

SUSTAINABILITY,
NON-INDUSTRIAL
INSTALLATION

FY 2016 Secretary of Defense Environmental Awards

HAWAII ARMY NATIONAL GUARD

INTRODUCTION AND BACKGROUND

The Hawaii Army National Guard (HIARNG) Sustainability program has implemented innovative new programs over the past 2 years. Tailored to the unique challenges of Hawaii's tropical environment and sensitive ecosystems, the program focuses on integrated pest management, waste reduction and cost efficiency. The installation is comprised of seven readiness centers, two Army Aviation Support Facilities (AASF), Regional Training Institute (RTI), Regional Training Site Maintenance (RTSM), six shops, training sites and headquarters.

The primary training site, the Keaukaha Military Reservation (KMR), is at the core of the Sustainability program, serving as a proving ground for initiatives that are implemented throughout HIARNG. KMR sits on a 504-acre parcel in Hilo on the Big Island of Hawaii and has been a HIARNG training site off and on since 1914. Of the training site's 504 acres, 245 are considered to be some of the most endangered lowland wet forest ecosystems. The 'ōhi'a/lama

forest community is a closed canopy forest that is currently only found on the eastern side of the island of Hawaii. It is dominated by 'ōhi'a (*Metrosideros polymorpha*) and lama (*Diospyros sandwicensis*) in the overstory, and various shrubs, small trees, and ferns in the midstory and understory. However, numerous non-native species have invaded these forests, most notably the trees strawberry guava (*Psidium cattleianum*), bingabing (*Macaranga mappa*) and melastoma (*Melastoma septemnerium*). These forests are also home to three endangered species—the Hawaiian hawk (*Buteo solitarius*), the Hawaiian hoary bat (*Lasiurus cinereus semotus*) and the endangered shrub Haiwale (*Cyrtandra nanawalensis*). The KMR forest is also home to a variety of endemic species that are not found anywhere else in the world. With such a sensitive habitat in HIARNG's hands, the Sustainability program has been particularly dedicated to implementing a pest management program that supports both wildlife and HIARNG training.

Judging Criteria



Program Management



Orientation to Mission



Impact & Outcomes



Technical Merit



Stakeholder Interaction



Transferability





ACCOMPLISHMENTS



This year, the Sustainability program launched a new technique in pest management, introducing goat and sheep grazing as a cost- and resource-effective approach to invasive species eradication, saving approximately \$4,500/acre. The project has slashed the use of herbicides and safeguarded sensitive habitat from adverse maintenance impacts; at the same time, this technique has re-opened large sections of KMR (46 acres) to training access. If area requires maintenance, then an additional \$1,000/acre is saved. The Sustainability program has also targeted waste stream reduction and recycling in accordance with Environmental Management System (EMS) goals for waste management. The Qualified Recycling Program (QRP) was expanded over the past 2 years, incorporating battery recycling as well as scrap metal in 2015. A QRP business plan was completed last year in-house and submitted to the National Guard Bureau for approval. HIARNG's environmental training structures have also been vastly expanded, bringing training programs in-house so that they can be tailored to the needs and focuses of HIARNG units and facilities. Environmental Officers (EO) complete in-person sustainability training modules that are customized to their spheres of responsibility, which has, in turn, improved accountability and integration between the HIARNG Environmental Office (HIARNG ENV) and other offices and directorates.

Sustainability is supported by HIARNG ENV staff from compliance, natural resources and pollution prevention, creating a cross-functional and comprehensive team to support sustainability in a broad context. The HIARNG ENV is also directly tied into operations and planning for the facilities management office. Active participation on the Environmental Quality Control Committee (EQCC) allows for the fuller integration of sustainability measures throughout HIARNG with the support of commanders and directorate heads. In total, 20 senior leaders and commanders and 11 HIARNG ENV staff members participate in these meetings and the decision-making process. A second tier of EQCC teams integrates unit EOs into sustainability activities.



The Sustainability program is broadly engaged in compliance throughout HIARNG; they have an

active, sustained role that incorporates sustainability in all environmental plans. These include but are not limited to: Spill Prevention, Control, and Countermeasures Plan (SPCC), Hazardous Material and Waste Management Plan, Storm Water Management Plan, Integrated Natural Resources Management Plan, Integrated Pest Management Plan, Statewide Operational Noise Management Plan and various memoranda that establish procedures not currently documented in present plan iterations. The hazardous waste and SPCC plans underwent an update in 2015, and the Storm Water Management Plan was rewritten in 2016 to reflect new best management practices for HIARNG facilities and operations. Maintenance of these plans and close cooperation with regulatory agencies have helped the HIARNG installation to maintain an excellent compliance record. The Compliance Manager has a regulatory background, which has enhanced communication with the Hawaii Department of Health (DOH), the primary regulatory agency for installation compliance. Three recent inspections by DOH were extremely successful, with no negative findings or Notices of Violation (NOV). The installation maintains National Pollutant Discharge Elimination Systems (NPDES) permits per the Clean Water Act and Underground Injection Control (UIC) permits per the Safe Drinking Water Act, and HIARNG ENV consults regularly with the DOH's offices of solid and hazardous waste and hazard evaluation emergency response. The Sustainability program emphasizes transparency and accountability, which has fostered a more collaborative rather than a regulatory relationship with DOH. The Conservation Program, among numerous other natural and cultural resource activities, coordinates with the Big Island Invasive Species Committee (BIISC) and Kauai Invasive Species Committee (KISC) to eradicate invasive *Miconia* (*Miconia calvescens*), *albizia* (*Falcataria moluccana*) and long-thorn Kiawe (*Prosopis juliflora*) trees from installation forests.



Emphasis on recycling expansion has been a revenue generator for HIARNG. Incorporating battery recycling into the program last year generated \$5,000 for the QRP, and this revenue is projected to increase in FY17. By coordinating with vendors, the Sustainability program was able to implement a pick-up/drop-off schedule that minimizes time and

resources HIARNG Soldiers spend on transporting recyclable materials. The Sustainability program’s grazing project also represents significant cost savings over conventional pest management employed at KMR. Goats and sheep cost just 10 percent compared to hiring contractors for mechanical and chemical invasive plant removal and one-third of the lower cost alternative to inmate labor previously employed.

FY 16	Contractor Cost	Inmate Labor Cost	Grazing Cost
Cost per acre	\$5,500	\$1,500	\$500
Cost for 46 acres	\$230,00	\$69,000	\$23,000



Treatment area prior to grazing. A six-month growth of a variety of invasive and non-native weeds dominated the perimeter of a security fence line before grazing by goats and sheep was introduced. Approximate size of this area is 2 acres.

Integrated Pest Management Program

 Introduction of grazing management has been the most impactful new initiative for the HIARNG Sustainability program this year. HIARNG is required to implement rigorous integrated pest management programs (IPMP) that incorporate a variety of methods to control invasive species without harming sensitive native vegetation. A mix of mechanical, chemical and biological controls have been employed by the Sustainability program. Invasive strawberry guava, for instance, began to be eradicated with insect biological control in 2014; the insect reduces the plant’s growth by forming galls on the leaves of the plant. Contractors and inmate labor have been utilized to conduct herbicide application and mechanical removal. Seeking to reduce management costs and pesticide use, however, the Sustainability program began to explore a different biological control method—goats and sheep.

The Sustainability program evaluated locations on KMR where terrain posed maintenance issues and where pesticides were routinely used. These sites were then reviewed to ensure no threatened or endangered species were at risk from grazing and to protect endemic plants from impacts; a plant density comparison was also completed. Invasive species have been such a perennial issue for HIARNG, the Sustainability program also researched grazing animals’ diets to ensure that the invasive plants would

be attractive to the animals. This led to a determination that goats and sheep would be the best candidates

In FY16, 46 acres were managed with a 194-animal herd. The animals are enclosed in portable paddocks of electric hog netting powered by solar panels. The efficiency of the herd was dramatic: the goats and sheep cleared an average of 1 acre with a density of six-month plant growth in just 1 1/2 days. They are also able to clear areas with terrain that is difficult for machines to access.

The elimination of machines for pest species removal also means a reduction in petroleum products and emissions as well as prevention of any equipment leaks or spills of fuel or hydraulic fluids, simplifying



A herd of 194 goats and sheep are introduced to the perimeter fence treatment area. Use of animals dramatically curtails mechanical and chemical control measures.



After picture of the same treatment are following just three days of grazing. The efficiency of the herds to control vegetation is remarkable.

compliance processes for the IPMP. Herbicide use has been eliminated for the 46 acres currently under grazing management along with fewer trips so less fuel needed for vehicles that transport people (which also reduces emissions). This results in fewer human footprints so less disturbance and more protection sensitive and fragile ecosystems.

Waste Stream Reduction and Recycling

The Sustainability program has continued to target waste stream reduction and recycling increases on the installation. Since implementing a paper and cardboard recycling program in 2012, HIARNG has seen significant increases in recycling adoption. Over the past 2 years, more than 46 tons of paper and 42 tons of cardboard were diverted from landfills. The paper and cardboard recycling vendor, Secure Solutions, is a business unit of Goodwill Contract Services Hawaii; 75 percent of the company's employees are people with disabilities, resulting in benefits for both the Army and the community.

Battery recycling was incorporated last year as well. In FY16, 13 tons of batteries were collected for recycling, generating around \$5000 for the QRP. Though the QRP is still in its early stages, the Sustainability program has begun accepting requests for project proposals. In addition, the installation recycles scrap metal, tires, used oil, anti-freeze and green waste. Beyond the HIARNG's recycling program, the state of Hawaii offers a 5-cent deposit for recycled cans and bottles. The Sustainability program encourages all buildings and staff members

to take part in the "HI-5" program. Buildings are free to conduct their own bottle and can collection and use the deposit money generated to host parties, barbecues and other morale, welfare, and recreation events.

Energy Conservation

The Sustainability program has also enacted measures to reduce energy use, supporting a key HIARNG eMS aspect. In 2012, the Adjutant General set an energy reduction goal of 25 percent, with 5 percent annual reductions through 2017, which is more aggressive than those set by executive order. Through diligent evaluation, re-training in best management practices and equipment updates, the HIARNG installation is on track to meet this goal. Under HIARNG ENV leadership, and in coordination with the energy manager, all the HIARNG's numerous personal refrigerators were replaced with allocated Energy Star appliances, significantly cutting each facility's daily passive energy use. In addition, new facilities are constructed to LEED Silver standards with an emphasis on energy conservation features.

The primary goal of the Sustainability program is to fully support Soldiers and staff in all environmental aspects and protect the viability of HIARNG training facilities and resources. Maintaining full compliance and pursuing environmental excellence ensures that restriction to HIARNG's operations and training are minimized and where possible, eliminated. The HIARNG ENV has long emphasized training as the critical tool in promoting sustainability initiatives. EOs take part in regular facility training that entails customized environmental education modules according to installation site needs and requirements. All HIARNG ENV staff provide facilities staff and Soldiers with contact information. New business cards include all Sustainability program points of contact and multiple phone numbers and emails to ensure if a problem arises, someone in the program will always be reachable. Dedicated Compliance (blue) binders have also been provided to every facility and site manager. These binders contain not only instructions and best management practices for pollution prevention and compliance, but also store each facility's training certification and environmental documentation in a single, easily accessed place. Each binder is maintained by its site

EO and contains the TAG environmental policy, training certificates, waste manifests, plans and memoranda, and any other relevant sustainability documentation.

The innovations to KMR's IPMP have also yielded significant benefits to the HIARNG mission. The cost-efficient removal of invasive species allows critical funds to be redirected to other environmental and training land support projects. The Sustainability program coordinates with trainers to prioritize sites for clearance, deploying herds to meet anticipated access needs. The use of the grazing herds also effectively reduces fire fuel loads, thereby minimizing the risk of fires that interrupt training, as well as Soldier access in forested areas. The goats and sheep remove understory while keeping mid and upper canopies intact according to natural resources management goals. In a context where elephant grass grows at a rate of a foot per week, keeping areas cleared for Soldiers is essential. Controlling invasive vegetation also helps to ensure that the training site will not become subject to restrictions related to protection of threatened and endangered or endemic species. Hawaii's invasive plants spread rapidly, degrading natural ecosystems; protecting these habitats is essential to KMR's long-term viability as a training resource

The Sustainability program's internal continuity is grounded in coordinated management across directorates, with environmental accountability and awareness instilled throughout all installation facilities applying customized training. The HIARNG ENV has taken further steps to ensure programmatic continuity and compliance success, tying sustainability activities into the operations of the FMO for better mission integration and coordination. HIARNG blends sustainability, compliance and environmental awareness into routine operations at all levels. On the operational level, the HIARNG ENV has created opportunities for environmental accountability as well. An environmental component in HIARNG's SharePoint system has allowed for easier access and updating of electronic copies of all environmental plans, policy memoranda, and EO supplemental training. The EOs throughout the installation are also provided with easily recognizable blue environmental binders that help facilitate



After picture of the same treatment are following just three days of grazing. The efficiency of the herds to control vegetation is remarkable.

documentation and record control. All documents and records are readily available for audit.

HIARNG's implementation of natural controls for invasive species management is a technique that could be readily adopted by other installations seeking to manage large tracts of land in a cost-effective, resource-efficient manner.



HIARNG and the Sustainability program are dedicated to sustaining their communities and enhancing public interaction with HIARNG and increasing understanding of its compatible military and environmental missions. The HIARNG ENV hosts events associated with National Public Lands Day and Earth Day, which have brought students and community members onto the installation for litter pickup, tree planting and habitat restoration projects. The HIARNG ENV is also a partner for HIARNG's Youth Challenge Academy for at-risk teens, organizing native planting activities and beach cleanups with youth participants.