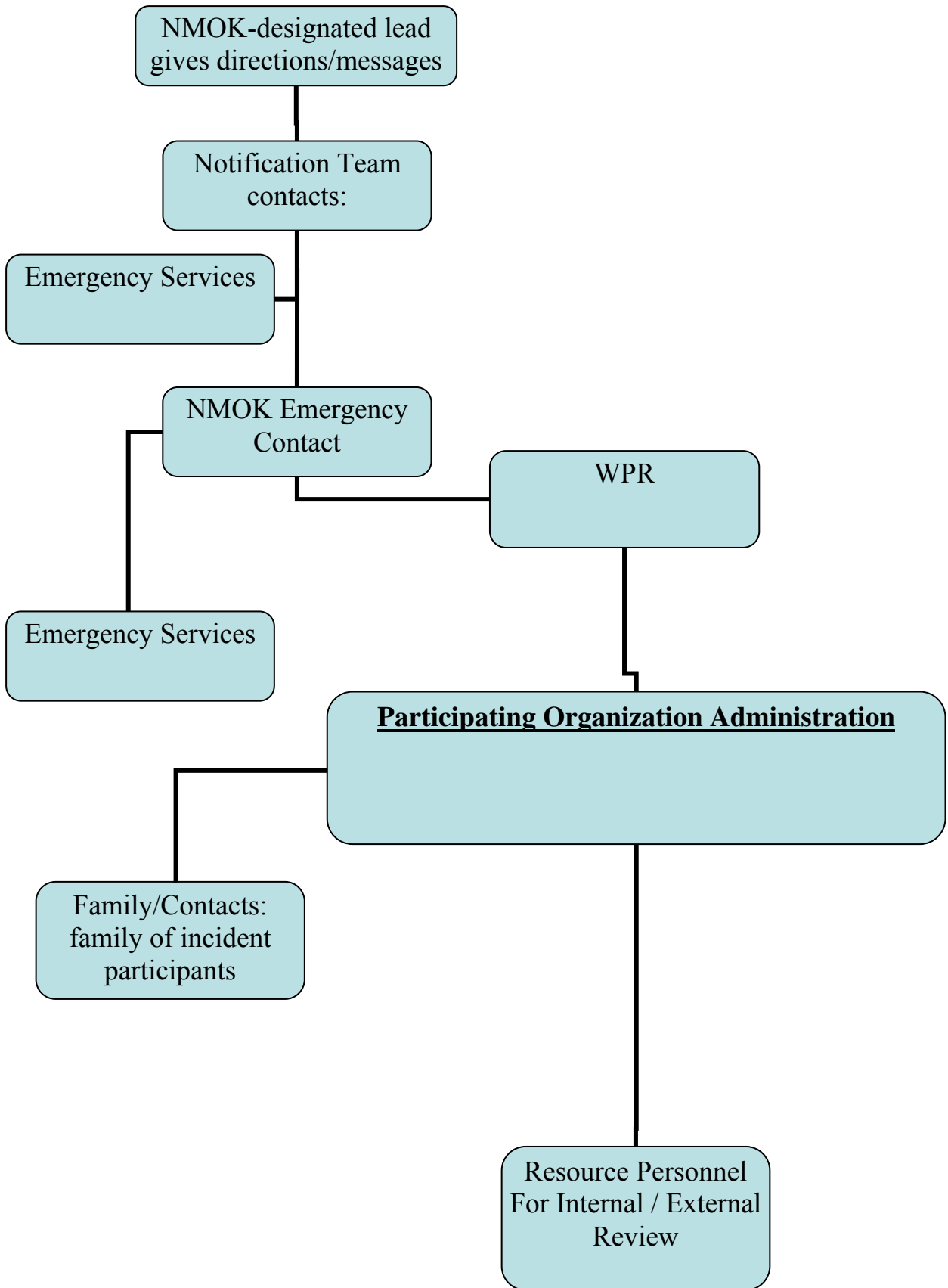
they are receiving a **Red Call**. Anytime a **Red Call** is initiated by the NMOK Emergency Contact, the information provided by the NMOK-designated lead or notification team in Step 2 will be relayed to the WPR. The NMOK Emergency Contact will also keep the WPR apprised of any additional information provided by search and rescue.

**Step 4: Work Project Representative** will initiate an administrative response by starting a communication chain. The WPR will contact the necessary administrators to inform them that a participant has been involved in a life threatening emergency and/or death. The information from step 2 will be provided to individuals involved in the communication chain and will be updated as new information arrives.

### **Communication with the Media**

NMOK-designated leads and participants should concentrate their discussion of the details of the incident with emergency professionals responding to the incident and/or the NMOK Emergency Contact. It is important to understand that all information regarding a catastrophic incident or injury is sensitive. Only NMOK or organization/school representatives should speak to the media, family members, or others who may inquire about the incident. It is not the intention of NMOK to remain isolated or reclusive in the case of an emergency. Our Emergency Response Plan promote the acquirement of knowledge of the incident, including potential reviews, for the purpose of disclosing to all involved a thorough understanding of the incident. The purpose of focusing information from a sole source during the emergency is to honor the privacy of all involved, to concentrate on the immediacy of the incident, to provide support to the incident participants and to thoroughly collect information.

**Following is a flow chart, highlighting the intended communication flow during an emergency.**



### **Incident Reporting**

An incident is defined as any occurrence in which a participant or NMOK-designated lead requires assistance to overcome a situation that has occurred that presents serious danger. Incidents typically occur from the presence of a risk that has not been managed effectively and causes an injury, illness, incapacitation, gear damage, etc. The purpose of incident reporting is to document the actions which led to the incident and to review for educational purposes. Incident reporting is intent on providing a constructive format for the review of an incident and insight into potential incidents within a program. The incident report may then serve as evidence for further reviews and revisions of the program. Incidents are reported on the NMOK incident report form by the NMOK-designated lead and presented to the NMOK Executive Director and WPR.

### **Important Phone Numbers**

911: Any emergency.

<b>Emergency Services Contact / Consultation</b>		
Law Enforcement	Naalehu Station (nonemergency)	(808) 935-3311
	Captain Kenneth Quiocho	(808) 939-2520
Fire/Ambulance	911	911
<b>Medical Resources</b>		
<b>Pahala</b>	Ka'u Hospital 1 Kamani Street	(808) 932-4200
<b>Naalehu</b>	Bay Clinic 95-5583 Hawaii Belt Rd	(808)929-7311

## ***NMOK Incident Report Form***

Date:                      Name of Reporter:

NMOK-Designated Lead:

Planned Activity:

Project Name (if any):

Incident Participants:

Incident Description:

Location/Time:

Activity:

Causal factors:

Witnesses:

Post-Incident Actions (how the patient was treated, group maintained, communication established, etc.):

Injury description:

Care provided:

Possible Complications:

**Communication Log**

Who was contacted?

When?

What information was provided?

# **NĀ MAMO O KĀWĀ (NMOK)**

## **Health and Safety Plan**

January 2018

## EXECUTIVE SUMMARY

The projects undertaken by staff, member, contractors, and volunteers on behalf of Nā Mamo O Kāwā (NMOK), will involve field operations on the ahupua'a of Kāwā, Hīlea Iki, Hīlea Nui, Ka'ū District, TMKs: 3-9-5 16:006 and 025, 3-9-5-17:005 and 007 (Kāwā). The work activities performed at these locations will subject personnel to hazards related to both site conditions and the nature of the operations. It is NMOK's intent to ensure hazards are identified and properly controlled to minimize risk to NMOK staff, contractors, members, volunteers, and the general public. NMOK is committed to full compliance with all applicable federal and local occupational safety and health regulations that may apply to work activities.

The NMOK Health and Safety Plan (HSP) presents elements of NMOK's Health and Safety Program that apply generally for all field operations. The HSP is a reference source for task-specific, safe work procedures that can be applied to a variety of operational conditions. This HSP complies with the requirements of the U.S. Department of Labor Occupational Safety and Health Administration (OSHA) and Hawaii Occupational Health & Safety Division (HIOSH) regulations. The scope and applicability of this HSP ranges to all NMOK employees, NMOK authorized contractors and subcontractors, NMOK members and volunteers, and all other personnel performing a function at the direction of the NMOK. Other agencies, not under the auspice of the NMOK, are responsible for developing their own safety plans and additional criteria as needed.

All NMOK plan and procedures may be waived at the express authority of the senior NMOK safety person and one member from senior management.

## 1. INTRODUCTION

The HSP specifies the requirements and safe work procedures that will be enforced during all NMOK field operations.

This HSP meets the requirements and follows the guidelines established in Title 29 of the Code of Federal Regulations, Part 1926 (29 CFR 1926), Safety and Health Regulations for Construction (OSHA). Policies and procedures within this HSP were also based on best practices identified in the Hawai'i natural and cultural resource conservation and management sector.

## 2. HEALTH AND SAFETY MANAGEMENT

Management of health and safety requires that a management organization be established for each project. The organizational structure will be standardized for each NMOK project, and will consist of the following positions and responsibilities.

### 2.1 EXECUTIVE DIRECTOR

NMOK's Executive Director is ultimately responsible for ensuring that all activities are completed in accordance with requirements set forth in this HSP.

Programmatic management and technical aspects of this responsibility are delegated to the NMOK members and volunteer leaders performing the task. However, the Executive Director is responsible for ensuring that work activities are performed safely.

### 2.2 HEALTH AND SAFETY MANAGER

NMOK's Executive Director oversees, as the Health and Safety Manager (HSM), the technical and programmatic aspects of NMOK's Health and Safety Programs. In addition, the Executive Director provides specific health and safety support, developing and coordinating each project-specific task, as required. The Executive Director is also the contact for regulatory agencies on matters of safety and health. Other HSM related responsibilities include the following:

- General health and safety program administration
- Conducting project health and safety audits
- Developing site-specific employee and community emergency response plans, as required, based on expected project hazards
- Determining the level of personal protection required
- Updating equipment or procedures based on information obtained during site operations
- Implementing employee exposure procedure
- Determining medical monitoring as needed

#### 2.2.1 Health and Safety Professionals

For each project the Executive Director is not directly involved in, the Executive Director will delegate operational authority for performance of H&S duties to an individual working on that project, who must be one of the NMOK directors, officers, or senior member-volunteers. That individual will become the assigned Health and Safety Professional (H&SP)

The H&SP will provide the project with all H&S-related technical services and support, and reports directly to the Executive Director.

### 2.3 PROGRAM MANAGER

Each Program Manager is responsible for coordinating with contractors and volunteers to complete all projects in accordance with requirements set forth in the HSP. The Program Manager will confer with the Executive Director on all matters affecting health and safety. The Executive Director can serve as program manager. Other responsibilities include the following:

- Ensuring that a H&SP has been assigned for the project.
- Reading and becoming familiar with the applicable portions of the HSP
- Maintaining compliance with the HSP and other safety regulations
- Approving in writing any addenda to the HSP
- Ensuring that site personnel have received the proper training and medical clearance (as designated in the HSP and/or other H&S documents) prior to entering the site
- Discussing potential health and safety hazards with the Executive Director or designated H&SP
- Requiring a prompt and thorough investigation of all accidents, including completing a *Report of Injury* and providing Executive Director with original report and a copy within 24 hours of incident.

## 2.4 FIELD MANAGER

At each fieldwork site, a Field Manager (FM) will manage all NMOK contractor, and volunteer activities at the site, and implement the specified H&S procedures. A program manager may also serve as an FM. This includes communicating site requirements to all involved in work; observing that all field leaders and contractors enforce all provisions of the HSP and other H&S documents; working with and consulting with the H&SP regarding any necessary changes to H&S requirements. Other responsibilities include the following:

- Reading and becoming familiar with the applicable portions of this HSP
- Enforcing the HSP and other safety regulations
- Maintaining the presence of at least two qualified first aid providers on-site at all times

### 2.4.1 Site Safety Officer

The FM or designated alternate will serve as the Site Safety Officer (SSO) for each field location, and will be responsible for the execution of the routine onsite duties for health and safety. The SSO will receive assistance and direction from the designated H&SP. The responsibilities of the SSO include the following:

- Conducting periodic safety reviews of the project site and project documents
- Performing regular and frequent site inspections to identify hazards and observe employees at work
- Stopping work, as required, to maintain personal and environmental health and safety
- Determining emergency evacuation routes, identifying and posting local emergency telephone numbers, and arranging emergency transportation
- Ensuring that all site personnel and visitors have received the proper training and medical clearance prior to entering the site
- Establishing any necessary controlled work areas
- Presenting tailgate safety meetings, and maintaining attendance logs and records

- Discussing potential health and safety hazards with the Executive Director or H&SP.

#### 2.4.2 Work Location Coordinators

Where project sites consist of geographically separated work locations, the H&SP will appoint an individual at each location who will be responsible for H&S coordination.

### 2.5 CONTRACTOR REQUIREMENTS

Each NMOK contractor is responsible for assigning specific work tasks to their employees, and for ensuring that their personnel are properly trained and participate in health and safety programs that fulfill the requirements specified in the HSP (e.g., hearing conservation). Each contractor's management will provide qualified employees and allocate sufficient time, materials, and equipment to safely complete assigned tasks. In particular, each contractor is responsible for equipping its personnel with any required personal protective equipment (PPE).

NMOK considers each contractor to be an expert in all aspects of the work they contracted to provide. Each contractor is responsible for compliance with regulatory requirements that pertain to their services. Each contractor is expected to perform its operations in accordance with its own unique safety policies and procedures to ensure that hazards associated with the performance of the work activities are properly controlled. Copies of any safety documents required for a contractor's work activities will be available for NMOK to review prior to the start of onsite activities. In the event that contractor procedures or requirements do not match requirements specified in the H&S documents, the more stringent guidance will be adopted.

Hazards not listed in any of NMOK's applicable H&S documents that are known to any subcontractor, or known to be associated with a subcontractor's services, must be identified and addressed to the NMOK Executive Director or program manager prior to beginning work operations. The Executive Director or authorized representative has the authority to halt any contractor operations and remove any contractor or contractor employee from the site for failure to comply with established health and safety procedures or for operating in an unsafe manner.

Appendix A provides NMOK's *General Safety Rules for Contractors*, which will be observed by all contractor organizations operating on a NMOK field site.

Onsite contractors and their personnel are responsible for reading, understanding, and complying with all site H&S requirements. Contractors are required, at a minimum, to follow the guidelines established in NMOK's H&S documents (or their own equivalent documents, upon NMOK approval) and all relevant state and federal safety regulations. In addition, contractors will develop safety guidance specific to work functions to supplement NMOK's guidance for the contractor's personnel. Each contractor will designate a safety coordinator, with the authority and responsibility to implement health and safety requirements for the contractor's employees. The safety coordinator will also serve as the contractor's point of contact with the Executive Director concerning safety issues.

## 2.6 ONSITE PERSONNEL AND VOLUNTEERS

Each person (NMOK employee, contractor, or volunteer) is responsible for their own health and safety, for completing assigned tasks in a safe manner, and for reporting any unsafe acts or conditions to their supervisor or the Executive Director. All personnel are responsible for continuous adherence to the specified health and safety procedures during the performance of their work. No person may work in a manner that conflicts with the letter or intent of safety and environmental precautions expressed in these procedures. After due warnings, NMOK will dismiss from the work site any person who violates safety procedures. NMOK employees are subject to progressive discipline and may be terminated for blatant or continued violations.

All personnel working for NMOK and its contractors are required to read and acknowledge their understanding of the HSP and any other applicable H&S documents. All visitors to controlled work areas of any project site must likewise read and acknowledge their understanding of the applicable H&S requirements. All personnel are expected to abide by all written H&S requirements and any supplementary instructions, and cooperate with supervisory personnel to ensure a safe and healthful work site.

All NMOK staff utilizing volunteers or contractors are responsible for ensuring that the NMOK volunteer packet with all the information and liability waivers completed and signed. All records must be filled out and filed with NMOK prior to utilizing volunteers or contractors.

Site personnel are required to report any of the following to the Executive Director immediately:

- Accidents and injuries, no matter how minor
- Unauthorized participants (persons without proper paperwork filled out)
- Unexpected or uncontrolled releases of any hazardous substances
- Any unsafe or malfunctioning equipment
- Any changes in site conditions which may affect the health or safety of project personnel

### 3. UNIVERSAL SAFE WORK PROCEDURES

The following requirements will be observed during all NMOK-managed work activities, and apply equally for both NMOK and contractor personnel.

#### 3.1 TRAINING

##### 3.1.1 H&S Training

Due to the strenuous nature of work, extreme weather conditions, and remote location of Kāwā, all NMOK staff shall have completed and maintain American Red Cross, American Heart Association or equivalent CPR and first aid certifications . In addition some staff members (such as those responsible for volunteers) may be required to complete a higher level of safety training.

##### 3.1.2 Onsite Training/Briefings

The following training/briefings will be conducted on site as part of each project.

**Initial Orientation Briefing.** The SSO will conduct a site safety orientation for every person assigned to the project on the following occasions:

- Before field personnel begin work at the site
- When there are significant revisions or modifications to the HSP or other H&S documents
- When additional workers or contractors begin fieldwork
- When authorized visitors are required to enter any active work area(s)

The site safety orientation will be documented by personnel signing a signature page. Records from any additional meetings, including a list of attendees, will be maintained in the project H&S file. At a minimum, the following must be included in the orientation and training meeting agenda:

- A review of the HSP and site-specific safety guidance
- Verification of medical and safety training clearances
- Fire safety training, fire extinguishment, and evacuation procedures
- Distribution of the HSP and other site-specific safety guidance documents
- Attendee signatures to acknowledge receipt and understanding of the documents and an agreement to comply

##### 3.1.3 Tailgate Safety Briefings

The SSO will conduct a tailgate safety briefing at the start of each workday to review and discuss the health and safety issues associated with the work, problems encountered, and modifications to existing procedures. These briefings will be documented with the tailgate safety briefing sign-in log, located in Appendix A. The Executive Director maintains copies of the tailgate safety briefing sign-in logs in the project files. All field personnel

associated with each day's project activities are required to attend these meetings and sign the log.

#### 3.1.4 Hazard Communication

Any organization wishing to bring a hazardous material onto any NMOK work site must first provide a copy of the item's Material Safety Data Sheet (MSDS) to the Executive Director for approval and filing. Copies of MSDSs will be maintained on site as well as in the NMOK office records. All personnel will be briefed on the hazards of any chemical product they use, and will be aware of and have access to all MSDSs.

### 3.2 GENERAL SITE SAFETY RULES

The following general requirements apply to all onsite activities.

#### 3.2.1 Smoking, Eating, and Drinking

Except where exempted by the Executive Director smoking, eating and drinking will not be permitted inside any controlled work area at any time. Field workers will wash hands and face immediately after handling any potentially contaminated materials and always prior to eating or drinking. Consumption of alcoholic beverages is prohibited during NMOK activities.

#### 3.2.2 Contact with Hazardous Materials

Field personnel will avoid contact with potentially hazardous substances. They will not walk through and will avoid, whenever possible, tall grass, deep ravines, and unknown objects.

All field personnel will use their senses to alert them to potentially dangerous situations.

#### 3.2.3 Site Awareness

Field personnel will be familiar with the physical characteristics and requirements of the work site, including the following:

- Accessibility to equipment and vehicles
- Communication
- Site access
- Emergency procedures and evacuation assembly points
- Location of protective and emergency equipment,
- Knowledge of first-aid procedures

The number of personnel and equipment in the hazardous area will be minimized, as appropriate for the task.

### 3.2.4 Housekeeping

During site activities, work areas will be continuously policed for identification of excess trash and unnecessary debris. Excess debris and trash will be collected and stored in an appropriate container (e.g., plastic trash bags, garbage can, roll-off bin) prior to disposal. At no time will debris or trash be intermingled with waste PPE or contaminated materials. Anyone observed throwing contaminated material or PPE away with municipal wastes will be removed from the site.

**Water Supply.** A water supply meeting the following requirements will be utilized:

- Potable Water – An adequate supply of potable water will be available for field personnel consumption. Potable water can be provided in the form of water bottles, canteens, water coolers, or drinking fountains. Where drinking fountains are not available, individual use cups and disposal containers will be provided. Potable water containers will be properly identified in order to distinguish them from non-potable water sources.
- Non-Potable Water – Non-potable water may be used for hand washing and cleaning activities. Non-potable water will not be used for drinking purposes.

**Portable Toilet Facilities.** Portable toilet facilities are located on premises at a designated location.

**Washing Facilities.** Employees and volunteers will be provided washing facilities (e.g., buckets with water and soap) at a designated location.

### 3.2.5 Communications

Effective communication is essential to safe working conditions and the successful completion of field projects. External communication will be maintained by NMOK using hand held radios or cell phones. Radios or cell phones will be required during all activities to facilitate communications with the Executive Director or authorized agent who will in turn notify emergency response units (e.g., medics, fire department, etc.).

Onsite, personnel will communicate between work locations using hand held radios. At any work site, communication will be performed using voice commands and hand signals. In the event of a catastrophic event at any work location, the notice to evacuate will be given verbally by the work task leader. A more complex evacuation system (e.g., use of horns) is not required if work areas will be quite small.

## 3.3 NOISE EXPOSURE

Exposure to excessive noise can damage hearing ability and cause permanent hearing loss. It is the intent of NMOK to prevent permanent hearing loss from noise exposures occurring on our field sites.

Workers will use appropriate hearing protection when noise levels exceed 85 decibels on the A-weighted scale (85 dBA). Workers may be exposed to hazardous levels of noise when working within 25 feet of operating heavy equipment.

### 3.4 PERSONAL PROTECTIVE EQUIPMENT

Proper selection of personal protective equipment (PPE) depends upon a number of factors. All use of PPE will conform to the requirements as well as the specifications provided below.

#### 3.4.1 Head Protection

Employees will wear hard hats on work sites with large equipment or overhead hazards, or as directed by the SSO. Where necessary, ear protection and face shields will be attached to hard hats.

All hardhats will meet the requirements set forth by American National Standards Institute (ANSI). Additional requirements (e.g., electrical or heat resistance) may be specified in other applicable H&S documents.

#### 3.4.2 Eye Protection

Eye protection will be worn on work sites at all times unless otherwise specified or directed by the SSO. All selected eye protection will meet the following minimum requirements:

- Provide adequate protection against the particular hazards for which they are designed
- Provide reasonable comfort when worn under the designated conditions
- Fit snugly and not unduly interfere with the wearer's movements
- Be durable
- Be easily cleaned and disinfected

Where specified due to particular work conditions, eye protection must also meet the impact and durability standards set forth by ANSI. However, where this is not specified, the use of commercial sunglasses will be permitted at work sites (due to the limited potential for high velocity impact hazards associated with most NMOK work activities).

Persons whose vision requires correction and are required to wear eye protection may wear goggles or spectacles of one of the following types:

- Spectacles with protective lenses that provide optical correction (Rx)
- Goggles that can be worn over corrective (Rx) spectacles without disturbing the adjustment of the spectacles
- Goggles that incorporate corrective (Rx) lenses mounted behind the protective lenses

### 3.4.3 Ear Protection

Appropriate hearing protection, including earplugs, canal caps, and ear muffs, will be provided when noise may be a problem.

### 3.4.4 Foot Protection

NMOK employees will wear sturdy boots of at least ankle height (as appropriate) while working on site. Sturdy boots with or without safety toes are appropriate for tasks where contact with hazardous materials or heavy equipment is expected to be slight or nonexistent. NMOK volunteers will be required to wear sturdy boots or shoes with boots of at least ankle height recommended. **Lightweight thin-soled shoes are not considered appropriate footwear due to the nature of the site (thorns, rocks, etc.).**

When off-duty or in the water, lightweight shoes, slippers, tabis, or surf booties can be worn as appropriate.

### 3.4.5 Hand Protection

Employees will use appropriate hand protection when exposed to hazards that could cause injury to the hands. Gloves must resist puncturing and tearing, and provide any necessary resistance to physical abrasion or chemicals.

### 3.4.6 Body Protection

Protective clothing and body protection is selected on the basis of the tasks to be performed and the physical hazards the worker may be exposed to. For all work areas other than ocean related areas, appropriate work clothing will be worn that at least covers from the ankle to shoulders. Tank- and halter-tops are never appropriate. Bathing suits, shorts, and cut-off pants are also not appropriate. Substantial pants and long sleeves are required at work locations where significant physical hazards are present.

## 3.5 ACCIDENT OR INCIDENT REPORTS

All accidents and incidents that occur on site during any field activity will be promptly reported to the Executive Director. The Executive Director will provide timely notification to the Program Manager. Reporting and documentation will conform to the following:

**Personal Injury.** The supervisor of the injured employee or work crew will initiate a written report, using the *Report of Incident* Form (found in NMOK Emergency Response Plan) within 24 hours of the incident.

**Vehicle Accidents.** Any motor vehicle incidents will be reported immediately to the Executive Director. Supervisors will complete a *Report of Incident* for personnel that have been involved in a vehicle accident or incident that results in damages to equipment or vehicles in excess of \$500.00. Motor vehicle incidents that occur on public highways are normally investigated by the responsible law enforcement agency. Copies of relevant reports will be obtained by the driver and forwarded to the Executive Director as soon as possible.

### 3.6 EMERGENCY PLANNING

Emergency response plans that identify potential emergency situations (based on anticipated fieldwork conditions) and provide the appropriate response actions will be developed and presented. Provisions will also be made to have appropriate emergency equipment available and in proper working condition. The following emergency response equipment will be available at every project work location, unless otherwise specified.

#### 3.6.1 First Aid Kits

Each major job site will have a first-aid kit meeting the following requirements:

1. First-aid supplies will be stored in weatherproof containers. The Executive Director will verify the contents of each kit meets all regulatory requirements.
2. First-aid kits will be available at the job site at all times.
3. Use of any item from the first-aid kit will necessitate completion of an Accident/Injury Report. The report will be submitted to the Executive Director within one working day.
4. First-aid kits will be inspected and restocked monthly.

#### 3.6.2 Eyewash Units

Eyewash units will be utilized at the site. All units will be capable of supplying hands-free irrigation for both eyes for at least 10 minutes at a flow rate of at least 0.25 gallons per minute.

#### 3.6.3 Fire Extinguisher

A fire extinguisher with a minimum rating of 1-A, 10B, C will be available for use at the site at all times. Site personnel will be readily aware of the location of the fire extinguisher at all times, in the event of an incident where a fire extinguisher may be utilized.

#### 4.2.2 On-Site Training

All lead project personnel will be trained about potential hazards at the site, and exposure prevention or control measures. Field personnel will be

- Instructed on the contents of applicable portions of this HSP
- Made aware of task-specific physical hazards and other hazards that may be encountered at the site
- Made aware of fire prevention measures, fire extinguishment methods, and emergency and evacuation procedures

The on-site-training will be performed on a daily basis. The initial on-site training will be conducted by the Executive Director or designated representative before work activities begin. Additional on-site training will be conducted by the SSO and will be documented on the Tailgate Safety Briefing Sign-in Log.

#### 4.1 SITE CONTROL

For all hazard operations, NMOK will manage site control in accordance with the following requirements.

##### 4.1.1 Controlled Work Areas

Controlled work areas will be designated around each work location where there is the potential for encountering physical hazards related to any NMOK work activity.

Only personnel conforming to all requirements of this Section of the HSP, and any additional specified requirements, are permitted to access controlled work areas. Controlled work areas are those in which specific tasks are performed and associated hazards have been assessed as common for the activity to be conducted. These types of Controlled Work Areas are not to be confused with common Work Areas, in which multiple various activities may be conducted.

Additionally, all personnel will be alert to prevent unauthorized or accidental entrance into controlled-access areas. If such an entry occurs, the trespasser will be immediately escorted outside the area, or all work at that location must cease.

##### 4.1.2 Buddy System

When working all personnel will operate using the two-person concept (buddy system). All personnel will operate in teams of two or more (single person entry into any controlled work area is prohibited) and will maintain visual contact with each other at all times. Personnel belonging to different organizations or volunteers can serve as “buddies” for each other.

##### 4.1.3 Visitor Clearances

Visitors will not be allowed within any active work area unless they can demonstrate a need for entry into the work area that is acceptable to the Executive Director. All visitors desiring to enter any work must meet the following requirements:

- The Executive Director has received written confirmation that each of the visitors has received the proper training required by this plan. Verbal confirmation can be considered acceptable if confirmation is provided by an officer or other authorized representative of the visitor's organization and followed by submittal of necessary documentation.
- The visitor has been briefed on the hazards associated with the site activities being performed, and has acknowledged receipt of this briefing by signing the appropriate tailgate safety briefing form. Until these requirements have been met entry will not be permitted.

## 4.2 PERSONAL PROTECTIVE EQUIPMENT

Often, personal protective equipment is required for protection from overexposure to environmental hazards.

### 4.2.1 Respiratory Protection

Respiratory protection is not required, since concentrations of airborne contaminants are expected to be below applicable action levels.

The following ensemble provides minimal levels of skin protection. Upgrades to greater levels of protection will be executed as required in the monitoring guidelines outlined in the HSP.

### **Typical Equipment List**

- Normal Work Uniform
- Hard hat (as required)
- Safety glasses/faceshield (as required)
- Safety-toe work boots (as required)
- Hearing protection (as required)

### 4.2.2 Modified PPE Requirements

The need for the use of modified or stricter protective equipment is highly unlikely at most NMOK field operations. Where analysis of site hazards indicates the potential for conditions that are beyond the capabilities of standard PPE to provide adequate protection, additional requirements will be specified by the Executive Director.

For any ongoing work operation where on-site monitoring indicates that standard PPE is inadequate, the Executive Director will be contacted for further guidance. All work will be halted until the Executive Director has prepared supplemental Health and Safety requirements.

## 5. TASK-SPECIFIC SAFE WORK PROCEDURES

The following procedures will be enforced for individual work tasks.

### 5.1 RECREATIONAL SWIMMING

All recreational swimming activities are done at the participant's own risk. However, in an abundance of caution by NMOK staff and NMOK volunteers will abide by the following rules.

NMOK staff or designated volunteers will ensure the following steps are completed:

- Conduct an initial, periodic, and final headcount.
- Ensure that rescue fins and board are present on the beach and designate a "rescue" person capable of using them.
- Identify any unusual hazardous conditions likely to affect swimming, such as high surf, high or low tide, marine hazards, etc...
- All swimming activities shall cease if designated person in charge feels ocean conditions or actions of swimmers are unsafe.

## 5.2 VEHICLE OPERATIONS

- All vehicles on NMOK job sites and facilities must observe a maximum speed limit of 10 miles per hour, unless otherwise posted.
- All vehicles must be parked in authorized areas only.
- There will be no passing of moving vehicles at job sites where there are narrow roads and short-sight distances.
- Vehicles will only be operated by personnel with valid licenses and good driving records.
- Vehicles will have all required inspection and operating permits.
- Seat belts will be used.

## 5.3 SLIPS, TRIPS, FALLS, AND PROTRUDING OBJECTS

Hazards from protruding objects, careless movements, or placement of materials on paths or foot traffic areas present a problem with regard to slips, trips, falls, and puncture wounds. Personnel will use a reasonable amount of effort to prevent such injuries.

## 5.4 HAZARDOUS NOISE ENVIRONMENTS

Working around large equipment often creates excessive noise. The effects of noise can include physical damage to the ear, pain, and temporary or permanent hearing loss. Workers can also be startled, annoyed, or distracted by noise during critical activities.

Data indicates working within 25 feet of operating heavy equipment (chainsaws, earthworking equipment, etc.) can result in exposure to hazardous levels of noise (levels greater than 90 dBA). Accordingly, all personnel are required to use hearing protection (ear plugs or ear muffs) within 25 feet to any operating heavy equipment.

## 5.14 HAND AND PORTABLE POWER TOOL SAFETY

The use of hand and portable power tools during site activities is a potential source of accidents. A fundamental program of using the right tool in a correct manner together with proper maintenance and storage is necessary to prevent personal injury and property damage. The following procedures will be used when performing operations involving portable hand and power tools:

- Each type of portable hand or power tool will be operated using the manufacturer's recommended operating procedures. Where specific operating procedures have not been developed by the manufacturer, only personnel familiar with the safe operating procedures of that equipment will be permitted to operate it. Only personnel who have been appropriately trained in the use, operation, and proper handling of portable hand and power tools will be permitted to do so. The Executive Director will ensure that only trained personnel perform work activities with portable hand and power tools

- Appropriate personal protective equipment will be used by personnel using safety features. Guards are not to be removed or rendered inoperative, unless written permission is obtained from the Executive Director. Most portable hand and power tools present a significant eye hazard to operating personnel, as well as personnel in the immediate vicinity. The Executive Director will ensure that all personnel within the immediate area are provided with protective eyewear
- The Executive Director will conduct periodic inspections of portable hand and power tools that are used at the site. Inspections will include both powered and non-powered equipment
- Any damaged, worn, or improper tool will be removed from service immediately, and will remain out of service until it is repaired or replaced

#### 5.16 HEAT STRESS PREVENTION

Heat stress can be a significant field site hazard. Depending on the ambient conditions and the work being performed, heat stress can occur very rapidly, within as little as 15 minutes. Site personnel will be instructed in the identification of a heat stress victim, the first-aid procedures, and the prevention of heat stress casualties.

Workers will be encouraged to immediately report any difficulties or heat-related problems that they experience or observe in fellow workers. Supervisors will use this information to alter the work-break schedule to accommodate such problems. During breaks, workers will be encouraged to drink plenty of water or other liquids to replace lost fluids and to help cool off. If any worker exhibits signs of severe heat distress (such as profuse sweating, extreme confusion and irritability, or pale, clammy skin) they will be relieved of all duties at once, and encouraged to rest in a cool location and drink plenty of water. Anyone exhibiting symptoms of heat stroke (red, dry skin, or unconsciousness) will be taken **immediately** to the nearest medical facility, taking steps to cool the person during transportation (clothing removal, wet the skin, air conditioning, etc.). Severe heat stress (heat stroke) is a life threatening condition that must be treated by competent medical authority.

##### 5.16.1 Heat Stress Monitoring

Heat stress-related accidents and illnesses are best prevented by continuous observation of employees and routine heat stress awareness training activities. Heat stress monitoring can be accomplished using one of the techniques discussed below.

1. **Instrument Measurements.** Wet Bulb Globe Temperature (WBGT) can be used to determine the heat stress index, in accordance with the techniques specified in the most recent edition of the Threshold Limit Values and Biological Exposure Indices, published by the American Conference of Governmental Industrial Hygienists (ACGIH). WBGT results will be used in conjunction with the Threshold Limit Values and Corrections specified in the Heat Stress Section of the ACGIH document.
2. **Direct Observation.** In the absence of WBGT monitoring devices, heat stress observations and monitoring may be accomplished by implementing a series of field medical observations. Observation of sustained pulse rates is most commonly used. The ACGIH recommends that individuals under 35 years old whose sustained heart rate exceeds 160 beats per minute (bpm) and 140 bpm for those over 35 discontinue work activities until the observed heart rate returns to normal.

Any results obtained from monitoring techniques will be used as guidance only. To properly mitigate the effects of heat stress, it is necessary to establish a work routine that incorporates adequate rest periods to allow workers to remove protective clothing, drink fluids (vital when extreme sweating is occurring), rest, and recover. The frequency and length of work breaks must be determined by the individual work location supervisor based upon factors such as the ambient temperature, sunshine, the amount of physical labor being performed, the physical condition of the workers, and protective clothing being used. While heat stress measurement techniques provide guidance in optimizing this routine, breaks must always be sufficient to prevent workers from manifesting symptoms of heat stress, regardless of monitoring results.

#### 5.16.2 Heat-Related Illnesses

The following guidance can be used in the identification and treatment of heat related illness.

**Heat Stress.** This is the mildest form of heat-related illness. Victims exhibit irritability, lethargy, and significant sweating. The victim may complain of headache or nausea. This is the initial stage of overheating, and prompt action at this point may prevent more severe heat-related illness from occurring.

First Aid: Provide the victim with a work break to relax, remove any excess protective clothing, and drink cool fluids. If available, an air-conditioned spot is an ideal break location. The victim may resume working once symptoms subside; however, the work pace will be moderated to prevent recurrence of the symptoms.

**Heat Exhaustion.** This usually begins with muscular weakness, dizziness, nausea, and a staggering gait. Vomiting is frequent. The bowels may move involuntarily. The victim is very pale, has clammy skin, and may perspire profusely. The pulse is weak and fast, and breathing is shallow. The victim may need to lie down to prevent fainting.

First Aid: Immediately move the victim from the work area to a shady or cool area with good air circulation (avoid drafts or sudden chilling). Remove all protective outerwear. Call a physician. Treat the victim for shock. (Make the victim lie down, and raise feet 6-12 inches. Keep the victim warm, but loosen all clothing). If the victim is conscious, it may be helpful to provide sips of water. Transport victim to a medical facility as soon as possible.

**Heat Stroke.** This is the most serious of heat illness, and represents the collapse of the body's cooling mechanisms. As a result, body temperatures often rise to between 105° and 110°F. As the victim progresses toward heat stroke, symptoms such as headache, dizziness, and nausea, can be noted, and the skin is observed to be dry, red, and hot. Sudden collapse and loss of consciousness follows quickly, and death is imminent if exposure continues. Heat stroke can occur suddenly.

First Aid: Immediately evacuate the victim to a cool and shady area. Remove all protective outerwear and all personal clothing. Lay the victim on the back, with the head and shoulders slightly elevated. Apply cold wet towels, ice bags, etc. to the head, armpits, and thighs. Sponge off the bare skin with cool water or rubbing alcohol, if available, or place the victim in a tub of cool water. The main objective is to cool without chilling the victim. Give no stimulants or hot drinks. Since heat stroke is a severe medical condition requiring professional medical attention, emergency medical help will be summoned immediately to provide on-site treatment of the victim and proper transport to a medical facility.

#### 5.16.3 Skin Hazards

Sunburn and prickly heat are both symptoms of skin irritation and damage produced through exposure to sunlight and operating in hot work environments. Protect exposed skin with an appropriate sunscreen. A sunscreen with a sun protection factor (SPF) of 15 or greater is recommended for a full day in the sun. Heat rash, also known as prickly heat, can be prevented by the application of a hydrophobic, water repellent barrier cream, such as Kerodex 71.

Appendix A  
General Safety Rules for  
Contractors

## INTRODUCTION

The rules and requirements contained in this attachment have been written for the guidance of Contractors who are performing work under contract with NMOK. This booklet prescribes general requirements. Additional specific rules may be necessary to ensure the safety of workers on a particular job. The contractor, working in collaboration with the NMOK representative, will be expected to establish additional rules and procedures as necessary to conduct a safe operation and comply with all NMOK, regulatory, and insurance requirements.

The term contractor, as used in this attachment, will be understood to include any and all persons, sole proprietorships, partnerships, corporations, or other business ventures under contract, oral or written, to NMOK.

NMOK is responsible for informing its contractors of these requirements, directing and supervising work of subcontractors, and assuring that its subcontractors adhere to the requirements herein. NMOK may request contractor to provide proof of its adherence to all rules and regulations, and will prohibit access to NMOK sites for those contractors not in compliance.

In order to assist contractors in following these instructions, a NMOK Representative will be assigned to the contractor to act as NMOK's agent in all matters relative to work activities at NMOK job sites. Under no circumstances will any work be started until the NMOK Representative has been contacted, a job orientation has been conducted by the NMOK Representative, and all permitting, insurance, NMOK, and regulatory pre-job requirements are met.

The NMOK Representative and the Executive Director are authorized to stop any work that they consider hazardous to NMOK personnel, volunteers, members, equipment, or contractor personnel. This authority may be delegated to appropriate individuals.

## GENERAL SAFETY RULES AND REQUIREMENTS

### ACCIDENT REPORTING

All accidents (personal and property damage) will be reported orally to the NMOK Representative as soon as emergency conditions no longer exist. A written report will follow within 7 days after emergency conditions are resolved.

### ALCOHOL, FIREARMS, AND ILLEGAL SUBSTANCES

Alcoholic beverages, illegal drugs or narcotics, or guns and ammunition are not permitted on NMOK job sites. Personnel under the influence of alcohol or drugs will not be allowed on NMOK job sites.

## SECURITY

For security reasons, entrance to and exit of NMOK facilities and job sites is restricted to those areas designated as the subcontractor's work area.

## SPEED LIMITS

All vehicles on NMOK job sites and facilities must observe a maximum speed limit of 10 miles per hour, unless otherwise posted.

## VEHICLE SAFETY

All vehicles must be parked in authorized areas only.

There will be no passing of moving vehicles at job sites where there are narrow roads and short-sight distances.

Vehicles will only be operated by personnel with valid licenses and good driving records.

Vehicles will have all required inspection and operating permits.

Seat belts will be used.

## SAFE WORK PRACTICES

### COMMUNICATION

Communication and coordination is vital to prevent accidents on work sites. Every worker must be aware of equipment operating in his or her vicinity.

### EMERGENCY EQUIPMENT

NMOK's fire equipment is not to be moved, relocated, or otherwise rendered inaccessible, unless specific permission is granted in each case by the NMOK Representative.

Emergency equipment such as first aid kits and eyewash kits are not to be moved, relocated, or blocked without the express permission of the NMOK Representative.

### FIRE PREVENTION

NMOK Representative, or their designee, is authorized to correct any condition which they may consider a fire hazard. In any emergency, the site personnel should evacuate the area until contact is made with the Executive Director or designee.

## MEDICAL SERVICE AND FIRST AID

**Emergency Medical Service.** Preplanned emergency medical service will be provided as designated by subcontractor and approved by the NMOK Representative.

**First Aid Kit.** Each subcontractor will provide an employee first aid kit that meets minimum OSHA requirements.

## OVERHEAD WORK

No overhead work will be performed when, as a result of that work, the possibility of a falling object striking any person exists. Do not work above any person at any time.

## PERSONAL PROTECTIVE CLOTHING AND EQUIPMENT

In certain construction and maintenance operations, personal protective equipment, such as safety glasses, chemical goggles, respirators, hard hats, and protective clothing, is required. The type of protective equipment to be worn will be determined by the degree of exposure to the potential hazard. There will be very few occasions when hard hats and eye protection will not be required at NMOK job sites. When in doubt of the safety measures to be observed, contractor will contact the NMOK Executive Director. This will not, however, relieve subcontractor of the responsibilities to determine appropriate protection.

Eye protection is required when engaging in operations such as the following:

Drilling, chipping, grinding, wire brushing

Handling caustics and acids

Breaking bricks or concrete

Hammering chisels, drift pins, etc.

Burning or welding

Other situations that create a possible eye hazard.

## POWER TOOLS

**Power and Air-Actuated Tools.** Gasoline-powered, electric, or air-actuated tools are not to be used on NMOK job sites without prior approval of the NMOK Executive Director. To obtain approval, subcontractor must contact the NMOK Representative.

## SMOKING AND OPEN FLAMES

Smoking and the use of open flames are strictly prohibited in areas where flammable liquids, gases, or highly combustible materials are stored, handled, or processed. Obey "No Smoking" signs. Smoke only in designated areas.

## SOLVENTS AND PAINTS

Adequate ventilation must be maintained at all times when paints or solvents are used.

Personnel will use proper respiratory protection and protective clothing when toxicity of the material requires such protection.

Flammable solvents and materials must be used with extreme caution when possible sources of ignition exist.

Flammable paints and solvents must be stored in an approved (Factory Mutual or Underwriters Laboratories) flammable-liquids storage cabinet, when storage is required inside the buildings. If an approved cabinet is not available, paints and solvents must be removed from the building when not in use.

Flammable liquids must be dispensed in safety cans with flash arresters bearing a Factory Mutual or Underwriters Laboratories approval. These containers must be clearly identified as to their contents.

Material Safety Data sheets, for materials used by the contractor, will be maintained by NMOK.

## TOOLS

Hand and power tools will be kept in safe operating condition. Mushroomed heads on cold chisels, star drills, etc., are unsafe and will not be used. Hammers will have handles that are not cracked, split, or broken.

Nonsparking tools may be necessary in certain areas where flammable materials are handled or where sparks could create an explosion.

## TRANSPORTING MATERIAL AND EQUIPMENT

Tools, materials, and equipment must not be left unattended in access ways.

Tools, material, and equipment will not be removed from the job site without permission of the NMOK Representative.

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**Contractors are expected to brief their employees on these requirements and enforce these rules with their employees. NMOK management may stop or suspend work at any time the Contractor fails to comply with NMOK rules and regulations.**

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REGULATORY REFERENCES

- (a) Title 29 of the Code of Federal Regulations, Part 1910 (29 CFR 1910), Occupational Safety and Health Standards (USDOL/OSHA)
- (b) HIOSH Standards