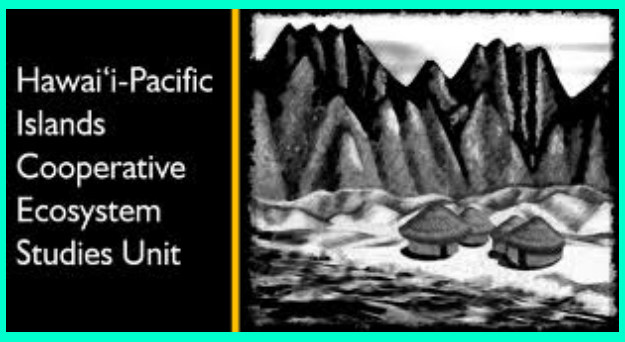
2019

The Army Natural Resources Program Safety Program

Updated: May 2019



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The Army

Natural Resources Program

on Oahu

Safety Program

May 2019

TABLE OF CONTENTS

THE ARMY NATURAL RESOURCES PROGRAM ON OAHU
SAFETY OVERVIEW

Accidents occur due to a variety of reasons, some beyond your control. We strive to ensure that you and your colleagues are exposed to the least risk possible. Safety in the workplace is everybody's responsibility. In addition to being responsible, you will be accountable for your activities, or inactivities, that contribute to an unsafe work environment or accident. You are as much responsible and accountable for correcting unsafe practices and irresponsible behavior on the part of your colleagues as you are of your own. If your colleague ignores you, you must report the problem to your supervisor. If your supervisor is unresponsive to your concerns, it is your responsibility to bring them up to the next level of safety authority (Safety Coordinator, Safety Officer, Unit Leader) until they are addressed. You will not be discriminated against for expressing your concerns or refusing to do something that you consider to be dangerous.

An injury not only affects the injured party; it can have an effect on their immediate family and cause problems within the work environment. The injured party takes the problem home with her/him. The loss of employment or life can be catastrophic. The family is suddenly deprived of income or, in the case of death, the nurturing of a parent. None of us wants to be haunted by the thought, "If only I had done …" The program can suffer disrupted schedules due to investigations, etc., even to the cancellation of the project. You need to appreciate that, though one may be compensated, the consequences for the injured party's future can be devastating.

For individuals who have been properly trained and supervised, there are several causes of accidents, but the principal ones are: carelessness, tiredness, and irresponsibility.

Carelessness can occur under various circumstances. One of the most common is when you are rushing to finish a job because you want to get home, beat an incoming shower, etc. Working under pressure is sometimes required, but you should be aware of that pressure and keep it foremost in your mind, making sure that you do not omit safety considerations in trying to finish. Being angry or distracted by other workers, operations, or even domestic issues often results in carelessness. "Old-timers" can have a false sense of security from years of experience. Carelessness is also often associated with tiredness.

Tiredness includes both coming to work tired as well as being exhausted while doing the job. If you come to work tired and your supervisor determines that you may not be alert enough to do your job, you will be sent home and charged a day's vacation. Exhaustion on the job can be felt in different forms. Just feeling tired, your muscles are quivering

from exertion, your thinking is muddled, your body coordination is bad (stumbling, jerky movements), etc. Dehydration can also result in tiredness. You should alert your fellow workers and your supervisor that you are tired. Drink a cup of water and rest for 20 min. You, or perhaps the whole crew, should be assigned a different, more relaxing task until you recover sufficiently. Tiredness can kill, because not only your body but also your mind is not working optimally. In some countries, tiredness is no longer an excuse for causing an accident; it is the responsibility of the tired person to get rest, refreshment, and recuperate.

Irresponsibility includes playing the fool, showing off, not thinking an action through adequately, etc. Misbehavior is not tolerated by the program under any circumstances and can result in disciplinary action against you, including dismissal.

If you feel uncomfortable about a situation, you need to call your supervisor's attention to the problem and your concerns. If you feel a task is beyond your capability, you should not do it.

If you fail to follow proper procedures or you behave irresponsibly, you will be held accountable for your actions and disciplined. You may initially receive a verbal warning from your supervisor or perhaps even a written warning that will go into your personnel file. We consider these infractions to be mistakes, opportunities to learn where and how you went wrong. Repeated or more flagrant violations will result in punishment (formal reprimands, suspension without pay), which will be included in your personnel file and could include the possibility of dismissal.

When you violate a written guideline in the SOPs, the discipline will be harsher. At a minimum, you will receive a written warning, which will go into your RCUH file, but depending on the severity of the infraction, you could be suspended without pay or possibly dismissed. Further infractions would result in suspension with the increasing likelihood of dismissal.

When you cause injury to another worker, you will be suspended immediately with pay. A review of the accident will be conducted and its cause determined. If at fault, the minimum disciplinary action that you should expect will be at least suspension without pay, and at worst, dismissal.

All disciplinary actions that go to your RCUH file will make you ineligible for pay increases or promotions for six months from the date of the infraction.

These warnings may seem severe. They are meant to be. However, with time, safety considerations will become part of your work ethic and culture.

NATURAL RESOURCES PROGRAM
SAFETY OFFICERS

Below is an outline of the responsibilities of various individuals to ensure the highest standards of safety in the workplace.

PCSU/PICHTR Principal Investigator or delegated person

- The buck stops here.
- Remain aware of safety program activities and losses (provided by Safety Officer).
- Liaise with U.S. Army to ensure that adequate safety standards are in place for PICHTR employees employed under the Cooperative Agreements. Ensure that Safety Program is adequately developed and implemented and that the Safety Binder is submitted to the U.S. Army on time for each Period of Performance. Effect major disciplinary actions, where necessary.

PCSU Safety Officer

- Develop SOPs.
- Develop and coordinate training programs – program level.
- Accident review – recommendation to PI.
- Track and analyze PCSU Project injury losses.
- Conduct periodic audits of PCSU Project safety programs and processes.
- Review and sign the Safety Binder required by the U.S. Army SOW.

ANRP Program Manager

- Liaise Safety Program with PCSU Safety Officer, Principal Investigator, and Army Technical Advisor.
- Review Supervisor's accident investigation reports.
- Chair major accident review where necessary.
- Respond to supervisor's concerns, safety equipment needs, special situations, and unsatisfactory performance or compliance with safety requirements.

Senior Natural Resource Management Coordinators and Specialist Program Managers

- Develop risk assessment for each new program or subprogram.
- Liaise Safety Program with NRP Project Manager and Army Technical Advisor.
- Coordinate training.
- Monitor training, recertification, etc., for individuals.

- Review Supervisor's accident investigation reports.
- Participate in major accident review where relevant.
- Review risk and hazard assessments.
- Respond to supervisor's concerns, safety equipment needs, and unsatisfactory performance or compliance with safety requirements.

Supervisors

- Conduct daily risk and hazard assessments
    - Evaluate special situations and make recommendations to Program Coordinator or Program Manager for concurrence or revision before carrying on.
- Supervise safety in the field
    - Conduct safety behavior observations, correct improper procedures, warn personnel about any problem; comments to personnel file, if appropriate, or report to Program Coordinator or Program Manager.
- Monthly training/review/updating.
- Monitor and ensure proper equipment maintenance and replacement when needed.
- Complete accident reports (coordinate with federal technical advisor where appropriate)
    - Provide details of assignment, what led to accident, how accident occurred, injury treatment, identify root causes, recommendations to prevent further occurrences.
    - Provide photographs of the injury, field situation.
    - Recommend disciplinary action, if necessary.

Every employee

- Follow the safety standards of the program.
- Recommend places where clarification or further safety guidelines are needed.
- Correct improper behavior or use of equipment when observed. If other employee disregards this advice, the person should bring the matter to the attention of the supervisor.
- Since safety is paramount in the project operations, you must make your concerns known. If your supervisor is unresponsive to your concerns, bring them up to the next level of safety authority (Program Coordinator, Program Manager, Safety Officer, Principal Investigator) until they are addressed.

RCUH ARMY-SPONSORED PROJECTS IN HAWAII
SAFETY PLAN FOR THE GENERIC WORK PLAN IN NON-IMPACT AND IMPACT AREAS

1.0 GENERAL. This Safety Plan (SP) was prepared in response to requirements posted by Range Division Hawaii (RDH) for personnel entering and conducting work in impact and non-impact areas. The Installation Safety Office (ISO) must also review this plan. All personnel conducting operations under this SP must read and understand the applicable parts of this SP prior to commencing work. Prior to all field operations, personnel will complete a daily risk assessment to reinforce the knowledge that there are risks involved with this work and to understand the methods to mitigate these risks.

1.1 PROJECT DESCRIPTION. Environmental Division, Natural Resource Management (NRM) personnel will conduct numerous conservation-related activities on Army training lands on Oahu. According to the Endangered Species Act, and 36 CFR 800, the Army, as a federal agency, is required by law to manage the endangered species and conserve natural resources, on any lands that include federal funding in order to continue training. It is the responsibility of the program to identify, monitor, and protect rare and endangered species of plants and animals, native areas, as well as control invasive weeds. All of this work entails many different kinds of activities that will be covered in the risk assessment as part of this plan.

1.2 SITE LOCATION. The NRM staff work on all of the different Army training lands, including: Schofield Barracks West, South, and East Ranges, Makua Military Reservation, Kawailoa Training Area, Dillingham Military Reservation, Kahuku Training Area, and Pohakuloa Training Area.

1.3 SITE CONDITIONS. Most of the areas where the NRM staff work are nonimpact areas. When working in Makua and Schofield Barracks West Range NRM staff are required to coordinate with EOD for support in entering and working in these areas.

2.0 APPLICABILITY. This SP applies to all personnel performing activities in support of the generic work plan as well as persons who may visit any of these work sites in the future.

3.0 RESPONSIBILITY. The RDH Range Officer is directly responsible for seeing all applicable rules and regulations are complied with and all necessary safety precautions are taken with operations in accordance with this SP. The Range Officer will ensure all personnel conducting activities in accordance with this SP have the proper range training and, if required, the proper certifications for the job being performed.

4.0 PERSONNEL QUALIFICATIONS AND REQUIREMENTS

4.1 PERSONNEL QUALIFICATIONS

4.1.1 Personnel will have experience in hiking and backpacking. Since almost all NRM injuries occur during hiking and backpacking, SOP 1 must be reviewed every quarter with the teams, with emphasis on following the recommendations made during daily risk assessments when relevant.

4.1.2 Personnel will follow the NRM Safety Plan and all applicable SOPs.

4.1.3 Personnel will receive the necessary training, such as: hand tool use, EOD ordnance identification (annually), orienteering, and certifications, such as chainsaw use, pesticide application, helicopter safety and sling loading, rappelling and ascending, use of firearms, first aid and CPR, driver's safety, and lava tube/ confined space activities.

4.1.4 Personnel will take precautions to remain adequately hydrated, particularly when the weather is hot. While doing especially tiring or sweat-producing work, be sure to drink plenty of fluids and take enough breaks to avoid dehydration.

4.1.5 EOD personnel must have current qualifications identified by their military unit.

4.1.6 Visitors must have training required to enter high-hazard areas and will be escorted at all times.

4.2 PERSONNEL REQUIREMENTS

4.2.1 First aid and CPR training.

4.2.2 Other training refreshers and re-certifications as required for 4.1.3 above.

4.3 PERSONAL ACCOUNTABILITY

4.3.1 Accountability is the key element of any safety program and environment. Personnel will be held accountable (via counseling or disciplinary action) for failure to follow relevant safety procedures, but it is equally important that you prevent others from endangering themselves or fellow workers. If your actions or inaction result in injury to a fellow worker, you could face dismissal.

4.3.2 Supervisory staff who fail to encourage a safe work environment or enforce safety protocols will be subject to disciplinary action and possibly dismissal.

5.0 EQUIPMENT AND SUPPLIES

5.1 TRUCK, PICK-UP, 4WD. Trucks with four-wheel-drive capabilities will be available for use. These vehicles will be used to access all work areas, landing zones, or trailheads. The vehicles will be equipped with tow straps with appropriate capacity and winches also rated appropriately.

5.2 MATERIALS

5.2.1 Tools - All hand tools and mechanical tools, such as chainsaws and weed trimmers used at work sites, will be maintained by the NRM and kept in good working condition with regular maintenance, which must be recorded and stored for reference.

5.2.2 Hazardous materials – All gasoline, oil, and propane will be handled properly and will be stored and disposed of according to their labels.

5.2.3 Supplies – Fence materials, water storage tanks, and other work-related supplies will either be stored at the NRM bases or the Nike Site. They will be transported carefully and used properly in the field.

5.2.4 Pesticides will be properly handled, stored, and maintained by the NRM.

5.3 MOTOROLA RADIOS. Motorola radios will be issued to members of the operations, and at least one radio will be kept on the Range Control frequency at all times as directed by Range Control.

5.4 HELICOPTERS. NRM personnel, contract pilots, and helicopters will be OAS (DOI - Office of Aircraft Services) certified. Bright clothing/reflective markings will be worn for better visibility in the event of an emergency that might require a rescue. The SOP on Helicopter Operations will be followed at all times. The Aviation Standards Office will review remote landing zones semi-annually.

5.4.1 GROUND GUIDES. When performing helicopter operations, one NRM staff person will serve as primary ground guide. He/she will serve as the project coordinator and will be the primary contact person between the NRM, the helicopter pilot, and Range Control.

6.0 UXO AND ASSOCIATED RESIDUE. When EOD personnel identify a hazard, the following will be enforced:

6.1 UXO PROTOCOL. When explosive, chemical, propellant, or intact UXOs are identified, a survey marker will mark the location of the UXO. The RDH-OPS-SB Safety Officer will be notified of the presence of the UXO. The EOD technician will determine the proper method of disposal for the UXO.

6.2 MARKING UXO. When non-explosive-loaded or ordnance components are located, the EOD technician will take prudent efforts to mark and identify the hazard. Ordnance includes: armor piercing projectiles, empty ejection munitions, spent rocket motors (only if found separated from the warhead), and nonexplosive-loaded training munitions. Only EOD personnel will certify the area is clear and safe before NRM personnel reenter the area.

6.3 GENERAL SAFE WORK PRACTICES: Prior to departure, a safety brief will be conducted and include the current risk assessment.

6.3.1 Do not go souvenir hunting.

6.3.2 Do not pick up or disturb unidentified items.

6.3.3 Report all UXOs or unidentified objects to the EOD.

6.3.4 Do not go outside the boundaries of the access routes or work areas.

6.3.5 Do not enter uncleared areas, the Impact Area, or the ICM area.

6.3.6 Do not carry fire or spark-producing devices into the site.

6.3.7 Do not smoke except in areas specifically designated for smoking.

6.3.8 Avoid inhalation or skin contact with explosives.

6.3.9 Remove from the area any person showing effects of explosive poisoning or dermatitis.

6.3.10 Do not allow one person to work alone in remote areas, those contaminated with UXOs or known hazards.

6.3.11 Visitors are prohibited from visiting the site in impact areas unless prior approval and liability release is obtained.

6.3.12 Suspend all operations upon approach of electrical storm or other severe weather conditions.

6.3.13 Do not attempt to extinguish burning explosives or any fire that may involve explosive materials.

6.3.14 If explosive materials and/or vegetation are burning, immediately vacate the area.

6.3.15 All operations will be suspended if so ordered by the Range Officer or designee.

6.3.16 If UXO or suspected UXO is encountered, all operations in the vicinity will cease, the Range Officer will be notified, and the area vacated.

6.4 UXO SAFETY RULES FOR IMPACT AREAS

6.4.1 All NRM staff will follow the lead of EOD in the field.

6.4.2 Only designated NRS, EOD, and trained visitors will be permitted on site during operations in impact areas, and all will wear flak and Kevlar helmets.

6.4.3 Use of CB radios or other radio communications devices rated above five watts output will not be permitted during operations.

6.4.4 All safety precautions related to UXO will be observed. Flak jackets, neck and crotch protectors, and Kevlar helmets will be worn by all personnel working in impact areas.

6.4.5 An EOD technician will be in charge of all UXO clearance operations. Safety responsibilities of the EOD Technician and the RDH OPS-SB Safety Officer during UXO operations are:

6.4.6 When and if required, ensures all barricades are in place prior to the start of any UXO operations.

6.4.7 Ensures all personnel in the area of UXO operations are qualified UXO personnel. All personnel in the area of an UXO operation will follow instructions from EOD.

6.4.8 Ensures adequate emergency fire/rescue, medical, and security support is available as required in 25th ID & USARHAW REG 210-6.

6.4.9 No ICM (Improved Conventional Munitions) designated areas will be entered.

7.0 EMERGENCY RESPONSE AND CONTINGENCY PLANS

7.1 In the event of an emergency, a Ground Accident Report (25th ID(L) & USARHAW FORM VG-GS-01-01-R-E, FEB 01) **Part I** will be completed and submitted immediately to the DPW Administrative Office, Safety Coordinator. The Safety Coordinator needs to receive the form with time to process for approval through the DPW command structure. DPW then forwards it on to the IFSO. All of these steps must happen within seven hours of the accident. If the Safety Coordinator is not on duty, email the report directly to IFSO (safeadm@schofield.army.mil) or fax 6563740) and cc the DPW Safety Coordinator, the DPW Natural Resource Manager, the Chief of the Conservation and Restoration Branch, the Chief of the Environmental Division, and the Deputy Director of DPW. For fatal or multiple injuries/illnesses call 656-3550/1153/9930. After duty hours, call DOC, 655-8764. The main goal in this initial report is to notify IFSO of the incident so they are aware ASAP. A phone call should also be placed to IFSO, Range Control, and the DPW Natural Resource Manager immediately following the accident so they are aware of the situation. In the event of an evacuation, all personnel in the affected area will be evacuated to a predetermined location.

7.2 An email summary of the accident should also be sent to the Chief of the Environmental Division ASAP. The DPW Natural Resource Manager should be kept abreast of the reporting status. This email can be used to notify the command of the accident if the Environmental Chief and DPW Director deem appropriate.

7.3 Within three duty days of the accident, **Part II** of the Ground Accident Report will be filed along with the risk assessment for the work project. This should be forwarded through the DPW Admin office for submission to the IFSO. All of these steps must be completed within three duty days of the accident.

7.4 DPW will determine the next steps for the program. For serious incidents, a “stand down” order may be issued, requiring field operations to cease. In some cases, only the field operations related to the activity involved in the accident must be halted. Regardless, RCUH should look to DPW to determine the next steps for the program based on IFSO recommendations and post-incident investigations.

The Army Natural Resources Program on Oahu

Safety and Health Program

Updated May 13, 2019

Submitted by_____ Date_____
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PCSU Principal Investigator_____ Date_____
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CONDITIONS: PCSU, PICHTR, RCUH and ANRP will review and revise this document at any time circumstances require any/all sections to be revised, adopted, or eliminated.

Standard Operating Procedure (SOP) for Wildland Hiking Techniques and Outdoor Hazards

1. PURPOSE. The purpose of this SOP is to outline steps to maximize personnel safety while hiking in wilderness areas. Historically most worker injuries within ANRP are the result of hiking injuries. It often seems that hiking is a natural function that anyone can perform without the need for specific training. As a result, the ability to hike is taken for granted, and the inherent skills and awareness of hazards from hiking slips, trips and falls are not in the forefront of worker's minds. HIKING IS THE NUMBER ONE INJURY HAZARD TO RCUH/PICHTR/ANRP WORKERS!

2. SCOPE. ANRP performs field work in remote wilderness areas. Much time is spent traversing rugged terrain in route to or from the work site. Often this travel occurs off established trails and across uneven and precipitous terrain. Accidents during hiking activities are the cause of most of the injuries reported by project staff and include twisted ankles, twisted knees, wrist injuries, a variety of strained muscles, bruises, lacerations, and a variety of broken bones. This SOP outlines steps to maximize safety in this work environment.

3. RESPONSIBLITIES: Ongoing follow-up safety behavior observations will be conducted on regular basis to maintain hiking safety awareness.

    a) All ANRP staff must be trained in wildland hiking techniques:

        i) Each new employee shall be interviewed about his or her hiking experience, including overall time, type of terrain, specific geographic locations, climate/weather conditions, gear, and size of backpack loads.

        ii) Read the SOP "Considerations and Procedures for Safe Hiking", included here as an appendix.

        iii) Read the "Wilderness Hiking and Backpacking Techniques Study Guide", and complete the accompanying examination, included here as appendices. Passing grade is 70%.

        iv) View the USDA Forest Service video "Wildlands Walking Techniques".

    b) Natural Resource Management (NRM) Supervisors: Review procedures with NRM staff quarterly to ensure understanding and compliance. Evaluate the hiking skills, experience, and physical condition of new employees during probation. Inability to perform under typical work conditions will be grounds for termination.

    c) NRM Staff: Execute fieldwork in accordance with SOP.

d) If staff are not prepared for field work because s/he lacks essential gear (e.g. spiked footwear, flight gear, eye protection), s/he will not be permitted to work in the field, unless a safe and useful activity can be identified. Particularly if such oversights are chronic, staff may face disciplinary actions, such as being required to take leave without pay for the work time missed due to his/her lack of preparation.

e) Failure to comply with this SOP may result in disciplinary action.

Staff preparing for field work. Note high visibility clothing.

4. PROCEDURES.

a) Conduct a daily safety brief with crews addressing the potential for slips, trips and falls. This includes identifying hazards, checking that PPE is adequate, and ensuring that staff meet the technical skill levels required for the day's hiking activities.

b) High-visibility bright colored clothing is required for all field operations. Long and short-sleeved shirts are provided for all staff and volunteers by ANRP.

c) Mechanics of safe hiking:

i) When contouring a steep slope, do not lean into the hill. This tends to loosen footing. Erect posture with hips out or slightly leaning out gives more secure footing.

ii) Plan ahead, select safe routes, and look for changes in ground surface, slick spots, or unusual hazards.

iii) Select each stepping spot carefully and do not shift body weight until you are sure the spot is solid.

iv) When traversing open lava fields (particularly a'a lava) or areas with extensive talus slopes, gloves are recommended. Gloves should be thick enough to prevent hand lacerations in the event of a fall (e.g. leather gloves).

v) Know how to fall to avoid hard impacts. Keep flexible with knees slightly bent. This helps your legs act as a shock absorber.

vi) If you feel yourself slipping, pick a landing spot. Before traversing a steep area survey the area, look for features to hold onto and good landing spots.

vii) Do not stick your arms out to break a fall. Keep your arms slightly bent in front of your head.

viii) When slipping, lean into the slope and grasp for something to help arrest your descent. Do not lean out away from the slope as this may result in a head over heels tumble.

ix) "Curse your fall." This means shout out an exclamation as you fall. This ensures you exhale as you land which in turn releases air from your lungs. This can help minimize damage to your internal organs.

x) In heavy undergrowth, lift your knees high to clear obstacles. Slow down and exaggerate steps in the area of exposed roots to keep from catching your toes.

xi) Avoid walking on logs unless they have been tested for secure footing.

xii) On slippery, loose, ground, or going downhill, keep most of your weight on your heels. Shorten your stride, keep knees bent, and lean slightly backward.

xiii) When moving uphill or in sandy soils, lean slightly forward, turn feet outward, shorten stride, and use as much of the inside of the foot as possible.

xiv) Make sure of secure footing and safe working positions. Walk, never run down slopes.

xv) Rocky slopes, especially loose rock and steep country, are treacherous. Have one hand free, preferably on the uphill side, for protection against falls or obstructions. Always carry tools on downhill side.

xvi) Maintain safe walking and working distance between people (10 feet minimum). Keep sharp tools sheathed or covered when carrying them at one's side while hiking. Stagger out across the slope such that people are not directly below other personnel higher on the slope.

xvii) Be sure other workers in vicinity know where you are.

xviii) When hiking or cutting trail through dense growth that obscures visibility of the ground in front of your path, be sure of your footing to avoid falls into ground depressions or drop-offs. Slow down and tread carefully while hiking through tall grass or brush to avoid banging your legs or head against hidden boulders, tree trunks and branches. Alert your co-workers for any hazards if they are behind you.

d) Always be on guard against injury from falling trees, snags, limbs, rolling logs, or rocks. Never run blindly if a rolling rock, log, or tree is heard. Try to determine the direction of falling item, then move out of its path. Avoid lingering at the base of cliff areas, including waterfalls. Alert co-workers to any hazards (e.g. precarious hanging branches, goats/hikers above, or large loose boulders).

e) SELFIE STICKS OR SELFIE PICTURES ARE NOT ALLOWED: Use of selfie sticks and/or taking selfie pictures is not allowed while staff perform work requiring full attention, use of both hands (e.g., for control, leverage or balance), or when working in locations where a fall could lead to serious injuries or fatality. This includes but is not limited to rappelling, hiking narrow ridge-top trails, and traversing steep slopes.

f) Proper footwear is required and is addressed in SOP #16. When hiking in areas with potential for foot puncture injuries (e.g. old fence skirting or areas with many small, punji-type stumps), additional foot protection is recommended in the form of hiking boots or puncture resistant insoles in tabis.

g) Safety eyewear is required whenever there is a chance of eye injury. This includes areas with thick vegetation and/or dusty conditions. Eye protection must be worn by all staff when operations enter sites beyond open trails and open area worksites. An "open" work site or trail is defined for this purpose as an area devoid of all eye hazards within four feet of employees. The use of eye protection while working with tools in the field is

governed by the relevant SOP: #6 (power tools), #8 (picks, Pulaskis, shovels), #11 (hand tools), #12 (field knives).

h) All eye protection must carry a Z87 stamp or be rated by the manufacturer as meeting the Z87 OSHA standard. CE marking is not regulated in the U.S. and research indicates there is no guarantee that this eyewear meets a Z87 standard.

i) The project will provide standard eye protection. Should standard models not fit well, staff can purchase other approved models directly, and be reimbursed as follows: twice a year for up to $50 per item, or once a year for up to $100 per item. As with all program gear, eye protection should only be used for work purposes.

j) Fogging of safety glasses can be a real issue when working in the field. Exertion, increased humidity, ambient heat and snug eyewear increase the likelihood of fogging. There are no products that provide 100% fog-proof protection, but the following solutions can significantly reduce and/or delay lens fogging:

    i) Change your eyewear design. A style allowing more air to flow around the lens may be all you need to reduce and/or delay fogging.

    ii) Apply anti-fog coating. Some employers report the almost 100% elimination of problems caused by fogging eyewear after workers used an anti-fog coating on their safety eyewear. Learn how to properly use anti-fog solutions for best results: https://blog.safetyglassesusa.com/how-to-use-anti-fog-solutions/

    iii) Buy Anti-Fog Eyewear. Look for eyewear specifically billed as 'anti-fog'. Anti-fog lenses come in nearly any lens tint or style, even bifocal and polarized. For example: https://www.safetyglassesusa.com/anti-fog-safety-glasses.html

    iv) Go extreme. For most, glasses with anti-fog coating are enough to solve the problem. Others, such as those who wear both prescription eyewear and safety eyewear, or those who work in extreme heat and humidity, sometimes need a more radical solution. Extreme Anti-Fog Goggles, with their dual-pane lenses that eliminate condensation and built-in fans that forcefully remove moisture and reduce fogging, may help. For example: https://www.safetyglassesusa.com/extreme-anti-fog-goggles.html

    v) Go with screen/mesh. Screen/mesh eye protection is available as an alternative. These provide greater air flow, but may not be suited for dusty environments (mesh googles or mesh face shields are available with chainsaw helmets).

k) The program will provide prescription eye protection as required by OSHA. All purchases must be approved in advance and must be the most economical model possible.

l) When hiking through thick brush, be aware of the risk of branches/foreign objects entering the ear. Injury can result from items such as blackberry canes entering the ear canal. This is an uncommon accident, but the risk is serious: a punctured ear drum, scratched ear canal, embedded splinter, or loss of hearing could result. It is not feasible

to wear ear protection while hiking (reduces ability to communicate - which is itself dangerous), so it is important to be conscious of hazards and mitigate them as feasible:

m) Bend branches/canes away from your intended path and ensure that they will not spring back at you or co-workers behind you, avoid really thick vegetation where possible (not always possible, we know).

n) Clear established trails from head height hazards.

o) Wear hats/beanies as these can also offer a fair degree of ear protection.

p) Helmets with straps are required in areas with significant overhead hazards. Staff are required to wear helmets in the areas listed below. Staff visiting other, non-listed areas with equivalent hazards shall also be required to wear helmets; these sites should be identified by supervisors or other staff during daily risk assessments at the baseyard. Acceptable helmets include standard brimmed hard hats, climbing helmets, and Kevlar military helmets; all helmets should be fitted with a chinstrap.

    i) Both Makua Neraudia reintroduction gulches

    ii) Koiahi

    iii) Waianae Kai Slot Gulch

    iv) Punapohaku (via lower access route)

    v) Upper Maakua Gulch, Koolau Mountains

    vi) Areas of recent forest fires, with large burnt trees and snags

q) Protection against lightning strikes.

    i) If thunderstorms are forecast, field crews may still conduct field work, but need to prepare to respond to lightning hazards by making contingency plans before heading into the field. These plans should address the location of safe shelters and length of time needed to reach them, what types of field activities are planned and whether they are particularly risky (checking fence on a ridgetop), and ensuring ample forms of communication (sufficient radios, cell phones).

    ii) Upon hearing thunder, watch for any lightning and be prepared to suspend activities and seek shelter immediately by hiking to an adequate safe area or returning to base. The supervisor in the field needs to use available weather information and his/her best judgment to make a determination on whether to wait in place, seek shelter, or continue field work if the risk is low and the storm is a safe enough distance away. Field teams caught in a thunderstorm should delegate one person to monitor weather information (e.g. Doppler radar on phones and information from base). Another person should be delegated to watch for lightning

and listen for thunder to calculate proximity. If thunderstorms are in the area, do not wait for rain to start to decide when/where to shelter, or begin exiting the field.

(1) 30/30 Rule: If the lightning flash to bang (thunder) is 30 seconds or less, lightning is less than 6 miles away and emergency weather plans should be implemented (divide flash to bang time in seconds by 5 to get miles away). Wait 30 minutes since the last sighting of lightning to resume outdoor activities. Waiting 30 minutes allows the storm to be approximately 12 miles away.

(2) Small structures like fabric tents, cabin porches, hunting shelters, snail enclosures, weather stations, radio antennae and towers, and isolated small groups of trees are not safe and should be avoided. Avoid ridgelines, mountain tops, and all fence lines. Lightning can travel long distances along fences. Move out of and away from streams or other bodies of water. If in an UXO area, cease operations and return to base or a safe shelter.

(3) Large structures with plumbing and electrical wiring are best for sheltering, as they direct lightning more safely into the ground.

(4) If sheltering in a vehicle, roll windows all the way up and avoid areas of conduction (car radios, ignition etc.).

(5) If in the open and unable to find shelter, crouch down (separated from co-workers), feet together, and remove metal objects from head and body. Do not lie down and try to avoid being the highest object in the vicinity.

5. APPENDICES

a) Considerations and Procedures for Safe Hiking
b) Hiking Training Study Guide
c) Hiking Training Exam

Standard Operating Procedure (SOP) for Helicopter Field Operations

1. PURPOSE. The purpose of this SOP is to outline the procedures for conducting a safe helicopter field operation.

2. SCOPE. This SOP identifies the Army Natural Resources Program on Oahu Staff (ANRP Staff) responsibilities, duties, and safety procedures during a helicopter field operation under the operational control of the ANRP. The helicopter operation may be under the Office of Aircraft Safety (OAS) Contract, OAS On-Call Contract, or through an RCUH purchase order. This SOP is Attachment 1 to the ANRP Helicopter Safety and Management Plan (Plan).

3. RESPONSIBLITIES

   a) Senior Natural Resource Management Coordinators (SNRMC) have the overall responsibility to ensure their subordinate staff are thoroughly versed in this SOP. They will ensure that their staff is trained to conduct the missions and have the required personal protective equipment and gear. The SNRMC must have a thorough understanding of the Plan.

   b) Natural Resource Management Supervisors (NRM Supervisors) plan the helicopter missions and make field assignments. They must review the SOP procedures with their Staff to ensure they understand how to conduct a safe helicopter field operation. The NRM Supervisors must have a good working knowledge of the Plan.

   c) Natural Resource Helicopter Managers (Heli-Manager), Contract Project Inspectors (CPI), Lead Contract Project Inspector (LCPI) are responsible for conducting a safe helicopter operation in accordance with this SOP. Only CPIs and the LCPI may conduct helicopter operations paid through the OAS Contract. Heli-Manager and CPI must have a good working knowledge of the Plan; all ANRP Heli-Managers are also CPIs, henceforth, they are referred to as Heli-Manager. See Appendix 4 List of Contract Helicopter Managers in the Plan.

   d) ANRP Staff must safely participate in helicopter operations in accordance with this SOP. At a minimum, staff should have the A-100 Basic Aviation Safety course; some may have taken A-219 Helicopter Transport of External Cargo and others may be Crewmembers.

   e) Failure to comply with procedures in this SOP may result in disciplinary action.

4. PROCEDURES

a) The ANRP helicopter safety policies are:

i) Staff and helicopter operation safety are top priority.

ii) Staff and heli-ops safety will not be compromised to fulfill mission goals.

iii) To enhance Staff and heli-ops safety ANRP shall utilize the services of an OAS-approved vendor. SNRMC will ensure that the pilot and helicopter are carded for the type of mission being requested. ANRP staff may fly in a Military or Cooperator aircraft as Incidental Passengers (see Appendix 2 Abbreviations, Acronyms, Definitions in the Plan) and may utilize Military heavy lift helicopters (see IX.) In this case ANRP staff are subject to SOPs that are at equivalent or more restrictive than internal procedures.

iv) All ANRP helicopter missions are categorized as Special Use requiring full use of personal protective equipment (PPE) when flying: properly fitted nomex flight suit or Nomex long sleeve shirt and trousers, nomex/leather flight gloves or all leather gloves, above the ankle all-leather boots, flight helmet, cotton or natural fiber or nomex underclothing.

v) It is the responsibility of all ANRP staff involved with a helicopter operation to ensure the safety of the operation. Each person is tasked with ensuring that the

operation is being conducted safely and each participant is performing according to all appropriate safety policies, helicopter or otherwise. Identifying contributing factors that could lead to an incident or accident is critical to the prevention of the potential incident/accident.

vi) Helicopter operations will be terminated under any of the following conditions

(1) VFR conditions are not met

(2) The pilot terminates operations

(3) Any passenger, crew member or manager has a justified safety concern

(4) Wind speeds are greater than 30 mph (25 knots) or there is a gust spread of more than 20 mph (15 knots) as measured by the heli manager or designee at the helispot or remote LZ or DZ

b) HELI-BASE OR REMOTE LZ MANAGEMENT

i) Heli-Managers are responsible for the overall safety at their Heli-base or remote LZ and coordinate the operation utilizing the Crewmembers assigned to their operation.

ii) S/he should not get passenger (pax) into or out of the aircraft, or load or unload nets unless the mission has limited staff requiring the Heli-Manager to perform those tasks.

iii) Duties of the Heli-Manager:

(1) Provide a preflight briefing to all the personnel at the Heli-base or LZ including the required passenger safety briefing for all pax; a qualified Crewmember may be asked to give the safety briefing. (See appendix 7A and 7B)

(2) Ensure all personnel are wearing the appropriate PPE. Flight helmets are not required for pax approaching when their flight helmets are already in the aircraft, or when departing if the flight helmets are being left in the helicopter; however, flight helmets must be worn during all flight operations.

(3) Pax without a hard hat or flight helmet may approach an operating helicopter after the helicopter has landed at the LZ or heli-spot with the pilot's permission if the flight helmets they will use are already inside the helicopter.

(4) Upon initial arrival of helicopter for the day's operation, pax with flight helmets shall wear the helmets during the approach/boarding phase. They will

connect the helmet to the appropriate avionics receptacle; if in doubt, ask the pilot.

(5) Pax putting on their flight helmets that were already in the helicopter may remove their gloves to cinch the chinstrap and make adjustments for proper fitting but must have their gloves on prior to liftoff.

(6) Pax with their own flight helmet for the operation shall wear their flight helmet during the approach to and departure from the operating helicopter.

(7) Ensure all external loads have been properly prepared and assign a Crewmember to do the hookups.

(8) Ensure that the area has been cleared of all loose items and foreign objects that may get caught up and damage the helicopter rotor blades.

(9) Ensure all staff at the LZ are within the designated safety zone and behind something solid, and all are paying attention to the arriving or departing helicopter.

(10) Notify the pilot by radio of known hazards as the helicopter approaches/departs.

(11) Ask for the Pilot's OAS-card and Aircraft Data Card to ensure they are current and carded for the mission. Heli-Manager familiar with the Contract pilot and aircraft may initially ask for the cards but may waive this requirement during the Contract.

(12) Conduct an aircraft inspection to ensure the doors are working properly, seatbelts are functional, and there is no exterior damage (dents to the fuselage, cracks in the Plexiglas, broken pitot tube, cracked external mirror, etc), or leaking fluids. This does not require shutting the ship down. Just inspect during loading and unloading operations and have crew members inspect along with other duties.

(a) If the Heli-Manager notices or finds any of the above, s/he will immediately notify the pilot.

(b) The pilot will fix the deficiency or note the damage. If the situation is minor and does not compromise the safety of the operation, the pilot will continue with the approval of the Heli-Manager.

(c) Heli-Manager will note the defect/damage on the Flight Plan or Load Calculation and submit the document to the Designated Flight Follower (DFF) at the end of their operation.

(13) If there is a mechanical issue then the heli manager must inform the DFF and/or the LCPI, they in turn notify the COTR/COR so that the CO (Contract Officer) can be notified. The ship must be deemed flight worthy by OAS before ANRP contract operations can commence.

(14) Brief the pilot on the mission, goals, pax and external load flights.

(15) Enter into the database arrival/departure times and Hobbs meter readings.

(16) Log clock times and Hobbs meter readings for departures and arrivals in the Heliops Database NO LATER THAN noon the first working day of the same or following week. Changes in planned operations for the week must also be entered into the database at the same time.

(17) Ensure pax and internal loading or unloading is done safely.

(18) List each pax flight destination with full names and internal loads, and accurate weights. This official flight manifest will be entered into the database.

(19) List contents of each external load with total weight and destinations, and name of person performing the hook up. These details must be correctly documented in the flight plan.

(20) Maintain radio contact with the field Heli-Manager or Crewmember after they arrive at their destination.

(21) Notify the next Heli-Manager that the helicopter is being released to the next mission.

(22) Delegate some of these duties to a Crewmember but remain in charge of the operation.

iv) Radio communications between the pilot and Heli-base/remote LZ are through the Heli-Manager unless otherwise delegated to a Crewmember.

v) Heli-base Crash Kits (Appendix 10 in the Plan) will be available at Heli-bases.

vi) Heli-base/remote LZ Heli-Manager and Crewmembers shall wear their hard hats with chinstraps when conducting sling and spray operations. Hearing protection is required, and eye protection based on blowing debris.

(1) Good judgment must be used in regard to blowing debris generated by the rotor wash during an operation.

(2) In areas where flying debris is an issue, safety glasses or some other form of eye protection shall be worn.

vii) To guide the pilot into a Heli-base or remote LZ, if a Parking Tender (PT) is used, the PT should stand with his/her back to the wind and arms parallel to the ground.

(1) In tight LZs, use the radio to communicate wind direction at ground level.

(2) Flagging tape on nearby exposed tree branches will also serve to provide wind direction.

viii) Other than the designated PT, all persons at the Heli-base or remote LZs must be stationary, in the safety zone, and preferably to the pilot-side of the helicopter before the pilot lands.

(1) This allows the pilot to keep track of all ground personnel and focus his attention on landing safely.

(2) Personnel at Heli-bases should be within the designated safety zone away from the landing/departing path of the helicopter, and behind a solid object (such as a vehicle, building, tree, etc) to protect against the rotor wash and debris.

(a) Each Heli-base will dictate a safety zone; try to be about 75-ft from the helicopter,

(b) Safety zone should not be within the approach or departure path of the helicopter.

(c) At remote LZs personnel should be as far from the landing/departing helicopter and behind a solid object (such as a tree or terrain) to protect against the rotor wash and flying debris.

(i) Try to maintain a 75-ft safety zone distance from the helicopter,

(ii) Try to stay out of the approach and departure path of the helicopter.

ix) Pilot shall prepare a Load Calculation (LC) for the mission. (Appendix 9 in the Plan)

(1) Heli-Manager shall ensure all loads are within the weight limits of the LC.

(2) LC will be completed for all internal and external load operations and shall be submitted to the DFF at the end of the operation.

(3) If there are multiple missions during the day, a LC will be done:

(a) For the 1st and subsequent missions if the temperature remains within 4°C/7°F and the highest elevation was used. Heli-Manager of the 1st

mission will receive the original copy of the LC; pilot will retain the copy and subsequent Heli-Managers will be shown this copy,

(b) Pilot shall complete additional LCs when operating conditions change (±4°C/7°F temperature, ±1000-ft elevation) from the previous LC.

x) HAZMAT items must be transported in compliance with OAS's Interagency Aviation Transport of Hazardous Materials Handbook.

(1) Pilot must be informed and approve any HAZMAT items being flown.

(a) To transport fuel in Sigg bottles, the pilot must be given written notification using the flight plan.

(2) Presence of Hazmat must be declared in the Flight Plan in both internal and external loads.

(3) A copy of the Hazardous Materials Handbook will be in the OAS-approved aircraft.

xi) No smoking allowed within 100 feet of the helicopter or fuel/refueling equipment.

xii) No moving equipment should pass closer than 200 feet of an operating helicopter.

xiii) Vehicles shall be safely parked as far from the LZ as possible.

(1) Each base of ops or LZ will dictate the safe distance a vehicle can be parked,

(2) Ensure the parked vehicle is not within the approach and departure path of the helicopter or within 75 feet of external loads,

(3) In some situations, parked vehicles may be used as the safety zone by the NR staff.

(a) Vehicle should be secured – windows up, doors closed, tailgate up, no loose objects in the bed of the truck.

(b) Staff should stand or crouch behind the vehicle during takeoffs and landings.

c) PASSENGER (PAX) OPERATIONS

Required PPE	Suggested PPE	Required Training
• Flight helmet (SPH-5), • Flight suit (nomex) or nomex firefighters long sleeve shirt and trousers, • Flyers gloves (nomex/leather) or all leather gloves, • All leather upper boots that extend above the ankles.		• See Helicopter Safety Management Plan. Varies depending on staff certification level

i) The Heli-Manager/CPI is responsible for the safety of all pax at his/her operation. S/he will utilize Crewmembers to safely load and off load pax.

ii) All pax flights landing at an LZ not staffed with a Heli-Manager or Crewmember will have minimally onboard a Crewmember who is responsible for unloading the pax, securing any internal gear and the seatbelts, securing the doors, and logging the clock time and Hobbs meter reading prior to the helicopter leaving the LZ.

iii) Combined weights of pax will be within the LC HOGE limits.

iv) Unless pax are performing an aerial survey/reconnaissance/HBT (as approved on the Ordering Record), the doors-on policy applies.

v) Pax shall remove their hats and store these items in a pocket or pack prior to approaching the helicopter. "Ball" caps or wide brimmed hats will not be worn at any time within the safety zone of an operating helicopter.

vi) Pax will not wear loose jewelry on wrists or necks. Jewelry in ears will not extend more than a quarter inch from the ear or face and should not be so sharp as to cut a flight helmet ear pads. Wristwatches should be removed and placed in a pocket of the flight suit.

vii) Pax that have long hair must secure it and tuck it down the back and inside the flight suit.

viii) For pax or Crewmember, approach or depart the helicopter:

(1) From the front, preferably pilot-side, and in clear view of the pilot.

(2) Never towards the tail rotor.

(3) Only after the pilot has given the approval to do so; he may need to reposition the aircraft.

(4) Pilot approval includes nodding, a hand signal or shaka to come forward, a beeping signal from the aircraft followed by a pilot's signal, or by radio comm to the Heli-Manager or Crewmember.

(5) Pilot will notify the pax that it is safe to disembark through the intercom; it is important for each pax to keep their flight helmet on until they hear the pilot.

(6) In a crouched position.

(7) In uneven terrain, pax will approach from or depart to the down slope (lower) side. If there is no safe place to go after disembarking, pax will stay put, signal the pilot that they are ready for him to depart, and protect themselves from the rotor wash/debris as the helicopter departs.

(8) When carrying long-handled tools or long items to or from the helicopter, Crewmembers or pax will keep them horizontal to the ground until secured in the helicopter or safely away.

(9) Upon exiting at a remote LZ, crewmembers or pax must ensure that their seat belts have been secured behind them; this will prevent a seatbelt from accidentally hanging outside the closed door.

ix) After drop-off at a remote LZ, the Heli-Manager (if available) or a Crewmember will signal the pilot when pax are safely away and the aircraft is clear for departure.

x) Pax should not talk to the pilot during takeoffs and landings, unless to inform the pilot of a hazard that the pilot may not be aware of.

xi) While flying, all pax must keep alert for hazards, such as power lines, birds, tall snags, overhanging trees, or other aircraft in the area, and notify pilot of these hazards.

xii) For pax operations utilizing helicopters without an external cargo pod and with excess field gear, two-pax per flight should be planned; the empty passenger seat and floor in front of the empty seat will be used for the excess gear. All gear must be secured.

xiii) If the disembarking passengers must leave items in the helicopter, these items must be placed in a closeable storage "bag" such as a small duffel, heavy-duty nylon bag or stuff sack with compression straps or end straps, or heavy-duty cloth bag with drawstring closure. The bag must be secured within the helicopter by the seatbelt or other appropriate tie-downs such as nylon webbing or bungee-type cords.

(1) Flight helmets being left in the helicopter will be placed in flight bags and appropriately secured via seat belts or tie downs.

(2) Bags shall not be left in the front right seat pax area known as the “bubble”.

(3) Plastic bags are not to be used in lieu of the other types of bags listed above.

(4) Should the doors be removed for an approved recon flight, the bag shall be secured by a crewmember by any of the pax seatbelts.

xiv) Full PPE shall be maintained prior to takeoff, during flight, and prior to landing. One exception during flight is when a pax must utilize electronic or HBT equipment which requires precise manual dexterity. If wearing the flight glove(s) prevents the pax from effectively manipulating small controls on such equipment (camera, GPS, computer, HBT equipment, etc), the pax may remove the glove(s) to use the equipment during flight but must quickly put on the glove should an emergency arise or prior to landing. The Heli-Manager should be notified prior to the flight that a pax will need to do this; the Heli-Manager will approve this request and note it on the flight manifest.

(1) Pilot will be notified by the Heli-Manager that a pax will be removing a glove(s) during flight.

(2) Pax will notify the pilot when s/he is removing the glove(s) and when s/he is putting the glove(s) back on. Pax will secure the removed glove(s) in the pocket of their flight suit or nomex long sleeve shirt.

(3) Pax will put the glove(s) back on when the equipment use is completed.

(4) Pilot shall inform the pax to put the glove(s) back on due to an emergency or prior to landing.

d) INTERNAL LOAD OPERATIONS

i) The Heli-Manager is responsible for safely loading and unloading the aircraft at the Heli-base or remote LZ through a remote Heli-Manager or Crewmembers; weight shall not exceed the HOGE limits determined by the LC.

ii) The pilot is ultimately responsible for the weight and balance of the aircraft and if there are concerns about the loads, the pilot and Heli-Manager will consult to resolve the issue.

iii) Doors-on policy shall apply during all internal load operations.

iv) All internal gear must be properly secured within the helicopter. Crewmembers will use a seatbelt or an appropriate tie-down such as nylon webbing or bungee-type cords.

v) Space behind the back seat may be used if it does not interfere with the position of the backrest.

vi) Floor space between the back-seat passengers may be used if the gear can be properly anchored to prevent any lateral or vertical movement that would impede any pax from safely exiting the aircraft.

vii) An empty rear pax seat may be used if the gear can be secured with the seat belt or otherwise secured.

viii) Light day packs (under 8 pounds) may be placed on the floor and secured by placing a leg through the shoulder strap to prevent lateral or vertical movement during flight and cannot impede the pax ability to safely exiting the aircraft.

ix) Gear shall not be stored under the back seat if there is a backseat pax.

x) Crewmembers will ensure all straps, seatbelts, and items in the aircraft are secured and that nothing is hanging out.

xi) Spiked boots are prohibited from use in internal helicopter operations.

Fuel and Battery shut-off in K&S 1PH

e) EXTERNAL LOAD

Required PPE	Suggested PPE	Required Training
• Hardhat secured with a chinstrap, • Eye protection when working at sites with flying debris (dust, dirt, gravel, cinders, leaves, grass, etc), • Hearing protection such as earplugs, • Flight suit (nomex) or nomex firefighters long sleeve shirt and trousers, • Flyers gloves (nomex/leather) or all leather gloves, • All leather upper boots that extend over the ankles (see K below for exemption), • Natural fiber underclothing.		• See Helicopter Safety Management Plan. Varies depending on staff certification level

i) Heli-Manager is responsible for the safe make up of all loads at the Heli-base/LZ through Crewmembers and must not exceed the LC HOGE-J.

ii) Weights for all sling loads must be listed on the flight plan. Each load must be within LC limits (see Appendix 14 in the Plan for common weights.) All external load equipment (nets, swivels, cables, straps, and hardware) will be inspected prior to each use.

iii) Prior to the start of an external load operation, the Heli-Manager or Crewmember will check the condition of the vendor's long-line and remote hook, and the cargo hook.

(1) The Heli-Manager or Crewmember will test the remote hook's electronic release with the pilot; s/he will also test the cargo hook's manual release.

(2) If there is a defect, s/he will notify the pilot immediately. The defect must be corrected prior to the start of the external load ops. The Heli-Manager will note this information on LC form or flight manifest.

iv) Heli-Managers or Crewmembers must exercise caution when working with the long line and hook. Together the line and hook weigh approximately 60 pounds. When it is wet it can weigh considerably more. In addition, you are squatting in an awkward positon when loading and unloading from the pod. Staff must follow these guidelines:

(1) Always carefully and neatly coil the line to facilitate handling.

(2) Never handle the hook and line as a single unit always unload the hook first then the line. Reverse to order when loading the pod.

(3) If the line and hook have to be moved away from the ship get other crewmembers help. One person can carry the line the other the hook.

(4) Be aware of proper body mechanics, keep your back straight and use your legs and arms to lift.

(5) Ask for help if you are inexperienced or unsure.

Conducting sling operations at Keaau

v) During external load operations the pilot will be the only person on the ship unless special authorization is obtained through the COR/CO for Contract or On Call operations for a spotter and approved by the ANRP Program Manager (PM). The

Ordering Record should inform the vendor that a pax may be onboard during the external load ops.

vi) Personnel involved in external load operations must have radio comm with the pilot.

(1) Communications with the pilot from the Heli-base is through the Heli-Manager or a designated Crewmember.

(2) Personnel receiving loads may contact the pilot in directing the pilot to the precise drop site as marked on the ground.

(3) Heli-Manager or Crewmember will keep constant visual on helicopter and longline or load until the helicopter is safely in flight to next area. They will leave site AFTER helicopter has safely departed.

(4) Receiving personnel should be away from the load unless:

(a) The load needs to be positioned in such a way to require a Crewmember to be with the load,

(b) The load needs to be manually unhooked after delivery,

(c) Under (a) and (b) above, a Crewmember with a radio and away from the delivery site should communicate with the pilot as to the status/release of the load.

vii) During a Long-Line/Remote Hook operation, Crewmember should pick up the remote hook after it contacts the ground or may handle it directly in the air. Factors to consider for direct handling:

(1) Load is located on a knife ridge, on muddy ground, or surrounded by trees.

(2) To prevent the hook from being tangled in the net's webbing or vegetation.

(3) To reduce helicopter hovering time above the load during swirling winds or as clouds move in/out.

(4) Requires the Crewmember to maintain constant visual contact with the hook.

(5) Crewmember is trained to do long-line/remote hook up.

viii) Crewmember receiving loads or empty cables/straps attached to the long-line:

(1) Should mark the spot(s) where the load(s) or cables/straps are to be delivered,

(2) Will maintain constant visual contact with the load or cables/straps,

(3) Will direct the pilot via radio comm to release the load or cables/straps,

(4) Should not to be in the flight path of the helicopter.

ix) Hover hook ups are permitted under the following requirements:

(1) VMC (Visual Meteorological Conditions) conditions restrict the load to be flown under 50-ft AGL.

(2) Only safe method to attach the load to the helicopter cargo hook.

(3) The load is critical to the mission's success and cannot be otherwise removed.

(4) Crewmember is specifically trained for this type of hook up.

(5) If a cargo pod is installed on the helicopter, hookup person must be familiar with the safe hover hookup procedures with an attached pod.

x) For cargo pod operations:

(1) Pilot will approve all gear to be placed in the pod.

(2) Staff will receive training/instructions by the pilot on the use the pod.

(3) Weights of items to be placed in the pod will not exceed the weight limit of the pod.

(4) When loading or unloading gear from the pod, crews will do so only when the pilot has indicated it is safe to do so.

(5) Long items to be placed into or removed from the pod will be carried parallel to the ground when carried to or from the helicopter.

(6) Care must be taken when utilizing the cargo pod that:

(a) No damage is done to the pod or the antennas attached to the belly of the helicopter while placing items into or retrieving items from the pod. There is one sturdy Transponder antenna that projects a couple inches from the helicopter's belly in the front of the pod.

(b) No damage is done to the fuselage of the helicopter or external wires while placing items into or retrieving items from the pod.

(c) No damage is done to the pod doors or straps

(i) Do not use the doors as shelves to support gear when loading,

(ii) Ensure the straps are not hanging out when the doors are closed.

(7) Trained Crewmember will ensure the pod compartment doors are secured prior to lift off.

Example of a cargo pod on a Hughes 500.

xi) PPE exception. Crewmember hooking or unhooking loads from a long-line may wear spiked tabis or spiked boots if environmental conditions require it. These situations would occur when wearing spiked tabis or spiked boots on muddy/slippery ground is better than all-leather hiking boot.

xii) Aerial Spraying operations. Most aspects of aerial spray operations are covered in the sections above including; load calculation, long line operations and communication procedures. For procedures on pesticide mixing, application and PPE see the Pesticide SOP #4. Additional operations procedures are described below.

(1) Inspect the vendor herbicide spray equipment prior to the start of the scheduled aerial operation to ensure that:

(a) The tank and all fittings are in good repair, free from any cracking or splitting that might interfere with a secure attachment to the helicopter.

(b) The spray ball or boom to ensure that all attachment points are free from debris.

(c) The nozzles on the spray ball or boom to ensure the free flow of herbicide mixture.

(d) On the ball sprayer the hose surrounding the cable to ensure that it is free from seeds that could be vectored to a new area.

(2) During aerial spray operations

(a) Pilot will ensure spray ball/nozzle is dispensing herbicides properly

(b) Helicopter doors and cargo pod will be removed during aerial spraying

(c) If a spotter is onboard:

(i) Will assist in identifying target plants

(ii) Ensure helicopter clearance of hazards on the right side

(iii) Use data logger and helicopter GPS to mark target plants being treated

(iv) Will wear appropriate flight PPE with flight helmet communications in working order thru helicopter PTT (Push to talk) or VOX (Voice activated) systems

(d) Should sprayer malfunction during the operation, pilot shall return to base and repair sprayer; if not capable of field repairs, the aerial spray mission ends.

f) MILITARY HEAVY LIFT OPERATIONS

i) ANRP use of military heavy lift helicopter provides training experience for the military and provides significant savings to the program. The Military's Operation Manager shall oversee the helicopter operation with ANRP staff in an advisory and/or support role. The Heli-Manager may advise the Military counterpart on load placement and unloading.

ii) ANRP staff (Project Leader, Heli-Manager, Supervisor, Crewmember) involved with the military operations shall:

(1) Meet with military personnel to establish the groundwork for the operation

(a) Location of base of operation and designated receiving site,

(b) Type helicopter to be used for type of materials being flown,

(c) Load preparation including hardware provided by ANRP and/or military,

(d) External load delivery method,

(e) Identify military's Operation Manager and their support staff,

(f) Establish communication protocols between ANRP and the military.

(2) ANRP shall:

(a) Conduct a meeting with all NR staff involved with the operation,

(b) If radio comm at the receiving end will be poor, plan to improve the situation.

(3) All ANRP staff must participate in a pre-operation debriefing that thoroughly details the operation including:

(a) Specific support roles for the NR staff that may include

(i) Delivering and preparing the loads ahead of time,

(ii) Receiving and unloading materials in remote field.

(b) Establishing safety protocols including safety zones at both ends,

(c) Determining possible contingency plans,

(d) Confirming communications protocols, type helicopter being used, etc.

(4) During Military operations, the base of ops Heli-Manager shall:

(a) Ensure NR staff is wearing all appropriate PPE,

(b) Direct NR support staff as approved by the Military Operation Manager including:

(i) Preparing loads while helicopter is away from the area,

(ii) Being in the designated safety zone while the helicopter is in the area.

(c) Stay in direct communication with the remote site Heli-Manager or Crewmember,

(d) Maintain communications with Military Operation Manager.

(5) During the operation, the remote site Heli-Manager or Crewmember shall:

(a) Ensure NR staff is wearing all appropriate PPE,

(b) Establish a safety zone that:

(i) Is dictated by the type of military helicopter,

(ii) Shall be out of the direct flight path of the helicopter to the extent practical due to vegetation and terrain,

(iii) Shall try to be beyond the strong downdraft and large blowing debris dependent on DZ geography,

(iv) Takes advantage of terrain and/or vegetation in the event of an accident.

(c) Maintain communications with on-site military personnel and base of ops Heli-Manager.

(6) ANRP shall conduct a post operation debriefing.

(a) Military Operations Manager may or may not be involved with the post-ops debriefing but will be debriefed by the appropriate NR staff.

(b) Debriefing will be conducted with all participating staff as soon as practical.

(c) Debriefing shall include positives and negatives with suggested improvements, be documented and presented to the ANRP Manager.

g) REFUELING

i) If the scheduled operation requires refueling, the Ordering Record shall so state. The location of the Heli-base or LZ for the refueling will be listed on the Flight Plan.

ii) Refueling will occur off army lands only unless the Contractor or On Call vendor is being used for fire suppression or some other emergency activity, during these operations, Wheeler AAF may be used with the permission from the Army.

iii) Vendor shall provide the refueling equipment that meet OAS requirements for remote refueling and fuel drum management.

iv) A spill kit will be available at each refueling site.

v) No pax allowed onboard during refueling.

vi) All NR Staff not involved with the refueling will stay within the designated safety zone.

vii) NR Staff are prohibited from refueling the aircraft; this is the pilot's responsibility. Staff may assist with bringing the fuel drum or pump to the aircraft if asked by the pilot.

viii) The helicopter will be shut down with all rotors stopped before refueling.

5. APPENDICES

a) Helicopter Risk Assessment
b) Abbreviations, Acronyms, Definitions
c) List of Contract Heli Managers
d) Load Calculation form
e) Heli-base Crash Kits
f) Common Weights

Standard Operating Procedure (SOP) for
Emergency Response

1. PURPOSE. The purpose of this SOP is to outline steps to follow in the case of a field emergency.

2. SCOPE. ANRP performs field work in a variety of conditions and locations, some of which are remote and difficult to access. Field emergencies are a real possibility, and all staff should be prepared to respond to emergency situations. This SOP lays out emergency response procedures.

3. RESPONSIBLITIES.

   a) Natural Resource Management (NRM) Supervisors: Review procedures with NRM Staff during safety briefings to ensure understanding and compliance. Ensure staff are trained and conduct periodic reviews to maintain perishable skills.

   b) NRM Staff: Execute emergency response procedures in accordance with SOP.

   c) New staff shall read this SOP and all attached documents before beginning field work.

   d) Daily Emergency Coordinator: Assist support operations staff/Base with safety checks during field operations. Coordinate emergency response if needed.

   e) Base: staff detailed to act as 'Base' shall monitor the radio and be the first point of contract for field teams reporting an emergency.

   f) Failure to comply with this SOP may result in disciplinary action.

Helicopter wreckage from crash December 2003

4. PROCEDURES.

a) General Considerations.

i) In the event of an emergency, staff should seek to remain calm, respond with alacrity and compassion, and communicate clearly and frequently with Base, supervisors, and other first responders.

ii) First responders may include: NRS, Emergency Medical Technicians, Medevac, Range Control, and Honolulu Fire Department Staff.

iii) Follow ANRP Wilderness First Response guidelines and WMA Wilderness First Aid Guide, both of which are appendices to this SOP.

b) Training

i) All full-time, permanent field staff are required to take a Wilderness First Aid Class and CPR.

ii) All term and temporary staff, like summer interns, and part-time permanent staff must take at minimum a basic First Aid Class and CPR.

iii) As feasible, part-time permanent staff will receive Wilderness First Aid training.

iv) All staff are suggested to take Medevac Orientation, although this is not required.

c) Gear (see SOP #5, Working Remote Field Locations, for detailed gear and first aid kit lists)

i) Required emergency equipment includes

(1) Field pack with standard gear

(2) First aid kit

(3) Communication: radio and/or cell phone, at least one per group. If a group splits up, each individual should have his/her own radio or cell phone.

ii) Camping trips: staff shall take a more extensive first aid kit to remain at camp. These 'Home Base' kits should be checked and restocked at least twice a year.

iii) Vehicles: each vehicle should be equipped with a 'Home Base' kit, which should be checked and restocked at least twice a year

d) Emergency response forms: staff shall have CURRENT copies of each of these forms in the field. Electronic versions may be carried instead of hard copies, with the exceptions noted below:

i) Field Contact List

ii) Emergency Narrative and SOAPA (hard copy required)

iii) ANRP Wilderness 1st Response (hard copy required)

iv) WMA Wilderness First Aid Guide (hard copy required)

v) Landing Zone List (hard copy required)

vi) Emergency Maps Koolau

vii) Emergency Maps Waianae

viii) NARS, Forest Reserve, and other Landowner Permits

ix) Emergency Contact List (Supervisor's only)

e) Fire Drills and Skill Practice

i) Field Team Coordinators shall conduct Fire Drills with staff two times per quarter (minimum), unless otherwise specified by the Senior Natural Resource Management Coordinators.

ii) All staff not on a field team shall have quarterly requirements for fire drills identified by their supervisor.

iii) Base shall conduct impromptu fire drills with field staff at their discretion.

iv) Fire Drills will be tracked via the Fire Drill Record Form and the ANRP training data base. These forms will be filed and reviewed quarterly by the Senior Natural Resource Management Coordinator. They will also be reviewed by participating staff and the PICHTR Safety officer.

v) Issues identified during fire drills will be discussed at supervisory meetings. If needed, changes to SOPS and other documents will be made.

vi) Safety Observations will also be conducted regularly. They are addressed in detail in SOP #25, Conducting Safety Behavior Observations/Inspections.

5. APPENDICES

a) ANRP Wilderness First Response
b) WMA Wilderness First Aid Guide
c) Emergency Narrative and SOAPA
d) Triangle Diagram

Standard Operating Procedures (SOP) for Safe Use of Pesticides

1. PURPOSE. The purpose of this SOP is to outline the procedures to follow when storing, pouring, transporting, mixing and using pesticides.
2. SCOPE. Includes procedures for field operations with pesticides, as well as baseyard pesticide handling.
3. RESPONSIBLITIES.
   a) Natural Resource Management (NRM) Supervisors: Review procedures with NRM Staff to ensure understanding and compliance. Conduct pesticide safety briefings. Ensure staff are trained as directed below in part 4.b. Train each employee on PPE requirements, use, limitations, care, maintenance, and disposal.
   b) NRM Staff: Handle and apply pesticides in accordance with the SOP. Participate in required trainings. Maintain a current restricted use pesticide applicator's license.
   c) Ecosystem Restoration Program Manager: Report pesticide usage to DPW as requested, at least annually. Inventory pesticide list annually. Maintain a current list of certified applicators, and provide it to DPW annually or upon request.
   d) Environmental Compliance Officers (ECO): Conduct quarterly environmental compliance training for all employees. Maintain an environmental compliance program book containing training attendance logs and hazardous waste disposal documents. For all pesticides, maintain current Safety Data Sheets (SDS). Perform monthly compliance inspections of the entire baseyard.
   e) Failure to comply with this SOP may result in disciplinary action.
4. PROCEDURES.
   a) General Considerations
      i) All pesticides will be managed in accordance with the Armed Forces Pest Management Board Tech Reports 7, 15, and 17, Hawaii State Law, Federal Law, pesticide labels, and safety data sheets (SDS). The 29 Code of Federal Regulations (CFR) 1910.132 through 138 is an additional resource.
      ii) Compliance with OSHA's Hazardous Waste Operations and Response, and Hazardous Communication Standard in addition to the United States Army Hawaii Installation Hazardous Waste Management Plan are required. See 29 CFR 1910.120 and 1200. An Authorized Use List (AUL) and SDSs will be available for easy reference (in a binder or other organized manner) next to the pesticide storage cabinets, but outside the spill containment area.
   b) Certification and Training.

i) Employees whose position description specify must obtain State of Hawaii Restricted Use Pesticide and/or Department of Defense Pesticide Applicator Certification within one year of hire, but are encouraged to acquire it as soon as possible after hire.

ii) To qualify for certification, employees must pass an exam, which covers pesticide label interpretation and the storage, mixing and use of pesticides.

iii) Employees also must undergo HAZCOM training and quarterly environmental compliance training.

iv) Employees who have not yet completed the trainings listed above, temporary staff, term hires of a year or less, summer interns, and volunteers must read the DPW Natural Resources Volunteer and Staff Pesticide Safety Course (appendix) and receive a thorough safety/training brief from their supervisor/field leader prior to working with pesticides.

c) Storage.

i) All pesticides will be stored in the spill containment sumps of the designated, lockable, fenced storage areas at both East and West Base. East Base is building #SB 1595 and West Base is building #SB 1128.

(1) All pesticide containers shall be stored in the sumps and off the ground.

(2) Pesticides may be placed either in cabinets or on open shelving. Shelving shall be made of non-absorptive materials.

(3) Unopened containers of pesticide, dilutant, and surfactant may be stored outside the sump only if placed within secondary containment.

(4) Storage/reactivity information should be checked, and incompatible products stored in separate cabinets/secondary containment.

(5) Dry products should be stored above liquid products in case of leaks.

(6) Herbicides should be stored separately from insecticides and fertilizers.

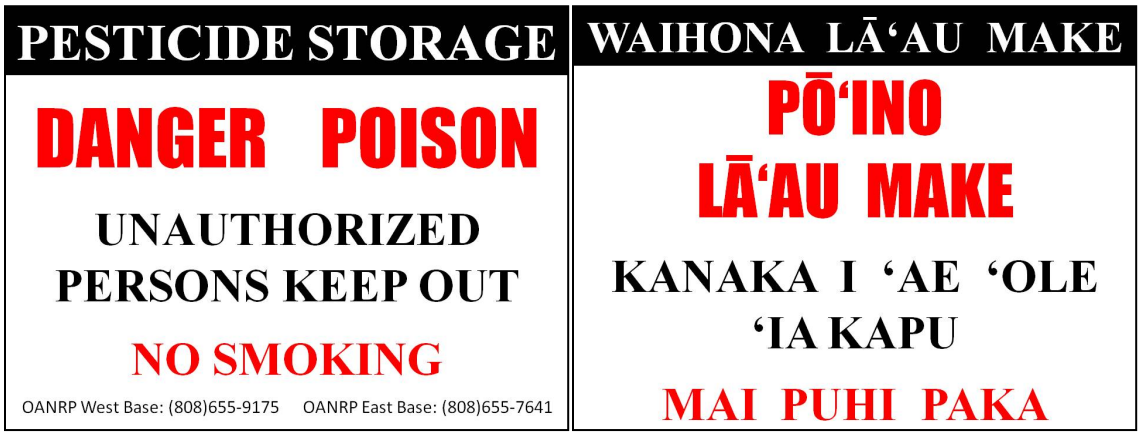
(7) The cages should be locked whenever they are not in use for extended periods of time, particularly at the end of the duty day. Staff are responsible for ensuring pesticides are not accessible to the public.

ii) All other pesticide related equipment will be stored in the designated pesticide areas at each baseyard. This equipment includes but is not limited to transfer containers, applicator bottles, sprayers, tanks, gloves, funnels, graduated cylinders, dry bags, and wash tubs.

(1) At East Base, the designated pesticide area is the sump. Items that are washed and drying (ex. gloves or wash tubs) may be outside the sump temporarily. Pesticide equipment will be kept separate from non-pesticide gear to reduce contamination.

(2) At West Base, the designated pesticide area is the Pesticide Cage. Items too large to fit within the Pesticide cage include the large herbicide mixing tanks and the aerial spray set-up (tank, line and ball sprayer). These items will always be triple rinsed after use, will be stored directly outside the pesticide cage, and will be labeled "Contaminated with Pesticides".

iii) The pesticide storage areas at both baseyards will be clearly marked with signage such as the examples below:



iv) Pesticide equipment will be labeled as "Contaminated With Pesticides" or equivalent verbiage. Applicator bottles used in the field are not required to be labeled but will be whenever possible. Items labeled "Greenhouse Use Only, No herbicide" may not be used for herbicides. See examples below:

v) Transfer containers (containers used to transport quantities of pesticide into the field), storage containers, and any other bottle containing herbicide shall be labeled with all required label information: program name, address and phone number; signal word; product name; EPA registration number; active ingredient name and percent; and dilution rate. Template stickers are available to facilitate this; see below. Note that any item in its original packaging is already labeled.

US ARMY GARRISON HAWAII DIRECTORATE OF PUBLIC WORKS ENVIRONMENTAL DIVISION 413 Oahu St. Bldg. 1123 Schofield Barracks, HI 96857 Phone: 656-9175	
Signal Word:	**CAUTION**
Trade Name:	
E.P.A Registration #:	
Active Ingredient Name and %:	
Dilution:	
KEEP OUT OF REACH OF CHILDREN	

US ARMY GARRISON HAWAII DIRECTORATE OF PUBLIC WORKS ENVIRONMENTAL DIVISION 413 Oahu St. Bldg. 1123 Schofield Barracks, HI 96857 Phone: 656-9175	
Signal Word:	**CAUTION**
Trade Name:	**Garlon 4 Ultra**
E.P.A Registration #:	**62719-527**
Active Ingredient Name and %:	**Triclopyr 61.1%**
Dilution:	
KEEP OUT OF REACH OF CHILDREN	

vi) Spill containment kits will be stored in the designated pesticide areas at both East and West Base. The spill kits contain absorbent materials to dike and absorb a spill. Water sources are available just outside the designated pesticide areas.

vii) Designated pesticide areas have emergency showers and eye washes. These shall be checked for proper usage weekly, as per DPW requirements. A record of these inspections will be kept by the ECOs.

viii) SDSs and Labels for all on-site products will be available in the designated pesticide area. These shall be updated as needed and kept current. Copies of this information will also be kept in the office by the ECOs.

ix) Inventories of all pesticides stored in a designated pesticide area will be posted. These inventories shall be updated as needed and kept current. At a minimum, they shall be updated annually.

x) Clean, never-used pesticide equipment may be stored either in or out of the designated pesticide area. This includes never-used transfer and applicator bottles. It also includes washed/cleaned PPE (coveralls and goggles).

xi) Respirators use is addressed in SOP #33. Respirators are maintained by individual staff. Staff are responsible for cleaning respirators after use, storing, monitoring cartridge life, and inspecting respirators for damage.

d) Basic Handling.

i) All volunteers, temporary hires, or new staff who do not yet have their Restricted Use Pesticide certifications must read through the "DPW Natural Resources

Volunteer and Staff Pesticide Safety Course" before applying herbicides. Only staff with the RUP certification can mix herbicides.

Left: Invasive grass control with 1% Round-up Professional in water with Turf Mark blue dye
Right: Schinus terebinthifolius (Christmas berry) trunk after being girdled with a hatchet and treated with 20% Garlon 4 in Forestry Crop Oil

ii) Pouring and mixing will be done inside the sump prior to going into the field whenever possible. Exceptions to this include but are not limited to: mixing solutions for power, backpack, hand, or pump sprayers in the field, and herbicide use during camp trips.

(1) Some product labels require the use of eye protection when working with pesticide concentrate. Check the label first. Whether or not eye protection is required, staff are recommended to use it whenever working with liquid pesticide concentrate.

(2) When mixing pesticides into sprayers and tanks, ensure that water jugs and hoses do not become contaminated with pesticides.

(3) Incidental mixing of pesticides in the field will be conducted using at least two persons whenever possible.

(4) Keep the lip of the water jug OFF the sprayer, or pour water into an intermediate container, such as an empty graduated cylinder first. Only mix the quantity of pesticide needed at the time of application. Storing excess mixed spray is difficult and is discouraged.

iii) PPE is to be worn always when handling pesticides. The minimum PPE requirements are specified by the pesticide label and must be followed. Note that outer surfaces of containers are considered contaminated. Gloves shall be worn when moving pesticide containers. Hands will be washed with soap and water before eating, drinking, using the restroom or any other similar activity.

Required PPE	Pesticide-Specific PPE	Required Training
• Nitrile Gloves. • Long trousers • Safety footwear	• Respirator • Long sleeved shirt • Eye protection	• Hawaii Commercial Restricted Use Pesticide Certification

e) Transport.

i) Vehicle Transport:

(1) All vehicles shall have copies of Labels/SDSs when transporting pesticides.

(2) Pesticides and pesticide equipment shall be transported in protective containers such as action packers, dry bags, or wash tubs. These containers will be secured in the vehicle to prevent movement during travel or in the event of an accident. Note that these containers may be contaminated on the inside but are generally not contaminated on the outside.

(3) Vehicles carrying pesticides shall not be left unattended in populated areas.

(4) At least one filled water jug shall be carried in the vehicle when transporting pesticides, to use for hand-washing/clean-up as needed. Water jugs shall be secured in the vehicle to prevent movement during transport. In addition, staff will ensure that there is enough water in the vehicle to allow for triple rinsing of pesticide equipment at the end of the field day.

(5) It is recommended that vehicles transporting herbicides have at least 1 heavy duty garbage bag and 2 absorbent pads in case of spills.

ii) Field Transport:

(1) Bottles of pesticides and pesticide equipment will be placed into leak-proof, puncture-resistant secondary containers, such as dry bags. Preferably, they will first be placed in Ziploc® bags (tertiary containment), then dry bags. Dry bags may then be placed in field packs or clipped to the outside of field packs. Dry bags are defined as bags designed to prevent liquid entry or exit, and typically have roll tops and plasticized material.

(2) Staff should carry at least one extra liter of water for washing off any pesticide that may come in contact with skin or eyes.

(3) At field sites, pesticides should be stored away from field packs and personal gear. When camping, pesticides should be stored outside of cabins, away from tents and food prep areas, in secondary containers such as action packers, lidded buckets, or dry bags.

(4) The largest transfer bottle available to staff has a 4L capacity. If this is used, a trowel and several Ziplocs or a heavy duty garbage bag shall be carried into the field in case of spills.

iii) Helicopter Transport. Supervisors and staff will notify pilots that pesticides are a component of sling loads and personnel loads, according to AMD regulations.

When placed in a sling load, pesticides shall be placed into leak-proof, puncture-resistant, compression-resistant secondary containers, such as action packers or lidded buckets.

f) Use.

i) Permanent employees must obtain State of Hawaii Restricted Use Pesticide and/or Department of Defense Pesticide Applicator Certification within one year of hire, but are encouraged to acquire certification as soon as possible after hire.

ii) Pesticides will be used in accordance with the Label and SDS for that pesticide. PPE will be worn during pesticide application, as stated previously.

iii) Application methods. Pesticides may be applied in a variety of ways. Always follow Label directions. Approved equipment in good working order shall be used. Application method shall be chosen to minimize drift, non-target effect, and maximize efficiency, target death, and staff safety.

(1) Some herbicide application methods include: basal bark treatment, girdle treatment, cut stump/clip-and-drip treatment, and foliar treatment via spraying. In general, woody weeds are treated with targeted applications such as basal bark treatments, herbaceous weeds are treated with clip-and-drip treatments, and grasses are treated with foliar sprays. Supervisors shall train staff in identifying target species and application methods prior to control operations.

(2) Other application techniques are used for pesticides targeting slugs (hand broadcast) and rodents (hand broadcast, bait stations, aerial broadcast).

(3) Greenhouse operations require the use of a variety of pesticides and application methods. The Nursery Supervisor is responsible for proper application of pesticides in the greenhouses. When needed, signs shall be posted after spraying to indicate re-entry time and other pertinent information.

iv) Aerial applications. Special permissions are required for aerial pesticide application. An Aerial Spray Statement of Need (ASSON) must be completed and approved by Army Environmental Command (AEC). Aerial operations shall operate within the parameters set out by the ASSON. Since aerial applications are highly visible, the Federal Biologist shall be notified prior to all operations. The Federal Biologist will determine whether or not the Public Affairs Office needs to be notified and work with them on appropriate outreach to nearby neighborhoods.

v) Triple Rinsing. All pesticide equipment shall be triple-rinsed after use, as per recommended pesticide handling procedures outlined in by the Hawaii Commercial Restricted Use Pesticide Applicator's Certification.

(1) Triple rinsing is defined as follows: 1st rinse with soap and water, 2nd rinse with soap and water, 3rd rinse with plain water.

(2) At each rinse stage, the item shall be filled at least ¼ full and agitated for at least 30 seconds; rinsate shall then be applied to target species in accordance with label directions.

(3) Triple rinsing shall take place in the field whenever possible. Pesticide equipment should be allowed to drain on target species (weeds) prior to rinsing.

(4) Rinsing at the baseyard is only to be done rarely; this is to minimize potential exposure to and accumulation of pesticides.

(5) Equipment shall be set out to dry in the designated pesticide area at the end of the field day. Equipment should be cleaned on the day of use.

Left: Weed control ipa tools and PPE

Right: Staff controlling weeds using clip-and-drip technique; note full PPE

g) Disposal.

i) Empty pesticide containers shall be disposed of as per label instructions. In general, all pesticide containers, including original containers, transfer bottles, vials, and applicator bottles must be triple-rinsed and punctured (to ensure that they cannot be re-used). They then may be placed in the trash or placed in commercial plastic recycling. Ziplocs used to carry pesticide bottles and used nitrile gloves must also be triple-rinsed, torn/punctured, and placed in the trash.

ii) Absorbent pads/rags used to catch/clean drips or small spills in the pesticide storage area shall be triple-rinsed and re-used. Once they are not re-usable, they should be placed in the bin labeled "Old/Used Pesticide Rags." When the bin is full, the ECO shall call the Transfer and Accumulation Point (TAP) to schedule a pick-up (656-0866).

iii) Wood or plastic lumber or other absorptive items contaminated with pesticides shall be treated as hazardous materials for disposal. Minimize the creation of such hazmat.

h) Spills.

i) Every effort will be made to prevent pesticide spills from occurring. For example, staff should work together to lift large, heavy containers when refilling transfer containers, and pesticide containers should be secured during transport.

ii) Report all spills regardless of the size, night or day. Complete the Spill Notification Form (see appendix) and turn it in to the ECO, who then will submit to the DPW Hazardous Waste Branch (656-1111). Clean up the spill only if it can be done safely. If not, call 656-1111.

iii) Spill kits:

(1) West Base: A shop spill kit (see appendix) shall be placed just inside the Pesticide Cage. It shall be inspected quarterly.

(2) East Base: A modified shop spill kit shall be located next to the pesticide sump. Given the small volume of herbicide stored at East Base, a full shop kit is not required. It shall be inspected quarterly.

(3) Field: A vehicle spill kit (see appendix) shall be taken on aerial spray or power sprayer operations. Kits shall be inspected before being taken into the field.

iv) Spill containment and clean-up shall be done in accordance with the instructions and the procedures on the appropriate pesticide label. PPE will be used at all times. Practice the three Cs: Control, Contain, and Clean.

(1) Identify the pesticide spilled and check the SDS for specific directions.

(2) Put on PPE. Rubber apron and boots recommended, depending on size of spill.

(3) CONTROL: minimize the quantity of product released. Place the leaky container into secondary containment, position container so it stops leaking.

(4) CONTAIN: keep the spill area as small as possible. If necessary, dike liquid spills to prevent them from spreading, or cover granules/powders to prevent them from becoming airborne.

(5) CLEAN: promptly clean the spill. For liquids, soak up with absorbent material from the spill kit or available absorbent pads and rags. Collect contaminated absorbent materials and place into spill kit drum. For solids, gently sweep or scoop product into a container. Once all the pesticide has been removed, clean the spill area with water (use soap for biodiesel solutions) and rinse the area thoroughly. Apply rinsate to target species or collect in a drum for disposal.

(6) Contact DPW Hazardous Waste Branch for instructions on how to dispose of contaminated clean-up material and rinsate.

(7) Spills less than 25 gallons can be cleaned by staff. The DPW Hazardous Waste Branch should be promptly called to respond to spills over 25 gallons, or with potential run-off issues, or otherwise requiring expertise. Until they arrive, staff should control and contain the spill.

i) First Aid.

i) In the event that pesticides are swallowed, inhaled, absorbed on the skin, or get into a person's eyes, the first aid procedures outlined on the respective pesticide's SDS are to be followed. If in doubt how to proceed, call Poison Control (1-800-222-1222).

ii) An eye wash fountain and shower are located next to the cabinets at the baseyard to wash out any pesticides that get into person's eyes.

iii) On day/camp trips where pesticide use is planned, field crews shall take at least one 5 gal jug of water and 1 full eye wash bottle (in 'Home Base First Aid Kit') to trailhead/camp in case of contamination. In addition, field crews shall carry an extra liter of water for emergency decontamination.

iv) All staff should keep a spare set of clothes at the office in case of a spill.

j) Emergency Response.

i) The pesticide inventory shall be provided to the appropriate fire department annually by the Federal Biologist. If there is a fire at either baseyard, staff should ensure that first responders are aware of the presence of hazmat.

5. APPENDICES

a) DPW Natural Resources Volunteer and Staff Pesticide Safety Course
b) USAG-HI Spill Notification Form
c) Spill Kit Contents

6. ADDITIONAL RESOURCES

a) U.S. Army Garrison – Hawaii Spill Prevention, Control and Countermeasures (SPCC) Plan
b) Armed Forces Pest Management Board Technical Report #7, Installation Pesticide Security
c) Armed Forces Pest Management Board Technical Report #15, Pesticide Spill Prevention and Management
d) Armed Forces Pest Management Board Technical Report #17, Military Handbook – Design of Pest Management Facilities
e) All of the above are located on the shared drive at V/Pesticides/Army/

Standing Operating Procedure (SOP) for
Working in Remote Field Locations

1. PURPOSE. The purpose of this SOP is to outline steps to maximize personnel safety while working in remote field areas.

2. SCOPE. Includes procedures for field operations.

3. RESPONSIBLITIES.

   a) Natural Resource Management (NRM) Supervisors: Review procedures with NRM Staff to ensure understanding and compliance during safety briefings. Ensure staff has completed all training necessary for the fieldwork being conducted.

   b) NRM Staff: Execute fieldwork in accordance with SOP.

   c) Failure to comply with this SOP may result in disciplinary action.

Planting demonstration at Makaha MU

4. PROCEDURES. NRM staff perform most of their field work in remote areas. It is important to be well prepared for all operations. Proper preparation includes having the right gear, tools, and training for fieldwork. This section provides a checklist to use when planning and preparing project operations.

   a) NRM Supervisors are responsible for the safety of their crews. The following should be considered prior to departure:

      i) The objective or purpose of the trip.

      ii) Personnel, skill/ability levels, and assigned tasks.

      iii) Project location/area and facilities or lack of facilities in the area

      iv) Date and time of departure.

      v) Trip duration.

      vi) Camping equipment, inventory and inspection.

      vii) Routes of travel, transportation of people and equipment.

      viii) Anticipated hazards/emergencies; for example illness, injury, wild land fire, adverse weather, etc.

      ix) Field operations will be terminated or cancelled if the National Weather Service posts high wind, flash flood, or other severe weather **warnings** for the planned work areas (see guidance on tropical storm and hurricane warnings). **Field operations may proceed with extreme caution when weather watches and advisories are posted.** Operations with overhead hazards (such as tall trees) should be rescheduled when high wind watches are predicted or posted. Helmets are also recommended for areas with large numbers of snags.

         (1) The NOAA National Hurricane Center (NHC) issues hurricane warnings and tropical storm warnings 36 hours in advance of tropical storm-force winds to allow people time to complete storm preparations (https://www.weather.gov/safety/hurricane-ww). During tropical storm or hurricane warnings, field operations can occur before storm conditions are forecast to begin. However, Base must closely monitor the progress of the storm and field crews must consistently check-in with Base for updates. Field crews must be able to exit the field immediately if directed to do so by the Emergency Coordinator.

      x) Health of personnel.

      xi) Disposal of waste material.

xii) Layout of campsite.

xiii) Special equipment needs and level of training of personnel involved.

xiv) Re-inspection of equipment and tools as necessary

xv) If fences will be crossed, safety procedures include:

(1) If crossover is not available, cross at a fence post (preferably a fence corner). Do not cross between posts due to loose tension, possible fence breakage, and risk of falling.

(2) Make sure fence post and fence are secure.

(3) Have co-workers hold tools, firearms, heavy packs and cross over with no excess gear and both hands free; then have tools, firearms, gear passed over.

(4) Hold on firmly to the fence post while crossing, placing feet as close to the post as possible and preferably above a fence clip.

xvi) Date and time of return

xvii) Contingency plans should the original plans require a last minute change

b) Planning/Briefing before and after setting out on a day trip or camping trip:

i) Complete the daily risk assessment checklist prior to field operations with all crew members present. Have all crew initial indicating that they understand the operation and the associated hazards and the required training and PPE. Daily risk assessments are located conveniently in each work vehicle and should be brought to each camp site.

ii) Review maps of the area.

iii) Talk to co-workers who are familiar with the area.

iv) Require crew to have a radio and a schedule for checking in with base or the appropriate range control.

v) Prepare travel itinerary and time schedule (return to trailhead and trip back).

vi) Keep a copy of the emergency maps on hand.

vii) Individual responsibility and task assignment.

viii) Debrief at the end of the day regarding hazards and other safety issues.

c) Communication procedures

i) All personnel are required to have operational cell phones and have these on during work hours between 7:00 am and 5:30 pm when conducting field operations.

ii) All groups are required to have a radio while conducting field work, although not all personnel will have a radio. However, there will be a radio with each group that is beyond earshot of others. For example, if a team of six is divided into two teams of three working on different tasks on opposite sides of Kahanahaiki, each of the groups of three will have a radio.

iii) All groups will report in by radio or cell phone to Army base at lunchtime between 12:00 am and 1:00 pm. If a crew fails to report by 3:00 pm base will begin an investigation of the situation. All groups camping will also report in at the beginning of the work day (between 7:00 am and 7:30 am) and at the end of the day between 4:30 and 5:30 pm. If crews do not check in by 5:30 or do not return to base, an investigation will begin. See Emergency Response SOP for procedures followed.

iv) Crews may use texting as a way to check in with Army base. However, field crews must ensure that the text was received by Army base. For example, they must receive a text in response to their check in. If no confirmation is received the field crew must assume that Army base has not received their check in.

v) Crews working in areas with cell phone and radio dead zones must pre-plan their communications strategy. Base shall be notified when a crew will be unavailable most of the time and a pre-established check in time will be set. For example, the Orange team working in Kaluakauila will inform base that they are descending into the gulch and will check in again at 3:30 when they expect to be back on the ridge.

vi) Crews involved in night operations must check in with a designated supervisor at the completion of operations.

d) Back-Country Travel

i) Planning. Avoid working alone if possible. Stay on established trails. Brief supervisor/staff on your work plan and stay in communication with a radio or cell phone.

e) Equipment. All crews are required to have the following equipment in the field.

i) First-aid kit and manual. (List of required gear at end of document.)

ii) Compass and map.

iii) Pocketknife.

iv) Flashlight.

v) Adequate supply of food/water.

vi) Rain gear.

vii) Signal mirror.

viii) Radio and cellular phone with emergency phone numbers. Always keep radios and cellular phones within ear shot in the event of an emergency. When traveling in vehicles keep radios and cellular phones in the cab.

ix) Approximately 30 feet of webbing.

f) Conditions

i) Get reliable and updated checks on expected weather and road conditions for the area. Get briefings about activity, equipment, limitations, and known or potential hazards.

ii) Exercise judgment: choose safe travel routes and stream crossings by scouting the area. Avoid traveling or camping in snag or rock slide areas in windy or inclement weather.

g) Campsite Selection.

i) Consider prevailing winds.

ii) The ideal site has trees, grass-covered ground, gentle slope, and protection from severe weather.

iii) Avoid natural hazards like overhanging cliffs, gulches, dry washes, land-slides, old trees with dead tops and branches, and low marshy areas.

h) Campsite Area.

i) Provided with adequate drainage under all circumstances.

ii) Not subjected to flooding or flash floods

iii) Large enough to prevent overcrowding.

iv) Maintained in a safe, clean and sanitary condition, free from walking hazards, rubbish, debris, wastepaper, garbage, and other refuse.

v) Ensure that campsite is approved by supervisors and landowners prior to use.

Camp site at Palikea MU

i) Setting Up Camp

   i) If possible, set up camp before beginning work. Always set up camp before dark and before fatigue sets in.

   ii) If the weather appears threatening, pitch tents such that their backs are against the wind.

   iii) Select tent areas on clear, gently sloping or flat ground. Take advantage of natural barriers for warming or cooling.

   iv) Latrines should be at least 150 feet from kitchen and 100 feet downstream.

   v) Take care to minimize your impact on the native forest in the area. Avoid locating high traffic parts of camp in native vegetation if possible.

j) Closing Down Camp

   i) When any site is closed, collect and dispose of all garbage and refuse in a sanitary manner. Secure cabins by securing windows, stowing gear, setting rat traps, stashing emergency food/water supplies as needed.

k) Night Operations. Occasionally some program staff must work at night usually for snail searches, bat detection, or arthropod collection.

i) Planning. Night operations are inherently hazardous. Staff must be extra vigilant about safety. Staff should be well briefed on operations and have a clear understanding of the plan.

ii) Never travel or work alone. At night crews will always work in pairs and communication will be maintained at all times. Staff should stay within visual range of each other (i.e. able to see co-worker's flashlights).

iii) Additional trail marking may be needed with flagging or reflective tape for orientation. Trails may also need better clearing for safe travel.

iv) Backup batteries and/or backup flashlights must be carried by staff.

v) Practice drills involving a night rescue scenario should be practiced by staff before conducting night work operations.

vi) Equipment. All staff are required to have the equipment listed above in the Back-Country Travel Equipment section.

vii) Duty Day; Staff must be aware of duty day and fatigue considerations. Operations should be planned such that there is adequate rest before night operations so that staff do not become exhausted. Following day operations should also be curtailed as needed if fatigued (i.e. no chain-sawing if sleep deprived).

viii) Emergency Response: See emergency Response SOP for details. Both HFD and Military Medivac services fly at night. However, both organizations consider night operations high risk, in particular, hoist and long line operations. HFD indicates that strobe lights are ideal signaling devices. Military Medivac services may be using night vision goggles and spinning a light stick or flashlight may be a more appropriate signaling device to avoid blinding the pilot.

l) Rules to follow if you're lost.

i) If lost, keep calm, don't panic. Attempt communication with co-workers before they are out of earshot or radio reception.

ii) Check the surrounding country and attempt to orient yourself. Do not walk aimlessly. Carry and trust the map and compass.

iii) If you can reach a trail, follow it until you can determine whether you are moving in the right direction. As a last resort, travel downhill parallel to a stream or drainage.

iv) If unsuccessful in attempts to find your way, stay in one place and conserve your strength. If signal mirror or portable radio is available, have ready for immediate use.

v) If you must spend the night;

(1) Select a sheltered spot to stay warm

(2) Prepare your shelter well before dark

(3) Shelter, warmth, and liquids are more important than food

5. APPENDICES

a) Gearing Up
b) First Aid Kits
c) Camping Checklist
d) Daily Risk Assessment and Debrief

Standard Operating Procedure (SOP) for
Safe Use of Field Power Tools

1. PURPOSE. The purpose of this SOP is to outline steps to be followed for the safe use of the following field power tools: chainsaws, weed whackers, pole saws, hand drills, and augers.

2. SCOPE. Includes procedures for field operations focusing on chainsaws, pole-saws, hand drills, weed whackers and augers.

3. RESPONSIBLITIES.

   a) Natural Resource Management Supervisors: Review procedures with Natural Resource Staff to ensure understanding and compliance during safety briefings. Ensure staff has all appropriate certifications and maintains their proficiency.

   b) Natural Resource Staff: Use power tools in accordance with SOP and within their own limits and abilities.

   c) Ensure that risk assessment and safety plans are completed incorporating procedures.

   d) Failure to comply with this SOP may result in disciplinary action.

Power Auger with rare plants for reintroduction

4. GENERAL PROCEDURES.

   a) Read all manufacturers' instructions carefully before operating a power tool. The following safety precautions should be observed by all users of power tools:

i) Before, during and after operation, conduct a thorough inspection to ensure that the tool does not have any loose, broken, or missing parts.

ii) Operate gasoline-powered tools only in well-ventilated areas.

iii) Do not operate power tools if you are under the influence of any substance (such as medications, drugs, alcohol) which can impair vision, dexterity and judgment. Lack of sleep can also have similar effects and use of power tools should be avoided.

iv) Working with power tools is strenuous and fatiguing. If you get tired, take a break. You must stay alert. You or someone nearby can get hurt if you lose control of the power tool.

v) Prolonged use of power tools exposes the operator to continuous vibrations which can lead to physical hand injury. Do not squeeze the handles with constant excessive grip; wear gloves and take frequent breaks.

vi) Wear required PPE (e.g. eye and ear protection, chaps, gloves, adequate footwear as required)

b) Fueling/Refueling

i) Transport gas in DOT or UL approved metal or plastic gas cans (Not to exceed 5-gallons) and MSR bottles and use caution when handling fuel.

ii) Keep the handles dry, clean and free of oil or fuel mixture.

iii) Refuel only where there is good ventilation and on flat, level ground. Use secondary containment and spill pads when refueling at baseyard and as feasible at work sites.

iv) Clean fuel and oil cap prior to opening to remove any dirt and debris that may fall into the tank. Clean any funnels used for fueling also to remove dirt and debris.

v) Open fuel cap slowly to release any possible build-up of pressure. Do not refuel a running or hot saw (i.e. boiling gas in tank, very hot bar oil.) Allow tools to cool before refueling.

vi) When replacing fuel cap, ensure it is on properly and tight. Be aware that while the tool is operating, the vibrations may loosen the fuel cap.

vii) Clean off any gas or oil that may be spilled on the equipment prior to starting.

viii) Report all fuel spills immediately by filling out a spill form and submitting it to the DPW Hazardous Waste Branch (656-1111). If a spill occurs at the base yard promptly report to the baseyard operations manager or one's supervisor.

ix) Do not start or operate equipment within 10 feet of the refueling or fuel storage location.

c) CHAINSAWS/ GAS POWERED POLE-SAWS

i) General considerations

(1) The full requirements for safe operational use of chainsaws are more thoroughly covered in the chainsaw training and refresher courses. The following considerations are not intended to be exhaustive and are intended as a list of the most important required procedures when using chainsaws. When using pole-saws all the following chainsaw requirements are also applicable.

(2) Do not operate chainsaws/pole-saws without parts that are in good condition and properly functioning including muffler, handles, rear hand guard, spark arrestor, chain brake, throttle, throttle trigger lockout, stop switch, sharp and properly tensioned chain, guide bar, and chain catcher.

(3) Do not use ethanol based fuel in gas powered tools. Use only ethanol free gasoline to prevent damage to carburetors, gas lines, and seals. Octane rating of 89 or higher recommended.

(4) Operation with faulty or damaged anti-vibration mounts can lead to higher vibration. Long-term vibration can cause damage to the operator's hands. For lowest vibration, replace damaged mounts immediately. Mounts hardened due to age or weathering should also be replaced.

(5) OSHA requires all chainsaw operations to have an additional First Aid kit as outlined in 1910.266. This kit includes a small portable fire extinguisher. These will be supplied to crews when chainsaws are signed out from the base yard. This requirement also applies to the use of pole-saws.

Required PPE	Suggested PPE	Required Training and Supplies
• Chainsaw specific chaps (apron-style or wrap around) made with cut retardant material, without compromising tears, covering shins and ankles (UL Approved or meets ASTM F1897-04 standards) • Protective gloves or chainsaw specific gloves* • Eye protection: Face shield or goggles or properly fitted protective glasses with adequate side and top protection (ANSI Z 87.1-2010)* • Hearing protection: ear mufflers or plugs rated for 85-115 dBA* • Protective safety helmet (ANSI Z89.1-2009)* • Long pants and shirt made of sturdy material but allows complete freedom of movement* • Sturdy, leather, lace up boots that are at least 8" (20 cm) high. Boots may have nonskid or lug soles. (ANSI Z41-1999) (See also Footwear SOP #16)	• Long sleeves can reduce exposure to wood chips and sap that can cause skin irritation	• Chainsaw Safety Course • Additional Chainsaw First Aid Kit with fire extinguisher • Tourniquet

* PPE required for personnel swamping for sawyers

Required Tool kit	Suggested Tool Kit
• Round file • Flat File • Chain Depth gauge tool • Scrench (or similar hex nut/spark plug remover and flat head screwdriver) • Extra ChainTorx Wrench • Wire Brush • Rag	

ii) Transporting

(1) By vehicle:

(a) Slide control switch turned off.

(b) Ensure the chain guard (scabbard) is over the saw chain and guide bar

(c) Secure in bed of truck to prevent turnover, fuel spillage, and damage to the saw.

(d) Do not store PPE, ropes or other tools or equipment near to saw where they can come into contact with chain teeth, oil or gasoline.

(2) Carrying (manual transport) in the field:

(a) When carrying the chainsaw or pole-saw over long distances, make sure the engine is off, the covered guide bar and saw chain is to the rear, and the muffler away from body.

(b) When carrying short distance for more cutting, the chainsaw may be shut down or may be carried with the chain brake engaged, never with the saw chain moving.

(c) Shut off the engine before setting it down on a non-combustible surface.

(3) By helicopter:

(a) Fuel and oil tanks are empty before flight.

(b) Ensure scabbard is secured over saw chain and guide bar and cannot slip off.

(c) Slide control switch is off.

(d) Secure and protect in net or cargo pod (particularly powerheads); if flown internally, make sure it's secured!

iii) Preparation

(1) Do not allow other persons to be within 10 feet of the chainsaw when starting or cutting. Keep bystanders out of the work area, at least 2 times the height of any tree being felled.

(2) Do not start cutting until you have a clear work area, secure footing, and a planned and cleared retreat path from the falling tree.

(3) Be aware of the weather; exercise caution if the wind becomes stronger or it starts raining.

Preparing a chainsaw for operation

iv) Starting up

(1) Before you start the engine, make sure that the saw chain is not in contact with anything and chain brake is engaged.

(2) Ensure pole-saw is secure on ground before starting, chainsaws may be started using the leg lock start technique. Drop starts are prohibited. Review training guides as needed.

(3) While holding the starter grip, do not wrap starter rope around your hand. Do not let the starter grip snap back; guide the starter rope so it rewinds properly.

v) Operating a Chainsaw or Pole-saw: See checklist at end of this SOP for a more complete summary of operating issues.

(1) The chainsaw shall be held with the thumbs and fingers of both hands encircling the handles during operation; keep both hands on the chainsaw at all times when cutting, when the chainsaw is running, and when the chain brake is not engaged.

(2) The pole-saw shall be held in accordance with manufacturer instructions. This typically involves one hand on the handle, one hand under the pole and the use of a shoulder strap to avoid fatigue and assist with the control of the cutting head.

(3) When cutting, position the chainsaw and align your body so that the guide bar is aligned off to the right side of your body to avoid contact during kickback or if the chain should jump off the guide bar or break.

(4) Maintain secure footing and good balance before and during cutting. The saw shall not be used in a position or at a distance that could cause the operator to become off-balance, to have insecure footing, or to relinquish a firm grip on the saw.

Staff using good footing technique

(5) Keep all parts of your body away from the saw chain when the engine is running.

(6) Always cut at high engine speeds.

(7) Prior to felling any tree, clear away brush or other potential obstacles which might interfere with cutting the tree or using the retreat path.

(8) Carefully inspect the tree for signs of rot or other abnormalities from the crown to the base of the trunk. Sound the entire diameter of the lower portion of the trunk for any sign of cavity, decay or other variance in density that may

indicate rot. Take special care when working in areas that have burned in the past. Do not hesitate to walk away from trees that appear hazardous.

(9) When felling trees in areas with interlocking canopies or long, spindly branches that may be supporting one another, inspections for hazards and potential interference with the fall of the target tree must be conducted. Safety zones must be placed beyond the possible fall zone of the redirected subject tree or falling of other branches from nearby trees. Additional time must be taken before returning to the fallen tree to inspect the remaining upright canopies to ensure stability. If there will be some interaction with other trees take time to inspect these trees to determine their integrity.

Felling a tree using a "open face cut"

(10) Guard against pinching the bar when undercutting or top cutting. This is very easy to do with the pole-saw given the length away from the cutting surface and the loss of dexterity given the awkwardness of cutting with a pole. If the bar is pinched do not simply yank the pole-saw as damage to the saw or chain will occur. Have a backup plan for freeing the pole-saw before cutting should an irretrievable bar pinch occur (e.g. carry rigging ropes, tree climbing gear and chainsaw to drop the entire tree).

(11) Shut off or release the chainsaw throttle before retreating during tree felling or bucking.

(12) Use extreme caution when cutting small size brush and saplings because slender material may catch the saw chain and be whipped toward you or pull you off balance.

(13) When cutting a limb that is under tension, be alert for spring back so that you will not be struck when tension in the wood fibers is released.

(14) Exercise extreme caution when reentering a previous cut.

(15) Keep chain well-oiled and sharp and free of debris. Check tension frequently but only when the chainsaw is off.

(16) Only use replacement bars and chains specified by the manufacturer or the approved equivalent. After continuous operation, allow chains to cool before replacing.

(17) Guard against kickback. Kickback is the upward motion of the guide bar that occurs when the top quadrant of the tip of the guide bar contacts an object. Kickback can lead to dangerous loss of control of the chainsaw. To reduce kickback:

(a) Maintain a basic understanding of the mechanics of kickback to reduce or eliminate the element of surprise. Sudden surprise contributes to accidents.

(b) Maintain attention to the tip of the guide bar and cutting portions of the chainsaw at all times when conducting cutting or when the chain is in motion.

(c) Do not let the nose of the guide bar contact a log, branch, ground, or any other obstruction.

(d) Do not overreach and do not cut above shoulder height.

(e) Do not cut branches or trees directly overhead or that may fall onto the chainsaw operator or Swampers.

(f) Do not operate a chainsaw with one hand. Serious injury to the operator, helpers, and/or bystanders may result from one-handed operation. A chainsaw is intended for two-handed use.

(g) Do not operate a chainsaw that is damaged, out of adjustment, or is not completely and securely assembled. Do not run without sprocket cover installed. Be sure that the saw chain stops moving when the throttle control trigger is released. Set the chain brake before moving your feet.

vi) Inspections and maintenance

(1) Perform a pre-operation and post-operation inspection of the chainsaw/pole-saw and PPE. Document inspection and hours of operation on the Operation Checklist (see attached at end of SOP). In the event of any incident, stop operations and re-inspect to ensure safe function.

(2) Perform quarterly maintenance inspection of all chainsaws/pole-saws at baseyard. Typically this is completed by the baseyard operations manager. Record inspection and maintenance preformed on the Quarterly Maintenance Log (see attached at end of SOP).

(3) Follow manufacturer's instructions for storage of power tools for extended durations. This usually involves cleaning filters, draining fuel tank, and running power tools till the gas tank is empty. Failure to properly store power tools can result in damage to powerheads due to old or ethanol-based gasoline damaging carburetors, gas lines and seals.

d) WEED WHACKERS

i) General considerations

(1) Follow manufacturer's instructions when fitting either whip head or blade to the weed whacker to achieve optimal performance.

(2) The blade is not intended to cut large diameter trees. Trees over an inch in diameter should be cut with a chainsaw or pruning saw.

Required PPE	Suggested PPE	Required Training
• Protective gloves • Eye protection: mesh face shield or properly fitted protective glasses with adequate side and top protection (ANSI Z 87.1-2010) • Hearing protection • Protective shoes (see Footwear SOP #16)	• Long sleeves • Chaps • Helmet with face shield • Hard hat with chin strap	• Evaluation by a supervisor

ii) Transporting

(1) By vehicle:

(a) Slide control switch is off.

(b) Secure in bed of truck to prevent turnover, fuel spillage and damage to the weed whacker.

(2) Carrying (manual transport) in the field:

(a) When carrying the weed whacker over long distances, make sure the engine is off and the muffler away from body.

(b) Shut off the engine before setting it down on a non-combustible surface.

(3) By helicopter:

(a) Fuel tanks are empty before flight.

(b) Slide control switch is off.

(c) Secure in net or cargo pod and protect powerheads. Cover or remove blades before flights. If flown internally, make sure it's secured!

iii) Preparation

(1) Ensure that the whip head or blade is undamaged and securely on before operating weed whacker. Check periodically during operations to ensure that the blade remains secure and free from cracks.

(2) Inspect area to be cut for loose rocks, metal or other objects that could be thrown.

(3) Pay close attention to the location of other people in the work area. Thrown objects could easily reach others if they are too close. Try to keep a distance of 50 feet from others.

Conducting a weed whacker operation

iv) Operating

(1) Use caution when weed whacking in rocky areas as sparks may result from the blades striking rocks and the blades themselves may chip and send out metal shards. Should contact with rocks occur, stop operations and inspect the blade for damage.

(2) Use caution when changing the whip or clearing the whip of debris as the spinning head gets very hot with use.

(3) Use caution as the motor head can get very hot with use.

(4) Turn off machine if you are approached.

v) Inspection and maintenance

(1) Inspect weed whackers and PPE prior to and after each use to ensure correct function of all parts. Inspect all safety features including guard and shut-offs and report all problems to supervisors.

(2) Follow manufacturer's instructions for storage of power tools for extended durations. This usually involves cleaning filters, draining fuel tank, and running power tools till the gas tank is empty. Failure to properly store power tools can result in damage to powerheads due to old or ethanol based gasoline damaging carburetors, gas lines and seals.

e) AUGERS and GAS POWERED/BATTERY HAND DRILLS

i) General considerations

(1) Operation with a broken or badly bent bit can lead to user injury.

(2) See Footwear Standards, SOP 16 for footwear PPE requirements.

(3) Read owner manuals before use.

Required PPE	Suggested PPE	Required Training
• Hearing protection • Protective shoes (see Footwear SOP #16) • Eye protection required when operating gas powered/battery hand drills	• Long sleeves • Gloves	• Evaluation by a supervisor

ii) Transporting:

(1) By vehicle:

(a) Slide control switch is off.

(b) Secure in bed of truck to prevent turnover, fuel spillage and damage to the auger.

(2) Carrying (manual transport) in the field:

(a) When carrying the auger or drill over long distances, make sure the engine is off and the muffler away from body.

(b) Shut off the engine before setting it down on a non-combustible surface.

(3) By helicopter:

(a) Fuel tanks are empty before flight.

(b) Slide control switch is off.

(c) Secure in net or cargo pod and protect powerheads. Cover or remove bits as needed before flights. If augers are flown internally, make sure it's secured!

iii) Preparation

(1) Follow manufacturer's instructions when fitting augers and bits to power head.

(2) Ensure that a hitch pin or equivalent is in place to ensure auger is secure to power head.

(3) Pay close attention to the location of other people in the work area, particularly in steep areas where the auger may send rocks down slope.

iv) Operating

(1) For larger augers do not operate without brake in place as augers often get jammed and forcefully spin the power head. Serious injury can arise if the spin of the power head is not arrested by the brake.

(2) Ensure proper leg or hip placement such that the brake quickly contacts body.

(3) For gas powered and battery drills, ensure good foot placement and braced hand positioning. This typically means one hand on the trigger handle and the other placed above or below the drill shaft. Loss of control can quickly result in wrist and hand injury. Forcing the bit should not be required if the bit is sharp enough; forcing the bit into the tree may also result in damage to the powerhead.

(4) Ensure auger bit or drill bits have completely stopped moving before moving tools to next work area.

(5) Use caution as the motor head can get very hot with use.

(6) Avoid prolonged exposure to exhaust.

v) Inspection and maintenance

(1) Inspect augers and drills before, during, and after each use to ensure correct function of all parts. Handles, brakes, and other parts may come loose during usage due to prolonged vibration. Inspect all safety features including brakes and shut-offs and report all problems to supervisors.

(2) Follow manufacturer's instructions for storage of power tools for extended durations. This usually involves cleaning filters, draining fuel tank, and running power tools till the gas tank is empty. Failure to properly store power tools can result in damage to powerheads due to old or ethanol based gasoline damaging carburetors and other seals.

f) Signing out Small Engines

i) When signing out small engines a Foundation staff member must be present to assist in the sign-out procedure. The list below are the individuals that are approved to assist. The list is in sequential order which is determined by who is present at the base yard at the time of sign out.

Power tool sign-out staff

George Schneller	Matthew Burt	Jobriath Rohrer	Taylor McCarthy

5. Appendices

a) Chainsaw Signout Log
b) Monthly Chainsaw Maintenance Log
c) Arbor Global safety checklists

Standard Operating Procedure (SOP) for
Safe Use of Power Tools at the Baseyard

1. PURPOSE. The purpose of this SOP is to outline steps to be followed for the safe use of power tools at the baseyard.
2. SCOPE. Includes procedures for field operations with power tools.
3. RESPONSIBLITIES.
   a) Natural Resource Management (NRM) Supervisors: Provide training to NRM Staff on safe use of each power tool before it is used; training may be delegated to other expert staff. Training shall be based on the tool's instruction manual and include a hands-on practical. Review procedures with NRM Staff quarterly to ensure understanding and compliance. Ensure that daily risk assessments incorporate safe practices.
   b) NRM Staff: Use power tools in accordance with SOP. Wear all required PPE.
   c) Failure to comply with this SOP may result in disciplinary action.
4. PROCEDURES. This SOP covers the operation of the following tools: Carpentry Chop Saw, Metal Cut Chop Saw, Shop Bench Grinder, Hand Grinder, Bench Chainsaw Chain Grinder, and Cordless Drill. The following procedures and safety precautions shall be observed by all power tool users:
   a) General Considerations.
      i) Read all manufacturer's instructions carefully before operating a power tool.
      ii) Do not operate power tools when you are fatigued. Be attentive!
      iii) Ensure that power tools are in good working order, with all safety features in place before use. Do not use a tool marked as 'Do Not Use".
      iv) Only use the power tool for the job it was designed to do.
      v) After using a power tool, make sure it is cleaned and stored properly, turned off and/or unplugged. Leave the work area tidy.
      vi) Disconnect the power supply from the tool before conducting maintenance, making adjustments, or changing accessories.
   b) Personal Protective Equipment (PPE): Required PPE varies slightly for different power tools. Please refer to the chart below for minimum requirements.
      i) Protect against entanglement while the tool is in use. Wear snug-fitting clothing. Secure long hair, necklaces, and remove dangling bracelets and earrings.

ii) As with all non-office baseyard activities, closed toed shoes are required.

iii) Wear gloves when handling sharp or hot objects, or if the tool produces intense vibrations.

iv) Ensure electrical safety at all times (no standing water near work areas, extension cords in good condition and properly rated for tool being used etc.).

v) Ensure work areas are free of slip/trip hazards and obstacles, and bystanders are alerted to hazards (sparks, flying debris, dust etc.)

vi) If copious dust is produced (for example, when using a grinder), use a dust mask.

vii) If chips are produced, recommend using a face shield.

5. Power Tool	6. Eye Protection	7. Hearing Protection	8. Long/loose Hair Contained
9. Carpentry Chop Saw	10. X	11. X	12. X
13. Metal Cut Chop Saw	14. X	15. X	16. X
17. Shop Bench Grinder	18. X	19. X	20. X
21. Hand Grinder	22. X	23. X	24. X
25. Bench Chainsaw Grinder	26. X	27. X	28. X
29. Cordless Drill	30. X	31.	32. X

c) Carpentry Chop Saw: This tool is used to cut wood, PVC, plastic, and other materials. Operational safety includes:

i) Use the correct cutting disc for the material and type of cut. Do not use a cutting blade that is cracked, chipped or heavily worn. Use only recommended blade sizes.

ii) Ensure safety features (blade guard, etc.) are secure and functioning. Adjust/repair promptly. Regularly check and tighten blade.

iii) Prior to installing or changing a blade, be sure to lockout or unplug equipment. Ensure that the blade and its related washers and fasteners are correctly positioned and secured on the saw's arbor.

iv) Do not cut materials with embedded nails or screws.

v) Only cut one piece at a time.

vi) Allow the saw blade to obtain maximum speed before making a cut.

vii) Do not hold material in “hand hazard zone.” Keep hands and especially thumbs well clear of line of cut. Hold the piece securely or use clamps to keep the piece against the fence, particularly for angled cuts. Use scrap wood to push pieces through the cut. Never cut freehand.

viii) Support the ends of long pieces at the same height as the table to keep them balanced and level.

ix) Protect the blade by lowering it slowly to the piece; do not drop abruptly.

x) If blade breaks or binds, turn the machine off immediately.

xi) Never reach in to the cutting area until the blade has come to a complete stop.

xii) Once the cut is complete, allow blade to come to a complete stop, then raise it before retrieving cut pieces. Accidental contact with the blade may result in injury.

xiii) Turn off the saw and unplug before clearing out debris around blade. Clean guards regularly to help visibility and movement.

xiv) Potential hazards include:

(1) Contact with rotating blade. Risk of severe wounds, cuts, amputation.

(2) Kickback. Material caught by blade is thrown back at the operator.

(3) Entanglement. Turning blades pull in loose hair, clothing, and jewelry.

(4) Flying chips and debris. Material thrown towards face and eyes of operator.

(5) Dust. Some materials produce copious dust.

(6) Noise. High decibel noise contributes to hearing loss.

d) Metal Cut Chop Saw: This tool is similar to the Chop saw, but is used to make cross-cuts on metal materials.

i) Follow all operational safety directives detailed for the Chop Saw, above.

ii) Additional potential hazards include:

(1) Sparks and heat. Cutting/grinding creates sparks and can generate significant heat, posing a risk of fire and burns.

(2) Heat: Grinding of

e) Shop Bench Grinder and Hand Grinder: These tools are used to remove material from work materials and sharpen tools. Operational safety includes:

i) Ensure that the wheels do not touch the work rest and that the gap between wheel and rest is no greater than 1.5mm (not applicable to hand grinder).

ii) Visually inspect the wheel for irregular wear or damage. Check that wheels are running true and are not glazed, loaded, or loose. Regularly check and tighten wheel.

iii) Ensure all guards and safety features are secure, in position, and functioning before operation. Adjust/repair promptly. Do not remove or modify safety features.

iv) Familiarize self with On/Off switch location and use.

v) Do not cut non-ferrous materials (brass, aluminum, copper, plastics, and wood). These can become embedded in the wheel, create pressure, and shatter it.

vi) Do not distract the operator during grinder use.

vii) Do not hold work piece with gloves, cloth, apron, fabric or pliers.

viii) Very small items should not be held by hand. Use locking clamps. A different tool, like a hand held Dremel, might be more appropriate.

ix) Stand to the side, then turn power on, allow grinder to reach operating speed, and observe for 1 minute. If vibration or rubbing sounds are heard, turn off immediately and lock-out grinder.

x) Once grinder has obtained maximum speed, begin use. Slowly move the work piece across the face of the wheel in a uniform manner.

xi) Do not grind on the side of the wheel.

xii) Never force the work piece against the wheel.

xiii) Do not allow excessive heat to build up in the work piece; take frequent short breaks.

xiv) Do not bend down near the grinder while it is running.

xv) Never leave the grinder running unattended.

xvi) Turn off the grinder when finished. Allow it to come to a complete stop on its own.

xvii) Potential hazards include:

(1) Contact with high speed rotating wheels and shafts. Wheels continue to spin, slowly decelerating after being shut off. Risk of violent release of energy from rotating parts, wheel explosion, abrasions, wounds.

(2) Kickback. Material caught by wheel is thrown back at the operator or caught between improperly adjusted work rests/guards.

(3) Entanglement. Turning wheels pull in loose hair, clothing, and jewelry.

(4) Flying debris. Work materials and equipment can be thrown towards face and eyes of operator.

(5) Sparks and heat. Grinding creates sparks and can generate significant heat, posing a risk of fire and burns.

(6) Sharp objects: Edges sharpened on grinder may be sharp or have burrs.

(7) Dust. Some materials produce copious dust. Depending on the material, this dust may be a physical or health hazard.

(8) Noise. High decibel noise contributes to hearing loss.

f) Bench Chainsaw Grinder: This tool is used to sharpen chains for chainsaws. Operational safety includes:

i) Never use a grinding wheel that has been improperly installed as it may crack and disintegrate during operation resulting in severe injury to the operator. A damaged grinding wheel may disintegrate during use due to high speed operation of the unit. This can cause wheel fragments to eject at very high rates of speed.

ii) Always maintain proper grinding wheel maintenance, check for visible cracks and perform a "ring test." A good grinding wheel will sound a clear musical tone when tapped gently with a metal tool like an Allen wrench.

iii) Do not force a grinding wheel onto the machine or alter the size of the mounting hole. Do not use a wheel that does not fit exactly.

iv) Make sure the mounting-flange nut is serviceable and not damaged in any way. If grinding wheel vibration should occur when the grinder is started, or running, remove and inspect the mounting flange and the grinding wheel.

v) To avoid possible grinding-wheel failure, always allow a new grinding wheel to run at operating speed for at least one minute before grinding or dressing. Dressing the grinding wheel places the fingers of the operator in close proximity to the grinding wheel. Contact with a rapidly turning wheel may result in injury. Wear gloves. Always work cautiously, maintain a strong grip on the dressing brick, and watch what you are doing at all times. Do not use the side of the grinding wheel for grinding.

vi) Check and ensure that the machine is properly secured to bench and that work area is free of tools and other objects including other people. Additionally, make sure the power supply cable is free from grinding area.

vii) Never start grinder without the wheel guard in place.

viii) Never use the grinder as a cutter or for grinding objects other than approved saw chains (see instruction manual for approved chains).

ix) Be sure all safety (and other) devices are in place and in good working condition.

(1) Always keep handgrips clean and dry.

(2) Clean chains before sharpening them (recommended).

(3) Remove adjusting keys and wrenches prior to turning on the grinder.

x) During sharpening operation:

(1) Pay close attention to the location of other people in the work area.

(2) Never stop grinding wheel with your hands, even after turning off motor.

(3) Carefully observe grinding wheel making sure the grinder does not oscillate either laterally or transversally, causing any anomalous vibration.

(4) Never advance the chain with your left hand until the grinding wheel has moved entirely outside the working area. To avoid the risk of cutting oneself, to move the chain, grasp it on the link and not the cutting part.

(5) For precise and easy grinding, grind all teeth of the same type (right-hand) before turning the vise from the opposite side to start grinding the left hand teeth.

(6) Use caution as the motor head can get very hot with use.

xi) After operation:

(1) Turn off grinder, turning the switch to "O" before removing chain.

(2) Clean area wiping up metal shavings using rag or swab. Do not use compressed air, this is likely to bring metal dust in positions which cannot be reached, damaging essential components.

xii) Maintenance and troubleshooting:

(1) Fill the hydraulic circuit with oil periodically.

(2) In case of technical problem, lock-out and tag-out machine and see instruction manual. If unable to fix, contact and authorized service dealer.

(3) Follow instruction manual when replacing grinding wheel.

xiii) Potential hazards include:

(1) Contact with high speed rotating wheels and shafts. Contact with rapidly turning wheel may result in injury.

(2) Kickback. Material caught by wheel is thrown back at the operator. The risk of this is increased if the cutting chain has been altered in any way.

(3) Electric shock. Do not operate in damp/wet areas. Keep power cable grounded and away from grinder action.

(4) Entanglement. Turning wheels pull in loose hair, clothing, and jewelry.

(5) Flying debris. Damaged grinding wheels may crack or disintegrate. Grinding wheel failure can result in high-velocity material being shot towards the operator.

(6) Sparks and heat. Grinding creates sparks and can generate significant heat, posing a risk of fire and burns.

(7) Sharp objects: Edges sharpened on grinder may be sharp or have burrs.

(8) Dust. Metal dust produced. Keep out of eyes.

(9) Noise. High decibel noise contributes to hearing loss.

g) Cordless Drill: This tool is used to drill holes and screws in wood, metal, PVC, plastic, and other materials. Operational safety includes:

i) Only the battery specifically designed for that model of drill can be used with the drill

ii) The battery must be recharged only using appropriate chargers for that model. Monitor charging as faulty batteries or chargers are known to spark and cause fires.

iii) Be sure the drill power switch is in the OFF position before inserting the battery.

iv) Disconnect battery from drill, or turn the power switch OFF, or place the power switch in the LOCKED position before making any adjustments or changing drill bits/accessories.

v) Fit and secure appropriately sized (for the task) drill bit. Ensure bit and chuck are secure and that bit does not wobble.

vi) Remove adjusting keys or wrenches before turning on the drill.

vii) Keep hands and fingers away from the rotating drill chuck and bit. Never stop the rotation of the drill chuck and bit with your hands.

viii) Do not hold material in such a manner that you are drilling in to your hand.

ix) Do not drill materials with embedded nails or screws.

x) Do not overreach. Always maintain proper footing and balance. Tie off as needed, particularly if working on a ladder or at any height above 6 ft. Brace drill with other hand to prevent loss of balance from torque.

xi) Select appropriate drill speed. Turn off drill before changing speed settings.

xii) Back out frequently on deep holes to clean and cool the drill bit.

xiii) To store the drill, place the power switch in the OFF or LOCKED position.

xiv) Potential hazards include:

(1) Contact with rotating parts. Risk of wounds, abrasions, burns.

(2) Entanglement. Turning drills/shafts pull in loose hair, clothing, and jewelry.

(3) Flying debris. Material thrown towards face and eyes of operator.

(4) Dust. Some materials produce copious dust.

(5) Noise. High decibel noise contributes to hearing loss.

5. APPENDICES

a) Yale EHS Bench & Pedestal Grinder Shop Safety Procedure
b) Pedestal Grinder SOP
c) Yale EHS Metal Chop Saw Shop Safety Procedure
d) Yale EHS Wood Miter Saw Shop Safety Procedure

Standard Operating Procedure (SOP) for
Safe Use of Picks, Pulaskis (Forester Axe), Shovels, and Post Pounders

1. PURPOSE. The purpose of this SOP is to outline steps to be followed for the safe use of picks, Pulaskis, shovels, and post pounders in the field.

2. SCOPE. Includes procedures for use of picks, Pulaskis, shovels, and post pounders in the field.

3. RESPONSIBLITIES.

   a) Natural Resource Management Supervisors: Review procedures with Natural Resource Management Staff to ensure understanding and compliance during safety briefings.

   b) Natural Resource Management Staff: Execute operations with hand tools in accordance with SOP.

   c) Failure to comply with this SOP may result in disciplinary action.

4. PROCEDURES. Read all instructions carefully before using a pick, Pulaski, shovel, or post pounder. All users of these tools should observe the following safety precautions:

   a) Do not use a pick, Pulaski, shovel, or post pounder when you are fatigued. If you are uncomfortable or not confident in using a Pulaski, shovel or post pounder don't use it.

   b) Do not use a pick, Pulaski, shovel, or post pounder that is damaged, or is not completely and securely assembled.

   c) When using picks, Pulaskis, or post pounders always clear the work area of material that could deflect the tool causing loss of control and potential injury. For post pounders, this includes low hanging branches, fencing, ropes etc. Be sure to push away any fencing well away from the post pounding area. This can be done by placing one's knee and foot against the panel or a co-worker can hold the fence panel well away from the pounding area.

   d) Your body should be distributed evenly on both legs with feet comfortably spread apart to retain balance, the body should be relaxed and free to pound or swing and bend at the waist and knees. When working on slopes or uneven ground pounding posts, try to place one's body on the upslope side of the t-post and tie oneself off as needed. This will allow for better leverage for pounding and for easier removal of the post pounder off the t-post. If you are lower than the post pounder when pounding, the worker must have both hands on the center of the post pounder when pounding.

   e) Use Personal Protection Equipment: Snug fitting clothing, protective gloves, and eye protection are highly recommended. For post pounding, a helmet, eye and ear protection

are all required. For post pounding work, bystanders should also be wearing eye and ear protection. For Pulaski work, eye protection is required.

f) Keep the handles and gloves dry and clean. For post pounders, a safety lanyard is recommended when working in steep areas.

g) Keep a 5 meter radius around all individuals working with picks, pulaskis, or shovels. Bystanders will be kept out of the work area. When working on slopes with post pounders, give a word of warning when removing the pounder off the post in case of slippage, especially when staff are below the pounding area. When using a Pulaski always determine a retreat path from the falling tree.

h) When swinging a pick or Pulaski:

   i) Do not overreach, do not cut above shoulder height.

   ii) Strike at such an angle that the follow-through will not approach body parts (i.e. shins).

   iii) Grasp the handle with hands close together near the end of the handle; with the right hand as the leading hand closer to the pick head. Position the left foot slightly closer towards the work for proper balance. Bring the pick over the right shoulder, bending the right elbow as the right hand slides up the handle towards the head. On the down swing, let the right hand slide down the handle towards the left hand. At the end of the swing the right hand will be next to the left hand.

i) Carry a pick, Pulaski or shovel by handle near blade. When hiking, carry tool at hip level. If on a slope, carry tools in the hand on the down slope side. Never carry picks, Pulaskis, shovels, or post pounders behind neck or over shoulder. Post pounders can be carried on backs if safely and securely attached to backpacks or carriers.

j) When swinging a pick or Pulaski be aware of the opposite side of head. Always keep in mind that it is a double-sided tool.

k) When swinging a pick or Pulaski ensure that swing path is clear of possible obstructions that may redirect the tool.

l) Be aware of the substrate when using a pick or Pulaski. As soil is loosened, clear away the accumulation as needed. Be careful of bounce back. Do not use the Pulaski as a pry tool as the head is easily broken off with sideward force.

m) When using a Pulaski, use extreme caution when cutting small size brush and saplings, because cut, slender material may be whipped toward you or pull you off balance.

n) When using a Pulaski to cut a limb that is under tension, be alert for spring-back so that you will not be struck when the tension in the wood fibers is released.

o) Use Pulaskis for chopping branches of smaller diameters (1 in.). Use handsaws for larger jobs.

p) Replace Pulaski in sheath when not in use. Never hike with an unsheathed pulaski.

q) Maintenance.

   i) Keep pick, Pulaski or shovel clean and free of rust.

   ii) Keep pick, Pulaski or shovel well sharpened. Never sharpen cutting edges all the way to the foot plate. Use light oil when storing.

   iii) When sharpening the blade, exercise extreme caution. Always wear gloves and ear and eye protection when using a mechanical grinder to sharpen tools. Remove any flammable materials well from mechanical grinding area.

   iv) To sharpen, secure shovel and stroke file across edge in only one direction, maintaining a consistent angle along the blade and on both sides.

   v) Inspect the post pounder daily for cracks along all welds and the top of the pounder in particular. Handles and shaft should be free of all metal burrs that could cause lacerations.

Standard Operating Procedures (SOP) for
Entering Areas with Unexploded Ordnance (UXO)

1. PURPOSE. The purpose of this SOP is to outline safe methods for entering and working in areas designated by Range Control as requiring escort by EOD/UXO personnel, such as Army Explosive Ordnance Disposal (EOD) personnel or private sector UXO personnel. Following these procedures will greatly minimize the risks to you and your fellow workers.

2. SCOPE. Working in areas requiring an EOD/UXO technician escort (hereafter termed 'Escort') can be dangerous, but those dangers can be substantially minimized through proper training and situational awareness. This SOP outlines the procedures for field operations that will allow employees to work safely.

3. DEFINITIONS:

   a) Explosives ordnance disposal (EOD) personnel - Military personnel who have graduated from the Naval School, EOD; are assigned to a military unit with a Service defined EOD mission; and meet Service and assigned unit requirements to perform EOD duties. (DA PAM 385-64).

   b) Unexploded ordnance (UXO) – Explosive or incendiary military munitions that have been primed, fused, armed, or otherwise prepared for action, and have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, personnel, or material and remains unexploded either by malfunction, design, or any other cause (DA PAM 385-64).

   c) Unexploded ordnance (UXO) personnel - Contractor personnel who have completed specialized military training in EOD methods and have satisfactorily performed the EOD function while serving in the military or who have completed a DOD certified UXO Technician Level 1 course. Various grades and contract positions are established based on skills and experience (DA PAM 385-64).

   d) UXO incident: An incident is defined as a sighting of a UXO or any near miss caused by UXO.

   e) UXO accident: An accident is an unfortunate incident that happens unexpectedly and unintentionally, typically resulting in damage or injury with a UXO.

   f) OANRP: Oahu Army Natural Resources Management Program.

   g) OANRP management: OANRP management/supervisory level employees.

   h) PCSU: Pacific Cooperative Studies Unit.

   i) PICHTR: Pacific International Center for High Technology Research.

j) RCUH: Research Corporation of the University of Hawai`i – Human Resources Department.

4. RESPONSIBLITIES

a) Natural Resource Management (NRM) Supervisors:

i) Ensure staff completes UXO training annually (certification to RCUH Office).

ii) Regulate all operations in UXO areas in the field and ensure, either directly or through a delegated field supervisor, that all procedures are followed explicitly.

iii) Work with the Escort to ensure the safety of all personnel present. It is the responsibility of the team supervisor to ensure that the instructions of the Escort are followed at all times, and any hazard assessments conducted by the Escort are shared with all personnel present.

iv) Assume responsibility for all activities of field personnel in UXO areas, including the safety of the Escort.

v) Report all incidents or accidents immediately by radio to Range Control. The supervisor may have the UXO escort relay specific information regarding the UXO to range control and document the communication between Range Control and the UXO escort. A written report using the appropriate forms will be submitted to Range Control no later than the close of business of the day of the occurrence. Duplicates of all reports must be submitted to the Army Biologist no later than the close of business of the day of the occurrence. Forms are discussed below and appended to this SOP.

b) NRM Staff: Execute fieldwork in UXO areas in accordance with SOP under the guidance of an EOD/UXO technician escort.

c) EOD/UXO Technician Escort: The Escort is not a member of staff, but a specialist who accompanies teams in the field to alert them to the presence of UXO.

d) All job descriptions specify employees will be required to work in UXO areas as a condition of employment.

e) Employee Right of Refusal and Reporting Requirement: Any employee participating in field activities in high hazard areas has the right to decline to work in the area if they feel unsafe, without prejudice. Any refusal to work due to safety concerns will be reported directly to RCUH by the employee's immediate supervisor. The report of an employee's refusal to work will be sent to the RCUH Director of Human Resources not later than the close of business of the day of occurrence. An RCUH investigation may be initiated, which at a minimum will include a written statement from the employee. The RCUH investigation may result in follow-up or corrective actions. The employee will be reassigned to other work until the investigation is completed. The corrective action may

require the coordination with U.S. Army Garrison, Hawaii, OANRP management staff, Range, and/or Safety personnel.

f) Volunteers will not be allowed to work in UXO areas.

g) DISCIPLINARY ACTION AND OPERATIONAL STAND-DOWN: Failure to comply with any part of this SOP will result in: (1) An Immediate Program-Wide Safety Stand-Down of all operations in UXO areas pending the completion of an investigation. Investigations will be conducted by program managers and/or RCUH. All investigation reports will be sent to RCUH for review. (2) Due to the serious nature of UXO operations, any violation of this SOP will result in severe disciplinary action (including possible termination of employment).

5. PROCEDURES

Required PPE (see part 5f. for exceptions)	Recommended PPE (for high hazard/density areas)	Required Training (Record of training will be maintained at OANRP Office)
Flak jacket* Kevlar Helmet*	Neck/yoke guard Crotch guard	Safety Briefing with Army or Contract EOD

*The latest version of PPE must be used. The current standard is Level IIIA body armor. Out-of-date PPE (e.g. Vietnam era) must not be used. Ceramic plates are not required.

a) As of April 2019 UXO area procedures have changed. All UXO areas will be cleared of all know historical UXO. All NRM staff must strictly follow the following procedures:

i) No work will be conducted within the Minimum Safe Distance (MSD) of all remaining known UXO. MSD is determined by Army regulation. For OANRP field operations the MSD is 381 meters unless otherwise specified by EOD.

ii) All discoveries of new UXO will be considered a UXO incident, NRM team will retreat immediately to the MSD. Incident reporting procedure will be followed as outlined below.

iii) Reporting requirements: As outlined above it is the NRM Supervisor's responsibility to complete reporting requirements. Daily Activities Report (DAR): Staff will complete a DAR for UXO access days. Regardless of whether there is an incident, DAR forms MUST be turned in to the Army Biologist no later than the close of business of the day of the access. When staff are camping the DAR will be turned in upon return to the base yard.

iv) If an incident occurs (discovery of a new UXO) SUPERVISOR MUST ALSO ENSURE THAT THE 9-LINE IS COMPLETED and turned into range control with a duplicate provided to the Army Biologist. The 9-Line can be completed by the Escort or the Supervisor. However, it is the supervisor's responsibility to ensure that it is complete and turned in to both Range Control and the Army Biologist.

b) UXO Sites. An Escort is required in the following areas, with the noted exceptions:

i) Schofield Barracks West Range, including the Battle Area Complex (BAX). An Escort is not required when working on established roads and fence lines.

ii) Makua Military Reservation. An Escort is required at all locations except the following: established, improved roads; the groomed and surface-cleared areas inside the south firebreak road; the ridge fencelines; and the surface and sub-surface cleared rare plant sites just south of the firebreak road (Hibiscus Patch, Upper Akoko Patch, and Lower Akoko Patch). Additional surface and sub-surface clearing by an Escort is needed whenever ground-disturbance activities, such as outplanting, occur at MMR. There is no access whatsoever to the designated ICM area.

iii) Kahuku Training Area. In operations involving ground disturbance, otherwise UXO escort is not needed in KTA.

iv) Areas previously scanned and cleared by Escorts will be re-scanned and cleared again as directed by Range Control and the Army Safety office.

v) Camping and helicopter landings are allowed in UXO Areas, once the sites have been surface and subsurface cleared by the Escort. All training courses will be supplemented by "tailgate briefings" before each day's entry into UXO areas. At these briefings pertinent start-of-day DAR information will be reviewed and completed.

vi) Remaining DAR information will be completed at end of the day debrief.

vii) All personnel entering areas with UXO will have current CPR and First Aid certifications and are required to carry first aid kits with tourniquets, compression dressing/bandage, and a blood clotting kit.

viii) Explosive Ordnance Disposal (EOD) Unit personnel and/or private sector UXO specialists will accompany all field staff into work areas designated by Range Control.

ix) The Supervisor shall provide the Escort with an overview of the day's planned field activities and review his/her expectations of the Escort for the day. The template at the end of this document may be used for this discussion.

x) The Escort will conduct a safety briefing that must be followed throughout the operation. The DAR will be conducted at Range Control and will be read out loud to everyone; all will acknowledge and sign that they understand each and every statement.

xi) The maximum number of people working in UXO areas with any one Escort is six.

c) Training/Certification – specific training is required to conduct fieldwork in UXO high hazard areas. OANRP staff will complete a pre-project checklist before beginning fieldwork in UXO high hazard areas to verify up-to-date training and certification. The OANRP management will ensure implementation. All required training will be documented and a copy of completion will be inserted in the employee's RCUH personnel file. No employee will be permitted to work in UXO designated work areas until they complete all of the following required training:

   i) Annual UXO Awareness Training (Conducted by Army EOD)

   ii) First Aid / CPR Training

   iii) Hawai`i Occupational Safety & Health Law, §396-6 and §396-8

   iv) Standard Operating Procedure No. 9 (including any updates or revisions)

d) Field Operations.

   i) Field work will be approved by Range Control (normally 48-72 hours in advance). Range Control will be notified when field staff are entering and leaving the range. Field supervisors will maintain radio communication with Range Control throughout the duration of operations; radio checks with Range Control will be conducted every 4 hours. Staff will check in with Range Control when departing the range. Cell phones will be carried as a redundant method of communication.

   ii) Field supervisors will conduct a daily briefing with all staff prior to work in UXO areas. This includes reviewing the DAR, verification and ensuring of field operations via daily risk checklist, equipment, safety gear procedures as well as this SOP.

   iii) UXO Escorts will be tasked with ensuring that OANRP staff take all safety precautions to remain safe while in UXO areas. The team supervisor is responsible for ensuring that team members comply with this SOP and the Escort's guidance at all times. Where other cooperating federal personnel are working in conjunction with the team, the team supervisor is still responsible for all actions that affect the team.

   iv) Teams must practice situational awareness and continually analyze risks and adapt operations as needed to maximize overall safety. Operations will be done primarily along established trails or in areas that have been previously surveyed by UXO specialists (e.g. fenced areas, managed rare taxa sites). Operations requiring survey work or monitoring off of established trails will be planned by the field leader and approved by the Escort. Staff should avoid walking through areas where the ground is obscured and cannot be visually inspected.

   v) All field personnel will wear the current standard flak jackets and Kevlar helmets (Level IIIA body armor) as well as other standard PPE while working in UXO areas other than the surface cleared and groomed areas at Makua Military

Reservation, the area of the Schofield Barracks Battle Area Course, or for surface operations along road corridors. However, staff will be allowed to operate without this gear when the UXO escort, working in consultation with the OANRP supervisors determines that wearing flak vests results is an increased risk to personnel over and beyond that of ordnance risk. Conditions to consider include but are not limited to: obstruction of view and overall reduction of observational capacity; additional weight and strain particularly on steep slopes; higher susceptibility to heat related stresses; and, increased obstruction when operating in thick vegetation or steep slopes resulting in slips and falls.

vi) Do not handle, pick up or kick any metal object under any circumstances without the Escort's approval. Do not throw objects of any kind. When relieving bodily needs, staff shall maintain situational awareness. If a new trail is established, it will be fully flagged, documented and incorporated into OANRP GIS data.

vii) When using firearms to control ungulates in snares and traps, staff should ensure there is no UXO behind the target, and review potential firearm use with the Escort and staff working elsewhere in the area. Operations involving hunting should be planned by the team supervisor and approved by the Escort. Staff must follow procedures detailed in SOP # 26, Firearm Use.

viii) All field operations will cease if lightning and thunderstorms are detected, due to the chance of electrical activity detonating UXO. See also SOP #1, Wildland Hiking Techniques, for precautions to take if lightning and thunder occurs while in the field.

ix) Field operations will be halted during periods of heavy (above normal) stream flow due to the chance of UXO detonations.

e) Any suspicious objects will be immediately reported to the Escort and must not be touched. If previously undiscovered surface or sub-surface UXO is found:

i) <u>Avoid, Mark, Record, Retreat to MSD, Report</u>

ii) At no time will field staff touch or in any way disturb anything appearing as possible UXO. The Escort must immediately be notified of the find.

iii) All personnel must retreat to the Minimum Safe Distance (MSD) of not less than 381 meters from the UXO. The Escort will evaluate the item and determine if the item is UXO. If the UXO escort determines the item is NOT UXO, personnel may return from the MSD and continue work. If the item is identified as UXO, the UXO escort will mark UXO with orange/yellow tape (below), collect a GPS point and photo of the item (if safe to do so) and then retreat to the MSD. The escort may coordinate with the Supervisor to use a staff camera and phone or GPS to mark the UXO item.

UXO Flagging

iv) The Supervisor or the Escort MUST notify Range control via radio of the UXO incident immediately. The supervisor will document the time this report is called into Range Control on the DAR. The written 9-Line MUST be turned into range control by close of business on the same day as the incident. It is the Supervisor's responsibility to ensure it is turned in.

v) The 9-Line form appended to this SOP MUST be completed by the Escort or the supervisor. This form contains the information required by Range Control for reporting of newly discovered UXO. If UXO are found, staff can call the base yard with GPS point to convert to 10 digit grid.

vi) Upon returning to the baseyard, staff MUST turn in GPS data to the GIS specialist, and turn in the DAR and copy of the 9-Line (if UXO found) to the Army Biologist.

Army Explosive Ordnance Disposal specialist inspecting a live 155 mm round at Schofield Barracks West Range

f) Restrictions apply for sub-surface work in UXO areas:

i) Areas where sub-surface work (e.g., fencing, outplanting) will be conducted must be toned at least twice by the Escort, preferably from different directions. For fence posts and Seibert posts, the position of each post will be agreed upon by the field supervisor and Escort, and toning will survey to a depth of eighteen inches. The acceptable cleared area must be indicated with either a spot marking or a continuous line before any further work is conducted. If the Escort runs out of marker, field operations for that day will be terminated.

ii) No excavations or post driving will be conducted in an area where subsurface toning detects a buried object. Another position will be chosen and toned.

iii) During sub-surface clearing by the Escort, staff must not be in the immediate area and should stand behind protection. Only after the line or area is approved may staff conduct ground-disturbance activities.

g) If UXO is found off Army lands the same field procedures apply (Avoid, Mark, Record, Retreat to MSD, Report). However, reporting procedures depend on the land jurisdiction. SNRMC and Federal Biologist will direct the process.

h) Working in the Radiologically Controlled Area (RCA): The RCA lies within the Schofield Battle Area Course. Rounds containing Depleted Uranium (DU) were found in this region in 2005. DU is emits alpha radiation, which is blocked by clothing and skin, and is a considered a low risk hazard. All the known DU was removed when the Battle Area Course was constructed, and there is a low likelihood of encountering any DU. If staff suspect that they have found DU, which is yellow in color, the Garrison Radiation Safety Officer (GRSO) must be notified. All access points into the RCA are noted with physical barriers (chain gates, cones, signs). Staff shall only enter and exit the RCA at designated entry points. Staff shall radio Range Control when entering the RCA.

i) Required Annual Training - Staff must take DU training prior to working in the RCA. This training is annual, and is conducted by the GRSO. Record of training will be maintained at OANRP Office and be available for inspection as needed.

ii) Staff shall not eat, drink, smoke, apply cosmetics or sunscreen, or relieve bodily needs in the RCA. Staff may drink water in the RCA, if the water bottle does not leave the vehicle.

iii) Any body part or gear which touched the ground within the RCA must be frisked prior to leaving the RCA. Staff shall radio Range Control when ready to leave the RCA. Range staff will meet NRM staff at one of the designated entry points, frisk staff (generally hands and feet), vehicle (tires, floor mats), and gear. If no contamination is detected, staff may exit the RCA. If contamination is detected, the GRSO will be notified and will direct decontamination procedures.

6. REFERENCES

a) USAG-HI DPW CRS UXO High Hazard Area Fieldwork
b) AR 385-10, 24 Feb 17, subject: The Army Safety Program
c) DA PAM 385-30, 2 Dec 14, subject: Risk Management
d) DoD 4715.11, 10 May 04, subject: Environmental and Explosives Safety Management on Operational Ranges Within the United States
e) AR 385-63, 30 Jan 12, subject: Range Safety
f) DA PAM 386-63, 16 Apr 14, subject Range Safety
g) DA PAM 385-64, Ammunition and Explosives Safety Standards

7. APPENDICES

a) Types of UXO
b) Serious Incident Report, Installation Operation Center, Schofield Barracks
c) UXO DAR and 9-line form

Review and Concurring:

Agency	**Signature**	**Date**
David C. Duffy, PCSU		
Dennis Teranishi, PICHTR		
Nelson Sakamoto, RCUH		
USAGHI Safety Office		
USAGHI Range Control Office		

Standard Operating Procedure (SOP) for Fleet Management

1. PURPOSE. The purpose of this SOP is to ensure that ANRP employees drive responsibly and safely when conducting their duties and that project vehicles are operated and maintained in a responsible way.

2. SCOPE. Provide directions for project vehicle use, maintenance, and accident/incident reporting. Project vehicles are classed into three types - General Services Administration (GSA, aka Federal vehicles), State of Hawaii, and Pacific International Center for High Technology and Research (PICHTR). Personal vehicles may be used for work purposes at times. Policies, procedures, and insurance coverage differ depending on which type of vehicle is used. The U.S. Army Garrison Directorate of Emergency Services brochure on safe driving is attached. The policies detailed in the brochure are considered as requirements under this SOP

   These regulations are exclusive to ANRP employees and are conditional on Army regulations and current insurance requirements. These provisions may be subject to change if the above regulations or requirements change.

3. RESPONSIBLITIES.

   a) Natural Resource Management Coordinators and Supervisors: Review policy and procedures with Natural Resource Staff and during recruitment for new staff to ensure understanding and compliance.

   b) Natural Resource Staff: Conduct vehicle operation in a safe and law/regulation abiding manner. Notify their supervisor immediately of any change in their driving eligibility and conviction on moving violations.

   c) Execute vehicle maintenance and cleaning in accordance with this SOP.

   d) Failure to comply with this SOP may result in disciplinary action.

4. PROCEDURES. The ability to drive project vehicles is an essential requirement of your job. In so doing you take on an extra responsibility of protecting the public and government. Reviews of driving infractions will be conducted on a case by case basis to determine consequences and possible restrictions to work driving privileges. If ANRP cannot make a reasonable accommodation for the revocation of your driving license or loss of privileges for driving on base, your employment will be terminated. Should you use your personal vehicle for work purposes, valid personal automobile insurance is required as stated in the RCUH Automobile Mileage Reimbursement Policy 2.602.

   a) RCUH/PICHTR involvement: All people driving project vehicles must have a valid driver's license. People whose license have been revoked or have been issued a

temporary license will not be allowed to drive any work vehicles and may be subject to disciplinary action including and up to termination of employment. People with a temporary license will be allowed to drive their own vehicles in accordance with any restrictions imposed by the courts (e.g. to and from work only). **Employees will be required to notify their supervisor and RCUH/PICHTR no later than the start of the next workday of any change in their driving eligibility and citation for any moving violations.** Failure to do so will result in disciplinary action. In the case of a DUI citation the restriction is applied immediately on receipt of the notification. For all other cases, any restriction will be applied only on conviction. All employees must complete the NSC Defensive Driving Course before being allowed to drive project vehicles. Restrictions for driving work vehicles for convicted offenses incurred while driving personal or government vehicles are outlined in the Garrison brochure included at the end of this document.

Offense: DUI (upon receipt of citation)	**Length of suspension from driving project vehicles**	**Other Consequences**
1st	12 months **and** driver's license must be reinstated by the court (whichever is longer).* *12 months suspension may be extended if driver's license has not been reinstated by the end of 12 months; if driver's license has been reinstated before 12 months, the employee still needs to complete the 12 months' probation.	Required to take substance abuse course, safe driving course on own time and expense, NSC Defensive Driving course, and any other remedial actions required by the court. Cannot use personal vehicle for work purposes other than commuting and may be subject to further disciplinary actions including and up to termination of employment.

b) For Federal (GSA), State and PICHTR vehicles:

i) General rules: Vehicles will be signed out on a daily basis, inspected to ensure that the vehicle is in sound operating condition, and the date, time out-in, ending odometer, operator's name and signature, and gas/oil expenditures recorded on the vehicle's dispatch log. Vehicle logs should reflect all destinations and any stops made to confirm inquiries regarding vehicle usage.

(1) Work vehicles are for official use only. Staff must never detour from direct routes between the baseyard and worksite for any non-work-related business.

(2) All operators must have their valid driver's license with them and be current on the NSC Defensive Driving Course.

(3) Federal (GSA) vehicles are only allowed to be driven by staff with CAC cards who have completed the NSC Defensive Driving course.

(4) PICHTR vehicles are only allowed to be driven by staff that have been added to the project's private PICHTR insurance. Staff may not drive PICHTR vehicles until approved.

(5) To avoid being a victim of theft, employees should not leave valuable items in work vehicles. Loss of personal items will not be covered by the project.

(6) Do not leave the General Services Administration (GSA) or Aloha GasGas credit cards visible while the vehicle is unattended. Remove binder and credit cards when dropping off trucks at auto repair shops.

(7) All work vehicles must have a first aid kit and fire extinguisher; the kits and extinguisher will be stored inside the passenger compartment and not in the bed of a truck. The extinguisher will be secured to prevent accidental discharge.

ii) Operating rules. All City and County of Honolulu and U.S. Army Garrison driving rules and regulations will be followed.

(1) Prior to vehicle use, all operators must check tire pressure for each tire on the vehicle and subsequent vehicle being towed. (Chipper/Trailer)

(2) Observe posted speed limits at all times and when driving program vehicles.

(3) Wearing seat belts is **mandatory** for all passengers (including rear passengers).

(4) The driver of the vehicle must wear closed toed shoes. Passengers must wear appropriate clothing and footwear for the upcoming mission.

(5) Supervisors will ensure that employees driving non-standard vehicles or vehicles with trailers are licensed and experienced in those categories.

(6) Passengers should refrain from distracting the driver while s/he is operating the vehicle unless warning her/him about a potential safety hazard or accident.

(7) Passengers shall assist the driver by alerting for hazards and assisting with navigation. This includes getting out of the vehicle and checking for obstructions in tall grass, soft shoulders, and other hazards.

(8) Drivers should exercise caution when forced to drive through dry grass areas given the risk of starting a fire from the undercarriage. Do not park in those areas and check for ignition when driving slowly in those dry, grass areas.

c) Prohibited activities.

i) Staff must never detour from direct routes between the baseyard and worksite for any non-work related business. Stops for various purposes should be documented on the vehicle log should any usage inquiries arise.

ii) There will be no riding in the bed of a truck or in the back storage compartment of an SUV.

iii) Drivers may not eat, drink, text, and/or talk on radios while driving. Drivers may not use cell phones while operating a vehicle unless they are using a hands-free device.

iv) There is no smoking or vaping in a project vehicles.

v) Wearing other portable headphones, earphones or other listening devices while operating a vehicle is not allowed.

d) Fueling: Federal vehicles may be re-fueled at on-post gas stations. Only unleaded regular fuel may be purchased on the GSA credit card. Drivers must use self-service fuel pumps to the fullest extent possible.

i) Employees may not purchase gasoline or motor oil at on-post stations for State or personal vehicles.

ii) Do not use cellular phones while at a gas station; it is hazardous.

iii) State and PICHTR Vehicles: <u>The license plate number for program vehicles must be written on the gas receipt and receipts must be turned into administrative staff immediately upon returning to base.</u>

iv) Federal Vehicles: Receipts for Federal vehicles must be kept with the Dispatch Record and submitted to Department of Logistics (DOL).

e) Maintenance: The exterior and interior of all vehicles will be cleaned prior to the first day of use of the work week. For example, cleaning may be done Thursday prior to the close of business or Monday morning before being taken out.

i) The interior windows will be cleaned to prevent hazy/streaky visibility for the driver and passengers.

ii) Mud, grass, and dirt from the wheel wells and under the vehicles need to be removed to prevent the spread of weed seeds. When necessary, muddy or dirty vehicles will be cleaned immediately after returning from weed infested areas.

iii) The interior of the vehicles will be cleaned and vacuumed to remove weed seeds/mud tracked into the vehicles by crews working in weedy areas. This is especially important when going from the Koolau mountain range to the Waianae mountain range and vice versa.

iv) Cleaning is mandatory when vehicles visit sites of incipient weed infestations. These areas include but are not limited to KTA (Melochia umbellata, Cenchrus setaceus, Acacia mangium, Chromolaena odorata), and SBE (Cenchrus setaceus, Chromolaena odorata, Schizachyrium condensatum, Rhodomyrtus tomentosa), and SBW (Chromolaena odorata).

v) All Federal vehicles must be dispatched at the end of the month. This requires taking the clean vehicle to the Dispatch Office. The completely filled out Dispatch Record, Vehicle Inspection Checklist, Daily Vehicle Inspections, driver's license and accident avoidance card need to be presented to the Dispatch Office.

vi) Administrative staff track fleet maintenance needs for all program vehicles.

(1) For foundational trucks, admin staff schedule and ensure maintenance is completed as needed before deadlines (safety, registration, insurance cards). Foundational staff assist with delivery and pick up.

(2) For team trucks (Blue, Green, Orange, Ungulate, Ecosystem Restoration, Horticulture, and Outreach) admin staff inform coordinators/supervisors of deadlines and available locations for service. **It is the team's responsibility to contact maintenance shops, make appointments, and complete needed maintenance before deadlines.**

f) All accidents, including noticeable dents and deep scratches, must be reported to supervisory staff and RCUH/PICHTR as soon as possible or within 24 hours. Failure to report damage or accidents is considered a serious matter. Incidents involving scratches and dents can be avoided:

i) Scratches caused by vegetation may be minimized if the vegetation is cut back prior to driving through.

ii) Dents and damage can be avoided by being more aware of the environment, using spotters or checking areas for hazards.

iii) Stopping and removing large debris on the road (and not simply driving over it) will help prevent damage to the undercarriage.

iv) Program vehicles are inspected monthly for damage by administrative staff. If unreported damage is found, administrative staff will investigate causes and disciplinary action may follow for not reporting damage.

v) If a Federal vehicle is involved in an accident, follow the incident/accident procedure in the vehicle's dispatch binder

g) Vehicle Damage: Driving a project vehicle is a privilege, not a right. If you damage a project vehicle while operating it you will be reprimanded and if it is sufficiently egregious your employment could be terminated. Should vehicles be damaged, staff responsible for the damage will also be expected to assist in the repair process. You

should assess potential hazards as you approach them and take precautions (e.g. use spotters) to prevent damage to the vehicle, yourself and any passengers, as well as to other people in the area. Special care should be taken when driving vehicles off-road and when reversing. You should be fully aware of all the hazards around you at all times.

i) Small scratches, etc., should be reported so that some preventive paint or other action can be carried out to prevent rust or further deterioration.

ii) If the dent is large or the damage has to be repaired in order for the vehicle to be roadworthy you will receive a verbal warning and you may be required to retake 4-WD training. Two such occurrences within two years will result in a written reprimand the second time. A third could result in the termination of your employment.

iii) If a person is injured as a consequence of your driving, you will receive a written reprimand and be disqualified from driving program vehicles for at least six months. You will not be allowed to drive program vehicles until you have taken the State of Hawaii Safe Driver course.

iv) Accidents where you were determined to be at fault (based on either a police citation, court conviction, and/or an internal accident investigation), will result in your receiving a written reprimand. You will not be allowed to drive program vehicles until you have taken the State of Hawaii Safe Driver course. Two such occurrences within two years will result in your termination.

v) When the damage occurs because of some unforeseeable situation or event these disciplinary actions will not be taken.

5. APPENDICES

a) Vehicle Sign-out and Mileage/Fuel and Oil Log Daily
b) Vehicle Inspection Checklist
c) Army Driving Pamphlet
d) Hawaii Drivers Manual

Standard Operating Procedure (SOP) for
Safe Use of Hand Tools: Hand Saws, Hand pruning shears, Hand axes, and Pocket knives

1. PURPOSE. The purpose of this SOP is to outline steps to be followed for the safe use of Hand tools are defined as any non-mechanized tool used in the field for cutting, for example hand saws, pruning shears, axes, hatchets, pocket knives, and loppers. Not included are digging tools (SOP #8) or field knives (SOP #12).

2. SCOPE. Includes procedures for field operations.

3. RESPONSIBLITIES.

   a) Natural Resource Management Supervisors: Review procedures with Natural Resource Staff to ensure understanding and compliance at safety briefings.

   b) Natural Resource Staff: Execute use of hand tool in accordance with SOP.

   c) Failure to comply with this SOP may result in disciplinary action.

Weed control hand tools including hand pruning saw, hand axe and 500 ml Applicator bottle with 20% Garlon 4 in biodiesel carrier oil

4. PROCEDURES. Read all instructions carefully before using a hand tools. All users of hand tools should observe the following safety precautions:

Required PPE	Suggested PPE	Required Training
• Safety Footwear	• Eye protection • Protective Gloves	

a) Be cognizant of the risk of eye injury when using hand tools. Chips from axes can fly unpredictably. Vegetation under tension can spring in unexpected directions when cut. Moving cut vegetation often brings branches and leaves close to eyes. Use eye protection when hazards exist.

b) Do not use hand tools, axes and saws when you are fatigued.

c) Do not use a hand tool that is damaged or is not completely and securely assembled. Carefully inspect tools and sheaths before and after each use.

   i) For hand saws ensure the saw blade is securely locked in the open position before and during use. Blade teeth and surfaces should be free of rust, tree gum, and chips. Ensure handle and blade is secure on long bladed tree pruners.

   ii) For hand pruners ensure that the hinge, spring and lock are correctly functioning.

   iii) For hand axes ensure there are no deformities or cracks on the blade or shaft and that the grip is in good condition. Blade must also be sharp and even.

   iv) For pocket knives ensure all hinges are operational and that locks are functioning.

d) With hand saws and axes, do not start cutting until you have a clear work area, secure footing, and a planned retreat path from the cut material. Long bladed tree pruning saws can be just as effective as a chainsaw and should be treated with the same precautions when felling and pruning.

e) Keep the handles and gloves dry and clean.

f) When using the hand pruning saw and axe, do not overreach and do not cut above shoulder height.

g) With all tools hold them firmly and focus on the task to ensure avoidance of careless mistakes.

h) With hand saws start cutting carefully and slowly to avoid jumping of the blade. Saws cut in the pulling motion rather than a pushing motion. Tips break easily when saws are forced into cuts.

i) With hand saws, when cutting a limb that is under tension, be alert for spring-back so that you will not be struck when the tension in the wood fibers is released.

j) With hand saws, be alert to slash and other material that may be resting on the branch or tree being cut that may fall uncontrollably after tension is released.

k) Be aware of where the slash will fall when cutting with hand pruning saw. Ensure that all other personnel are clear of the fall area including adjacent snags. Do not place yourself directly below material being cut and be alert to sudden movement and swinging debris particularly when cutting rotted wood.

l) Prune branches appropriately and cut stumps close to the ground to prevent hazards to hikers.

m) Close or sheath hand tools when not in use.

n) Do not use hand tools near any electrical conductors (wires) to prevent electrical shock.

o) Use wire core lanyards when using saws during tree climbing or other rope operations.

p) Mark hand tools with flagging or other method to prevent injuries and tool loss.

Standing Operating Procedure (SOP) for
Safe Use of Field Knives

1. PURPOSE. The purpose of this SOP is to outline steps to be followed for the safe use of field knives in the field. Field knives are defined as "edged tools with a metal blade of any length."

2. SCOPE. Includes procedures for use of field knives in field operations.

3. RESPONSIBLITIES.

   a) Natural Resource Management Supervisors: Prior to field knife usage staff will be evaluated for safe work practices and understanding of tool capacities and dynamics. SOP procedures will be used as key points in evaluation.

   b) Natural Resource Staff: Execute use of field knives in accordance with SOP.

   c) Failure to comply with this SOP may result in disciplinary action.

4. PROCEDURES. Field knives are dangerous tools. Determine if a field knife is necessary for the job. If not, use another tool. Read all procedures carefully before using a field knife. The following safety precautions must be demonstrated to supervisors before staff can use field knives at work.

Required PPE	Suggested PPE	Required Training
• Safety footwear • Eye protection • Wrist safety strap attached to field knife handle.	• Protective gloves • Long sleeves can reduce exposure to wood chips and sap.	• Training and proficiency evaluation by designated staff.

   a) Do not use a field knife when you are fatigued.

   b) Do not use a field knife that is damaged or is not completely and securely assembled. Carefully inspect tool before each use.

   c) Ensure that there is room to swing the field knife freely. Brush or branches in the line of swing can deflect the stroke and cause injury.

   d) Do not start cutting until you have a clear work area, secure footing and a planned retreat path.

   e) Keep the handles and gloves dry and clean. Use grip tape on the handles as needed.

   f) Keep a 5-meter radius around all individuals working with field knives. Keep bystanders and animals out of the work area.

g) Utilize wrist safety strap to maintain control of field knife.

h) Do not overreach, do not cut above shoulder height.

i) Strike at such an angle that the follow-through will not approach body parts (i.e. shins).

j) When cutting grass and light brush, swing the field knife horizontally.

k) Use extreme caution when cutting small size brush and saplings, because when cut, slender material may be whipped toward you or pull you off balance.

l) When cutting a limb that is under tension, be alert for spring-back so that you will not be struck when the tension in the wood fibers is released.

m) Use field knives for chopping branches of smaller diameters. Use handsaws for larger jobs.

n) During the dry season, beware of sparks that can be produced by tools striking a rock or other object and start a fire.

o) Do not use near any electrical wires to prevent electric shock.

p) Replace field knife in sheath when not in use. Never hike with an unsheathed field knife.

q) Maintenance:

    i) Keep field knife sharp, clean and free of rust. Use light oil when storing.

    ii) When sharpening the blade exercise extreme caution. Always wear gloves and eye protection.

    iii) To sharpen, secure field knife and stroke file across edge in only one direction, maintaining a consistent angle along the blade and on both sides. Nicks and dulled edges should be removed with a smooth round file. Badly damaged field knife blades can be restored by using a grinder. Do not overheat the blade so that it loses its tempering.

Standing Operating Procedures for Fall Protection

1. PURPOSE. The purpose of this SOP is to outline the procedures for the safe use of fall protection gear.

2. SCOPE. Includes procedures for field operations.

   a) Assuming circumstances including weather, equipment being carried, and substrate stability are normal; traversing steep terrain is part of the Position Descriptions for all Natural Resource Management Technicians, Coordinators, Specialists & other staff. Some areas where we work are steep and precipitous so that a hand line or hand holds are needed to cross safely. This activity and all required safety considerations are covered by the Hiking SOP. This should cover techniques needed for most of the terrain the ANRP works in. However, there are two scenarios where authorized equipment and techniques can be used to access steep terrain for specific work tasks not covered in Hiking SOP (High Angle Rappelling Operations SOP #14 and Tree Climbing SOP #15). The following scenarios require the use of ropes and rappelling equipment and are NOT within the scope of this SOP:

   b) Scenario 1, High Angle Rappelling Operations SOP #14: Other work sites occur directly on and around high-angle cliffs so that ropes are needed to perform tasks on the cliffs such as rare plant and snail monitoring and collection, weed control, and fence construction.

   c) Scenario 2, Tree Climbing SOP #15: Tree removal, snail and predator removal searches are the most common operations in which tree climbing gear is required

   d) When both hands are needed to perform a task on a slope (that could otherwise be accessed with hand holds or a hand line under the Hiking SOP), fall protection gear and techniques as described in the Fall Protection SOP are required. These areas are contrasted with areas where the terrain is too steep that vertical rappelling techniques are needed for work positioning or tree climbing. In fall protection operations, the line remains slack while moving into position and then is used as a safety backup once conducting work with both hands. Equipment and techniques applied in this SOP are used as a safety backup and not as climbing aids.

   e) Fall protection is also required when working above one's height (greater than 6 ft.) during certain construction activities (e.g. roof construction or maintenance). Fall protection can also be railings and other safety measures to protect against falls.

3. RESPONSIBLITIES.

   a) Natural Resource Supervisors: Review procedures with Natural Resources Staff (NRS) to ensure understanding and compliance during safety briefings.

b) Natural Resource Staff: Execute use of equipment in accordance with SOP.

c) Failure to comply with this SOP may result in disciplinary action. A total suspension of fall protection activities will occur if a work-related injury occurs during operations. A RCUH investigation will determine whether activities may or may not resume.

4. PROCEDURES. Working in areas were fall protection is required is an optional activity for NRS and staff may refuse to participate in operations in these areas without consequences.

Required PPE	Suggested PPE	Required Training
• Fall protection harness • Helmet • Gloves • Appropriate Footwear	• Eye protection is recommended in most environments	• Fall Protection or Rappelling/Rope work

a) Fall protection procedures will be used by NRS in areas where slips and falls may result in catastrophic injury and the nature of the work requires staff to have their hands engaged in activities other than assisting in traversing such areas. An example of this is working on fence construction on a narrow ridge crest or during roof construction and maintenance.

b) All personnel will complete initial and refresher trainings so they are proficient in proper techniques to be implemented in the field. In lieu of fall protection training, rappelling trainings and annual refresher trainings can suffice.

c) All operations will be approved by Range Control for work on Army lands. Radio communication with base will be maintained until mission is completed.

d) All personnel involved with operations requiring fall protection will have current CPR and First Aid certification.

e) All fall protection operations will require at least two staff. With the exception of emergency situations, when work requiring fall protection equipment is ongoing at least one staff at the worksite must be unattached to the system and able to respond to an emergency. Staff must have a radio and cellular phone for emergency situations. Talk about handheld radios are also recommended.

f) All gear will be cleaned and inspected before and after each use. Redundant safety equipment will be used during all operations.

g) Abrasion barriers will be placed between the rope and any substrate that may damage the rope during rappelling and other rope operations.

h) All ropes, lines, and webbing will be retired following guidelines set by manufacturer as far as maximum life in service or after any damage is noted during safety checks or if they sustain any dynamic strain. Dynamic strain is defined as a fall against a rope that was previously unloaded with weight such that the rope was slacked then snapped tight by the force of the load falling against it. The load must be at least fifty pounds. Damage

required to retire a rope must be either extensive enough to the sheath that the core is exposed. Any damage at all to the core will require retirement. All gear will be retired and removed from service such that gear will not be available for rappelling operations.

i) All gear will also be inspected quarterly and notes taken on the gear condition on the attached form. Rope Logs will be completed and maintained on all ropes used in the project.

Quarterly Climbing Gear Inspection Log

FALL PROTECTION GEAR
Fall Protection Harness
Carabiners (2)
Fall protection lanyard
Gloves
Helmet
Eye Protection
Rope
Anchor straps
Fall Arrester
Ascender
Prussic, Webbing, Lanyard

Standard Operating Procedures (SOP) for
High Angle Rappelling Operations

1. PURPOSE. The purpose of this SOP is to outline the procedures for the safe use of ropes in field operations.

2. SCOPE. Includes procedures for field operations.

   a) Assuming circumstances including weather, equipment being carried, and substrate stability are normal; traversing steep terrain is part of the Position Descriptions (PDs) for all Natural Resource Management Technicians, Coordinators, Specialists & other ANRP personnel. Some areas where we work are steep and precipitous so that a hand line or hand holds are needed to cross safely. This activity and all required safety considerations are covered by the Hiking SOP. The Hiking SOP covers techniques needed for most of the terrain the ANRP works in. However, there are two scenarios where authorized equipment and techniques can be used to access steep terrain for specific work tasks not covered in Hiking SOP (High Angle Rappelling Operations SOP #14 and Tree Climbing SOP #15). The following scenarios require the use of ropes and rappelling equipment and are within the scope of this SOP:

   b) Scenario 1, High Angle Rappelling Operations SOP #14: Other work sites occur directly on and around high-angle cliffs so that ropes are needed to perform tasks on the cliffs such as rare plant and snail monitoring and collection, weed control, and fence construction.

   c) Scenario 2, Tree Climbing SOP #15: Tree removal, snail and predator removal searches are the most common operations in which tree climbing gear is required

ANRP Personnel approved for High-angle Rappelling operations as of April 2019

Foundational	Green	Blue	Orange
Joby Rohrer SM	Scott Heintzman SM	Missy Valdez SM	Jamie Tanino SM
Dan Adamski SM		David Hoppe-Cruz RW	
Vince Costello SM			

SM= Site Manager Level III
RW= Rope worker Level II

3. RESPONSIBLITIES.

   a) Natural Resource Supervisors: Review procedures with staff annually to ensure understanding and compliance. Ensure personnel has completed rappelling training.

b) Natural Resource Staff: Execute use of ropes in accordance with SOP. Rappelling is an optional activity and personnel may refuse to participate in any rappelling activities at any time without consequences.

c) Failure to comply with this SOP may result in disciplinary action. A total suspension of rappelling activities will occur if a work-related injury occurs because of rappelling operations. A RCUH investigation will determine whether rappelling activities may or may not resume.

4. PROCEDURES. The following describes training, equipment, and procedures required for conducting rappelling operations.

Rappel training: HFD training center

a) TRAINING

i) All ANRP personnel certified for rappelling will complete an initial training course to certify that they are proficient in proper techniques to be implemented in the field. These techniques include rigging, rappelling, ascending, operating a rescue haul/lower, and performing a single person pickoff rescue. Evaluations will be completed annually in order to reassess proficiency using the Rappelling & Fall Protection Certification Checklist. Personnel that demonstrate all skills proficiently will be certified as a Rope Worker. Personnel that have at least one year of experience and have demonstrated a high-level of proficiency will be certified as a Site Manager. At least one Site Manager must be present while conducting rappelling operations. The roles and responsibilities are:

Site Manager	Rope Worker
• Oversight of anchor selection, rigging, and procedures and PPE used by each staff • Manage safety (PPE, communications, risk assessment, work plan, rescue plan) for rappelling operations • Determine the serviceability of all equipment • Direct rappelling operations	• Installation and inspection of anchor, rigging and PPE used by each staff • Rappelling and ascending under direct supervision of a Site Manager • Determine the serviceability of all equipment

ii) All personnel involved in operations using ropes will be trained in rare plant identification in order to prevent damage to protected species while on rope.

iii) (3) All personnel involved in operations using rope do so of their own volition and shall never be punished for refusal to do so.

iv) (4) Only essential personnel will be certified to rappel. Rappelling will be limited to the senior staff with most experience and with the knowledge of the resources being monitored. No more than ten personnel will be certified at any time. This will ensure that these personnel remain proficient in rappelling skills.

v) (5) All personnel certified for rappelling operations must participate in a minimum of one operation for a total of five hours on rope every six months. All personnel must participate in a minimum of 10 hours of rappelling operations each year to maintain their competency. The time that each personnel spends on rope for each operation must be documented.

vi) (6) All personnel involved with rappelling operations will have current CPR and First Aid certification.

b) EQUIPMENT

i) All equipment will be manufactured specifically for climbing, rescue or similar fall protection and only used for that purpose. All equipment will be purchased through reputable suppliers and used within the limits established by the manufacturer.

ii) All gear will be cleaned and inspected by the user before and after each use. Any equipment that does not pass inspection will be removed from service until it is repaired or replaced. In addition, all equipment must be inspected quarterly using the inspection forms provided by each manufacturer. All inspection results must be entered on the ANRP Database. These records must be stored until the equipment is no longer in use. Equipment will be stored in a secured, clean and dry environment.

iii) Rope and Equipment Use Logs must be completed and maintained on all ropes and equipment to track the time in service using the following fields:

(1) Manufacturer & model
(2) Serial number or other unique tag (tape color for ropes)
(3) Date of Purchase
(4) Current personnel equipment is assigned to
(5) Equipment Type (Connector, Rope Grab, Rope, Helmet, Harness, Lanyard)
(6) Rope Length & diameter
(7) In service date & out of service date
(8) Date, user, location of use, and time in service each day used

iv) All ropes and equipment will be retired following guidelines set by manufacturer as far as maximum life in service or after any damage is noted during safety checks or if a rope sustains a dynamic strain. Dynamic strain is defined as a fall against a rope that was previously unloaded with weight such that the rope was slacked then snapped tight by the force of the load falling against it. The load must be at least fifty pounds. Damage required to retire a rope must be either extensive enough to the sheath that the core is exposed. Any damage at all to the core will require retirement. All gear will be retired and removed from service such that gear will not be available for rappelling operations. Guidelines provided by the manufacturer (mostly Petzl) will be used to inspect all equipment and determine if it can be returned to service or retired.

v) Rappelling operations require the use of the following PPE:

REQUIRED PPE	**RECOMMENDED PPE/GEAR**
Climbing harness	Vest with pockets
Climbing helmet	Handheld radio/talkabouts
Gloves	Camelback backpack for water
Knife	
Eye protection	
Appropriate footwear (tabis, spiked or non-spiked boots)	

Rare plant monitoring on rappel

c) PROCEDURES

i) Rappelling and other rope techniques will be used to traverse steep areas to access work sites and/or access cliff areas to monitor plants, rare snails, control weeds and to construct fence.

ii) All rappelling operations will require at least two certified personnel and appropriate rescue equipment must be available on site (two sets of rappelling gear, rescue haul/lower, radio, phone, first aid kit). In the event of an emergency, SOP #3 Emergency Response will be followed.

iii) Radio communication with ANRP base will be maintained until rappelling operations are complete.

iv) An Daily Risk Assessment to cover weather, field gear, communications, and safety considerations must be completed before leaving for the field. In addition when on site, a Rappelling Site Assessment must be conducted including a review of the Rappelling Site Description before operations can begin.

v) An ANRP Rappelling Site Description will be prepared for each site when repeat visits are needed. It should include considerations such as anchor locations, flagging scheme, rope lengths used, and a rescue plan.

vi) All operations will be performed in areas free of loose substrates. Rocks and other debris must be removed from the slope before proceeding below such hazards. If the area cannot be cleared and secured, another route must be selected.

vii) A helmet zone in which everyone wears a helmet at all times will be established. The helmet zone must include: the top of the site, within 20 feet of the base of the work area, any route which requires the use of ropes, and any area subject to falling objects.

viii) Abrasion barriers will be placed between the rope and any substrate that may damage the rope during rappelling and other rope operations.

ix) Anchors should be E.R.A.N.E.S.T, that is equalized, redundant, angle, no extensions, strong, and timely.

5. Appendices

a) Rappelling Site Description
b) Rappelling Risk Assessment and Gear/PPE Checklist
c) Rappelling and Rescue Procedures
d) Rappelling and Fall Protection Certification Checklist

Standard Operating Procedures for Tree Climbing

Staff conducting tree climbing operation

1. PURPOSE. The purpose of this SOP is to outline the practices and procedures to minimize the risk of injury during tree climbing with fall protection equipment. Tree Climbing techniques are used by ANRP for collecting material from endangered plants, monitoring/collecting tree snails, monitoring elepaio nests and bat roosts, controlling tree snail threats (Jackson's chameleons and Euglandina rosea), obtaining good vantage points, and trimming or removing trees.

2. SCOPE. Includes procedures for field operations. After consultation with PICHTR the following staff are approved to conduct Tree Climbing operations. Tree Climbing is defined as operations where NRS climb a tree more than six vertical feet off the ground. Rope techniques are generally required to do this safely. When climbing to secure vantage points (e.g. during weed or rare plant surveys), some means of secondary attachment is required.

ANRP Staff approved for Tree Climbing

Foundational	**Green**	**Blue**	**Orange**
Joby Rohrer		Missy Valdez	Jamie Tanino
Vince Costello			

3. RESPONSIBLITIES.

   a) Natural Resource Supervisors: Ensure staff are proficient in tree climbing techniques and competent to supervise subordinates. Ensure staff has completed tree climbing training. Review procedures with NRS to ensure understanding and compliance during safety briefings. Ensure staff is certified.

   b) Natural Resource Staff: Execute tree climbing in accordance with SOP. Tree climbing is an optional activity and personnel may refuse to participate in any activities at any time without consequences.

   c) Failure to comply with this SOP may result in disciplinary action. A total suspension of tree climbing activities will occur if a work-related injury occurs because of operations. A RCUH investigation will determine whether tree climbing activities may or may not resume.

4. PROCEDURES. The following describes training, equipment, and procedures required for conducting tree climbing operations.

Required PPE	Suggested PPE	Required Training
• Arborist grade Climbing harness • Helmet in conformance with ANSI Z89.1 • Climbing knife • Gloves • Sturdy work boots with ankle support and gripping tread	• Eye protection is recommended for most environments	• Tree Climbing Certification

   a) TRAINING

      i) All ANRP personnel certified for tree climbing will complete an initial training course to certify that they possess the knowledge, skills, ability and demonstrated, minimum level of proficiency in proper techniques to be implemented in the field. These techniques include inspecting trees and work sites, rigging, climbing, and performing a single person rescue. A refresher course will be completed every three years in order to ensure proficiency.

      ii) Only essential staff will be certified to ascend trees. This action will be limited to the senior staff with the most experience and with the knowledge of the resources

being monitored. This will ensure that these personnel remain proficient in climbing skills.

iii) All personnel certified for tree climbing operations must participate in a minimum of one operation for a total of five hours on rope every six months. The time that each personnel spends on rope for each operation must be documented. Off duty tree climbing operations may count towards this requirement as long as properly documented.

iv) All personnel involved with tree climbing operations will have current CPR and First Aid certification.

b) EQUIPMENT

i) All equipment shall be manufactured specifically for tree climbing, rescue or similar fall protection and only used for that purpose. All equipment shall be purchased through reputable suppliers and used only in conformance with the manufacturer's operations manual.

ii) All gear will be cleaned and inspected by the user before and after each use. Any equipment that does not pass inspection will be removed from service until it is repaired or replaced. In addition, all equipment must be inspected quarterly using the inspection forms provided by each manufacturer. These records must be stored until the equipment is no longer in use. Equipment will be stored in a secured, clean and dry environment

iii) Rope and Equipment Use Logs must be completed and maintained on all ropes and equipment to track the time in service using the following fields:

(1) Manufacturer & model
(2) Serial number or other unique tag (tape color for ropes)
(3) Date of Purchase
(4) Current personnel equipment is assigned to
(5) Equipment Type (Connector, Rope Grab, Rope, Helmet, Harness, Lanyard)
(6) Rope Length & diameter
(7) In service date & out of service date
(8) Date, user, location of use, and time in service each day used

iv) All ropes and equipment will be retired following guidelines set by manufacturer regarding maximum life in service or after any significant damage is observed during safety checks or if a rope sustains a significant shock load that likely reduces its tensile strength below accepted standards. Shock load is defined as a fall against a rope that was previously unloaded with weight such that the rope was slacked then snapped tight by the force of the load falling against it. The load must be at least fifty pounds. Damage required to retire a rope is described by the manufacturer. Any damage at all to the core will require removal of the damaged portion or retirement of the entire rope. All gear will be retired and removed from service such that gear will not be available for tree climbing operations. Guidelines

provided by the manufacturer will be used to inspect all equipment and determine if it can be returned to service or retired.

v) Tree climbing operations require the use of the following PPE: Arborist Climbing Harness, Climbing Helmet, Knife, Gloves, Eye Protection, and Appropriate Footwear.

c) PROCEDURES

i) Tree climbing techniques will be used to access tree canopies and sites higher than 6 feet above ground level to monitor plants, collect material for propagation, monitor and/or collect rare snails and remove weedy trees.

ii) All gear will be cleaned and inspected before and after each use. Redundant safety equipment will be used during all operations.

iii) All tree climbing operations will require at least two certified personnel and appropriate rescue equipment must be available on site (one extra, full set of tree climbing gear readily available to a potential rescue climber, radio, phone, first aid kit). In the event of an emergency, SOP #3 Emergency Response will be followed.

iv) All operations on Army lands must be approved by Range Control. Radio communication with base shall be maintained until mission is completed.

v) An ANRP Daily Risk Assessment to cover weather, field gear, communications, and safety considerations must be completed before leaving for the field.

vi) A helmet zone in which everyone wears a helmet at all times will be established. The helmet zone must extend two times the canopy height. Thus if the tree is 30 feet tall, the helmet zone is 60 feet from the base of the tree.

vii) Abrasion barriers will be placed between the rope and any substrate that may damage the rope during operations. Cambium savers will also be used as needed to avoid damage to resources.

viii) All anchor point crotches and limbs must be 4” in diameter or larger. All anchor points must be bounce tested before climbing and before releasing a primary tie-in point and transferring to a new primary tie-in. False crotches can be constructed with 1” tubular webbing slings.

ix) Two in one lanyard must be clipped to harness at all times and proper fastening sequence must be strictly followed.

x) All knots must be correctly tied, dressed and set.

xi) Chainsaw operations while climbing require two independent anchor points (typically a lanyard and the main climbing line) when cutting. All chainsaw operations must follow procedures in SOP-6, Safe Use of Field Power Tools.

xii) Tools used while in the tree must be secured with lanyards.

xiii) All personnel involved in operations using ropes will be trained in rare plant identification in order to prevent damage to protected species while on rope.

xiv) Tree climbers can refer to The Tree Climbers Companion for more explanation on procedures and techniques. Each approved climber was issued this guide at their training.

xv) All personnel involved in operations using rope do so of their own volition and shall never be punished for refusal to do so.

5. Appendices:

a) Tree climbing Risk Assessment
b) Tree Climbing Gear Inspection Log

Standing Operating Procedure (SOP) for
Personnel Protective Equipment: Footwear Standards

1. PURPOSE. The purpose of this SOP is to define Personnel Protective Equipment (PPE) footwear standards required in different types of field work performed by staff.

2. SCOPE. Includes standards that outline footwear PPE requirements for field operations.

3. RESPONSIBLITIES.

   a) Natural Resource Management (NRM) Supervisors: Review procedures with NRM Staff to ensure understanding and compliance during safety briefings.

   b) NRM Staff: Follow footwear PPE standards when conducting fieldwork.

   c) Failure to comply with this SOP may result in disciplinary action.

4. PROCEDURES. ANRP staff perform many types of fieldwork. Depending on the demands of the activity and terrain, different types of footwear PPE are required. The following standard aims to the primary consideration of personnel safety with the demands of different tasks, and the pros and cons of various types of PPE footwear.

   a) Hiking in steep terrain. For hiking in steep, loose, or wet terrain, the following types of footwear PPE are authorized: lace up boots above the ankle; or metal spiked tabis. Boots without spikes are not authorized in steep and/or slippery terrain.

   b) Hiking in terrain with foot puncture hazards. Boots or tabis with puncture resistant insoles are recommended for areas with puncture hazards, such as old skirting wire or numerous pongee-type stumps.

   c) Helicopter operations. For all helicopter operations, boots above the ankle, with all leather uppers with no metal against the skin are required. No tabis or spiked boots allowed. For sling load operations, boots must be above the ankle, with all leather uppers with no metal against the skin. In steep terrain where slipping is the primary hazard, tabis or spiked boots are allowed for sling load operations.

   d) Power tool operations for chainsaw and bladed weed eaters. All personnel involved must have above the ankle boots. Operations in steep terrain require corked/spiked boots.

   e) Operations for auger and string line (whip) weed eaters. All personnel involved must have above the ankle boots or spiked tabis. In steep terrain boots must be corked/spiked.

   f) Hand tool operations. For all hand tool operations, including the use of machetes, picks and Pulaskis, all personnel involved must have above the ankle boots or metal spiked

tabis. Boots may have nonskid or lug soles. In steep terrain boots must be corked or spiked.

Photo shows examples of leather boots and spiked tabis.

g) Application of pesticides. Footwear requirements are specified on each pesticide label. Label directions must be followed whenever applying pesticides. In general, most pesticides require closed-toe shoes. Rubber boots are often required in green house pesticide applications. Pesticide greenhouse PPE requirements will be strictly enforced.

h) Daily operations at base yard. For all operations at the base yards the following type of footwear PPE is required: all personnel must have covered shoes while working in fuel storage, chemical storage or green house areas. Additional footwear PPE maybe required if work involves activities specified above.

i) Driving work vehicles. The staff member operating the vehicle is required to have closed toed shoes.

Standard Operating Procedures (SOP) for
Army Natural Resources Hazard Communication Program

1. PURPOSE. The purpose of this program is to maximize personal safety and outline the minimum requirements for hazard communication (HAZCOM).

2. SCOPE. Includes procedures for field operations as well pre-field preparations.

3. RESPONSIBILITIES.

   a) Natural Resource Management (NRM) Supervisors: Review procedures with NRM Staff to ensure understanding and compliance. Ensure staff has completed all necessary training. Ensure operational procedures incorporate risk assessments and safety plans.

   b) NRM Staff: Execute procedures in accordance with SOP

   c) Environmental Compliance Officers (ECOs): Provide quarterly updates and trainings to NRM staff about HAZCOM issues. Monitor the baseyard for HAZCOM violations and work with NRM staff to resolve. Communicate with DPW Environmental regarding environmental compliance inspections, and inspection results.

   d) Failure to comply with this SOP may result in disciplinary action.

4. PROCEDURES:

   a) Occupational Safety and Health Administration (OSHA) requires every employer using or producing hazardous chemicals to develop and implement a written hazard communication program that includes provisions for container labeling, Safety Data Sheets (SDS) and an employee-training program. The program must include a list of the hazardous chemicals in each work area. The employer will inform employees and contractors of job hazards (including non-routine tasks). In addition, the employer will inform employees and contractors how hazards will be communicated.

   b) The Army Natural Resources Program on Oahu (ANRP) has implemented a Hazard Communication Program to minimize the risk of hazardous materials to staff.

   c) ANRP will provide information about chemical hazards and the control of such hazards via the Hazard Communication Program. This program will include: proper labeling of containers, maintenance of current Safety Data Sheets, and employee training. Training will include information about hazardous materials, how to mitigate/control the risk of hazards, how to read SDSs and locate requirements for Personal Protective Equipment (PPE) on them, and proper use of PPE. Additional detailed HAZCOM information is provided in SOP #4, Safe Use of Pesticides, and SOP # 18, Blood-Borne Pathogens.

d) Staff should keep in mind that the Written Hazard Communication Program is only a step in complying with the Hazard Communication Standard. For more information and assistance in complying with the State right-to-know law and OSHA Hazard Communication standard, please contact the RCUH Human Resources Department.

i) Container Labeling.

(1) All containers of hazardous substances must be labeled with the following:

(a) Contents/product

(b) Appropriate hazard warnings

(c) The name and address of the manufacturer

(2) All staff are responsible for ensuring ensure labeling is complete.

(3) Secondary containers include any container used for storage or transport of a hazardous substance which is not the originally purchased container. All secondary containers must be labeled as described above. Supervisors, the ECO, and subject area staff shall ensure that all secondary containers are properly labeled.

(4) All staff are responsible for ensuring container labeling is complete

ii) Safety Data Sheets (SDSs). SDSs summarize health and safety information for products containing hazardous chemicals. They include the information on the product: properties of hazardous chemicals; physical, health, and environmental health hazards posed; safety precautions for handling, storing, and transportation; required PPE; first aid procedures; and spill clean-up procedures.

(1) ANRP keeps copies of SDSs for all hazardous substances to which employees may be exposed. They are located digitally on the V-drive. Hard copies are kept in the work areas where hazardous products are used. Different work areas contain different SDSs, depending on the products used in each respective area.

(2) Any staff purchasing a new product which requires an SDS must also obtain a copy of the products SDS. SDSs are available to all staff for review. If a SDS is not available at a work area, staff shall contact a supervisor or the ECO immediately.

(3) The ECO is responsible for maintaining current copies of the SDSs and may delegate part of this responsibility to other staff.

(4) New products/hazardous substances must have an SDS on file before they are used. If an SDS is not available, staff shall contact a supervisor or the ECO immediately.

(5) If an SDS is missing or obviously incomplete, a new SDS will be requested from the manufacturer. OSHA will be notified if a complete SDS is not received.

iii) Employee Information and Training. Employees will, as part of their hazard orientation, receive information on the following:

(1) Employees will, as part of their hazard orientation, receive information on the following:

(a) A summary of the OSHA Hazard Communication Regulation, including their rights under the Regulation.

(b) Locations of hazardous substances at the baseyard.

(c) Location of the written hazard communication program.

(d) Physical and health effects of hazardous substances used by the program.

(e) How to lessen or prevent exposure to these hazardous substances.

(f) Steps that have been taken to lessen or prevent exposure to these substances.

(g) First aid procedures to follow if employees are exposed to hazardous substances(s).

(h) How to read labels and review SDSs to obtain appropriate hazard information.

(i) What PPE to use to avoid injury or illness from hazardous substances.

(j) Where PPE is stored and who to notify when the supply gets low.

(2) NOTE: It is critically important that all of our employees understand the training. If you have any additional questions, please contact a supervisor.

(3) When new hazardous substances are introduced, supervisors will review the above items as they are related to the new material.

iv) Hazardous Non-Routine Tasks.

(1) Periodically, employees may be required to perform hazardous non-routine tasks. Each affected employee will be given information by their supervisor about hazards to which they may be exposed during such an activity. This information will include:

(a) Specific hazards relating to the task.

(b) Required protective safety measures.

(c) Measures which have been taken to lessen the hazard, such as: ventilation, respirator use, modified emergency procedures, or requiring a buddy on site.

(2) When new hazardous substances are introduced, supervisors will review the above items as they related to the new material.

(3) The following is a list of non-routine tasks performed by employees of the Army Natural Resource Program:

Tasks	**Hazardous Substance**
Herbicide Ballistic Technology	Various herbicides (Triclopyr, Imazapyr)

v) Informing Contractors.

(1) To ensure that outside contractors work safely on ANRP contracts, it is the responsibility of the ANRP staff in charge of the contract to provide contractors the following information:

(a) Hazardous substances to which they may be exposed while on the job site.

(b) Precautions contractors may take to lessen the possibility of exposure, such as usage of appropriate PPE or other protective measures.

(2) If anyone has questions about how work considered hazardous, they should contact a supervisor to ensure policies are carried out, information has been shared appropriately, and a plan is in place to mitigate risk

vi) Personal Protective Equipment. OSHA maintains standards for PPE which address general PPE requirements, as well as design, selection, and use requirements for specific types of PPE. Below are excerpts from OSHA standards relating to General Requirements, Eye and Face Protection, Head Protection, Foot Protection, and Hand Protection.

(1) PPE devices alone should not be relied on to provide protection against hazards, but should be used in conjunction with guards, engineering controls, and sound manufacturing controls.

(2) If you have any questions regarding OSHA's PPE Standard, the completion of the required hazard assessment, or the selection of the proper type of PPE, please contact The Research Corporation of the University of Hawaii (RCUH) Human Resources Department.

(3) 1910.132 General Requirements

(a) Protective equipment, including personal protective equipment for eyes, face, head, and extremities, protective clothing, respiratory devices, and protective shields and barriers, shall be provided, used, and maintained in a sanitary and reliable condition wherever it is necessary by reason of hazards of processes or environment, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation or physical contact.

(b) The employer should assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of PPE. The employer should verify that the required workplace hazard assessment has been performed through a written certification that identifies the workplace evaluated; the person certifying that the evaluation has been performed; the date(s) of the hazard assessment.

(c) If such hazards exist, the employer should select and have each employee use, the types of PPE that will protect the affected employee from the hazards identified in the hazard assessment.

(d) The employer should provide training to each employee who is required to use PPE. Each such employee should be trained to know at least the following:

(i) When PPE is necessary

(ii) What PPE is necessary

(iii) How to properly don, doff, adjust, and wear PPE

(iv) The limitations of the PPE

(v) The proper care and maintenance, useful life and disposal of the PPE

(e) Each affected employee should demonstrate the ability to use PPE properly, before being allowed to perform work requiring the use of PPE. Defective or damaged PPE shall not be used.

(f) Retraining is required to include but not limited to situations where:

(i) Changes in the workplace render previous training obsolete, or there are changes in the types of PPE to be used; or

(ii) If an employee demonstrates an inadequate knowledge or use of assigned PPE.

(g) The employer should verify that each affected employee has received and understood the required training through a written certification that contains the name of each employee trained, the date(s) of training, and that identifies the subject of the certification.

(h) PPE and replacement PPE damaged through normal wear and tear shall be paid for by the employer. The employer may not replace PPE lost or intentionally damaged by the employee.

(4) 1910.133 Eye and Face Protection

(a) Each affected employee should use appropriate eye or face protection when exposed to eye or face hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation.

(b) Each affected employee should use eye protection that provides side protection when there is a hazard from flying objects. Detachable side protectors (e.g. clip-on or slid-on side shields) are acceptable.

(c) Each affected employee who wears prescription lenses while engaged in operations that involve eye hazards should wear eye protection that incorporates the prescription in its design, or should wear eye protection that can be worn over the proper position of the prescription lenses.

(d) Each affected employee should use equipment with filter lenses that have a shade appropriate for the work being performed for protection from injurious light radiation.

(e) Protective eye and face protections devices must comply with the ANSI Z87.1 standard.

(5) 1910.135 Head Protection

(a) Each affected employee should wear protective helmets when working in areas where there is a potential for injury to the head from falling objects.

(b) Each affected employee when near exposed electrical conductors which could contact the head should wear protective helmets designed to reduce electrical shock hazards.

(c) Head protection must comply with the ANSI Z89.1 standard.

(6) 1910.136 Foot Protection

(a) Each affected employee should wear protective footwear when working in areas where there is a danger of foot injuries due to falling and rolling

objects, or objects piercing the sole, or when the use of protective footwear will protect the employee from an electrical hazard.

(7) 1910.138 Hand Protection

(a) Employers should select and require employees to use appropriate hand protection when employees' hands are exposed to hazards such as those from skin absorption of harmful substances; severe cuts or lacerations; severe abrasions; punctures; chemical burns; thermal burns; and harmful temperature extremes.

(b) Employers should base the selection of the appropriate hand protection on an evaluation of the performance characteristics of the hand protection relative to the task(s) to be performed, conditions present, duration of use, and the hazards and potential hazards identified.

vii) List of Hazardous Substances.

(1) The following is a list of most of the known hazardous substances present at the ANRP baseyard or involved in Natural Resource Program work. The list is not exhaustive as products go in and out of use.

Tasks	**Hazardous Substance**
Weed Control	Garlon 4 Ultra, Ranger Pro, Polaris AC, Milestone, Sulfomet, Fusilade II, Escort, Biodiesel, NuFilm, Sulfomet, Turf Trax, Bas-oil Red
Chainsaw Use	Gasoline, Two-stroke Oil, Bar and Chain Oil
Invertebrate Control	Marathon 1%, Amdro, Maxforce, Sluggo, Ferroxx AQ
Greenhouse/Nursery Propagation	Avid 0.15, Banrot 40%, Diazinon 4E, DithaneT/O, Enstar II, Isotox, Malathion 5EC, Marathon 1%, Mavrik Aquaflow, Merit 75 WSP, Lilly Miller Microcop Fungicide, Lilly Miller Sta-stuk “m”, Neem Concentrate, Safer Insecticidal Soap, Zerotol

Specific information on each noted hazardous substance can be obtained by reviewing the appropriate SDS.

Standard Operating Procedures (SOP) for
Blood Borne Pathogen Exposure Control Procedures

1. PURPOSE: The purpose of these procedures are to maximize personal safety and outline the minimum requirements for Blood borne pathogen control.

2. SCOPE: Includes procedures for field operations as well as pre-field preparations.

3. RESPONSIBILITY:

   a) The Natural Resource Supervisors. Natural Resource Supervisors will be responsible for training all employees on blood borne pathogen exposure control during daily safety briefs.

   b) The Natural Resource Staff: Execute procedures in accordance with SOP.

   c) Failure to comply with this SOP may result in disciplinary action.

4. PROCEDURES:

   a) In accordance with the Occupational Safety and Health Administration (OSHA) Blood borne Pathogens Standard, 29 CFR 1910.1030 the following exposure control plan has been developed:

   b) Purpose: The purpose of this exposure control plan is to:

      i) Eliminate or minimize employee occupational exposure to blood or certain other body fluids;

      ii) Comply with the OSHA Blood borne Pathogens Standard, 29 CFR 1910.1030.

   c) Exposure Determination:

      i) OSHA requires employers to perform an exposure determination concerning which employees may incur occupational exposure to blood or other potentially infectious materials. The exposure determination is made without regard to the use of personal protective equipment (i.e. employees are considered to be exposed even if they wear personal protective equipment). This exposure determination is required to list all job classifications in which all employees may be expected to incur such occupational exposure, regardless of frequency. In this program the following job classifications are in this category:

         (1) Predator Control
         (2) First Aid/CPR
         (3) Ungulate Control

d) Implementation Schedule and Methodology

i) OSHA also requires that this plan include a schedule and method of implementation for the various requirements of the standard. The following complies with this requirement:

(1) Compliance Methods

(a) Universal precautions will be observed in this program in order to prevent contact with blood or other potentially infectious materials. All blood or other potentially infectious material will be considered infectious regardless of the perceived status of the source individual.

(b) Engineering and work practice controls will be utilized to eliminate or minimize exposure to employees at this facility. Where occupational exposure remains after institution of these controls, personal protective equipment shall also be utilized. At this facility the following engineering controls will be utilized;

(i) Medical gloves when treating co-workers' wounds

(ii) Face shield when administering CPR

(iii) Medical gloves when conducting predator and ungulate control work

(c) All of the controls listed above are single use control devices and will be disposed of after one use. Disposal will follow HAZMAT requirements.

(i) Clean unused gloves will be taken each time into the field when conducting all predator and ungulate control work. All used gloves shall be disposed of appropriately.

(ii) Clean unused face shields shall be carried into the field each day for emergencies and disposed of appropriately when used.

(iii) Hand washing facilities shall be made available whenever possible to the employees who incur exposure to blood or other potentially infectious materials. When hand washing facilities are not feasible employees can use antiseptic towels to sterilize hands.

(iv) Ensure that after the removal of personal protective gloves, employees shall wash hands and any other potentially contaminated skin area immediately or as soon as feasible with soap and water.

(v) If employees incur exposure to their skin or mucous membranes, then those areas shall be washed or flushed with water as soon as feasible following contact.

(2) Work Area Restrictions

(a) In work areas where there is a reasonable likelihood of exposure to blood or other potentially infectious materials, employees are not to eat, drink, apply cosmetics or lip balm, smoke, or handle contact lenses. Food and beverages are not to be kept in refrigerators, freezers, shelves, cabinets, or on counter tops or bench tops where blood or other potentially infectious materials are present.

(b) Mouth pipetting/suctioning of blood or other potentially infectious materials is prohibited.

(c) All procedures will be conducted in a manner, which will minimize splashing, spraying, splattering, and generation of droplets of blood or other potentially infectious materials. Methods that will be employed at this facility to accomplish this goal are:

(i) Post so that all can read that no food shall be kept in refrigerator that contains specimens of any sort (plant or animal)

(ii) Post so that all may read that no eating, drinking, smoking, applying cosmetics, lip balm, etc., around potentially infectious area.

(3) Specimens

(a) Specimens of blood or other potentially infectious materials will be placed in a container, which prevents leakage during the collection, handling, processing, storage, and transport of the specimens.

(b) The container used for this purpose will be labeled or color-coded in accordance with the requirements of the OSHA standard.

(4) Contaminated Equipment

(a) Ensure that equipment which has become contaminated with blood or other potentially infectious materials shall be examined prior to servicing or shipping and shall be decontaminated as necessary unless the decontamination of the equipment is not feasible.

(5) Personal Protective Equipment (PPE)

(a) PPE Provision

(i) All PPE used in this program will be provided without cost to employees. PPE will be chosen based on the anticipated exposure to blood or other potentially infectious materials. The PPE will be considered appropriate only if it does not permit blood or other potentially infectious materials to pass through or reach the

employees' clothing, skin, eyes, mouth, or other mucous membranes under normal conditions of use and for the duration of time, which the protective equipment will be used.

1. Medical gloves, coveralls, and respirator masks are always available to employees when needed and employees are free to acquire at any time free of charge.

(b) PPE Use

(i) Supervisors shall ensure that the employee uses appropriate PPE unless the supervisor shows that employee temporarily and briefly declined to use PPE when under rare and extraordinary circumstances, it was the employee's professional judgment that in the specific instance its use would have prevented the delivery of healthcare or posed an increased hazard to the safety of the worker or co-worker. When the employee makes this judgment, the circumstances shall be investigated and documented in order to determine whether changes can be instituted to prevent such occurrences in the future.

(c) PPE Accessibility

(i) Supervisors shall ensure that appropriate PPE in the appropriate sizes is readily accessible at the work site or is issued free to employees. Hypoallergenic gloves, glove liners, powderless gloves, or other similar alternatives shall be readily accessible to those employees who are allergic to the gloves normally provided.

(d) PPE Cleaning, Laundering and Disposal

(i) All personal protective equipment will be cleaned, laundered, and disposed of by the employer at no cost to the employees. All repairs and replacements will be made by the employer at no cost to employees.

(ii) All garments that are penetrated by blood shall be removed immediately or as soon as feasible. All PPE will be removed prior to leaving the work area.

(iii) When PPE is removed, it shall be placed in an appropriately designated area or container for storage, washing, decontamination or disposal.

(e) Gloves

(i) Gloves shall be worn where it is reasonably anticipated that employees will have hand contact with blood, other potentially

infectious materials, non-intact skin, and mucous membranes: when performing vascular access procedures and when handling or touching contaminated items or surfaces. Disposable gloves used in this program are not to be washed or decontaminated for re-use and are to be replaced as soon as practical when they become contaminated or as soon as feasible if they are torn, punctured, or when their ability to function as a barrier is compromised.

(f) Eye and Face Protection

(i) Masks in combination with eye protection devices, such as goggles or glasses with solid side shields, or chin length face shields, are required to be worn whenever splashes, sprays, splatters, or droplets of blood or other potentially infectious materials may be generated, and eye, nose, or mouth contamination can reasonably be anticipated. Situations in this program that would require such protections are as follows:

1. Predator Control Operations
2. Ungulate Control Operations
3. First Aid/ CPR

(6) Laundry Procedures

(a) Laundry contaminated with blood or other potentially infectious materials will be handled as little as possible. Such laundry will be placed in appropriately marked (biohazard labeled, or color coded red bag) bags at the location where it was used. Such laundry will not be sorted or rinsed in the area of use.

(b) Laundry at this facility will be cleaned at the Schofield Barracks Laundry Facility.

(7) Hepatitis B Vaccine and Post-Exposure Evaluation and Follow-Up

(a) General

(i) The Research Corporation of the University of Hawaii (RCUH) may make available the Hepatitis B vaccine and vaccination series to all employees who have occupational exposure, and post-exposure follow-up to employees who have had an exposure incident. The Army Natural Resources Program may also make available the Hepatitis A vaccine and Tetanus shots to all employees.

(ii) All medical evaluations and procedures including the Hepatitis B vaccine and vaccination series and post-exposure follow-up, including prophylaxis, are:

1. Made available at no cost to the employee;

2. Made available to the employee at a reasonable time and place;

3. Performed by or under the supervision of a licensed physician or by or under the supervision of another licensed healthcare professional; and

4. Provided according to the recommendations of the U.S. Public Health Service.

5. An accredited laboratory shall conduct all laboratory tests at no cost to the employee.

(b) Hepatitis B Vaccination

(i) Hepatitis B vaccination shall be made available after the employee has received the training in occupational exposure (see Section 13, "Information and Training") and within 10 working days of initial assignment to all employees who have occupational exposure unless the employee has previously received the complete Hepatitis B vaccination series, antibody testing has revealed that the employee is immune, or the vaccine is contraindicated for medical reasons.

(ii) Participation in a pre-screening program shall not be a prerequisite for receiving Hepatitis B vaccination.

(iii) If the employee initially declines Hepatitis B vaccination but at a later date while still covered under the standard decides to accept the vaccination, the vaccination shall then be made available.

(iv) All employees who decline the Hepatitis B vaccination offered shall sign the OSHA required waiver indicating their refusal.

(v) If the U.S. Public Health Service recommends a routine booster dose of Hepatitis B vaccine at a future date, such booster doses shall be made available.

(c) Post-Exposure Evaluation and Follow-up

(i) All exposure incidents shall be reported, investigated and documented. When the employee incurs an exposure incident, it shall be reported to the RCUH/PICHTR Safety Officers.

(ii) Following a report of an exposure incident, the exposed employee shall immediately receive a confidential medical evaluation and follow-up, including at least the following elements:

1. Documentation of the route of exposure and the circumstances under which the exposure incident occurred;

2. Identification and documentation of the source individual, unless it can be established that identification is unfeasible or prohibited by state or local law.

3. The source individual's blood shall be tested as soon as feasible and after consent is obtained in order to determine HBV and HIV infectivity. If consent is not obtained, the Safety Officer shall establish that legally required consent cannot be obtained. When the law does not require the source individual's consent, the source individual's blood, if available, shall be tested and the results documented.

4. When the source individual is recognized as being infected with HBV or HIV, testing for the source individual's known HBV or HIV status need not be repeated.

5. Results of the source individual's testing shall be made available to the exposed employee, and the employee shall be informed of applicable laws and regulations concerning disclosure of the identity and infectious status of the source individual.

(d) Collection and testing of blood for HBV and HIV serological status will comply with the following:

(i) The exposed employee's blood sample shall be collected as soon as feasible and tested after consent is obtained.

(ii) The employee will be offered the option of having his or her blood collected for testing of the employee's HIV/HBV serological status. The blood sample will be preserved for up to 90 days to allow the employee to decide if the blood should be tested for HIV serological status.

(e) All employees who incur an exposure incident will be offered post-exposure evaluation and follow-up in accordance with the OSHA standard. All post-exposure follow-ups will be performed by a physician assigned by the applicable worker's compensation insurance company.

(8) Information Provided To the Healthcare Professional

(a) The RCUH/PICHTR Safety Officers shall obtain and provide the employee with a copy of the evaluating healthcare professional's written opinion within 15 days of the completion of the evaluation.

(b) The healthcare professional's written opinion for HBV vaccination shall be limited to whether HBV vaccination is indicated for an employee, and if the employee has received such vaccination.

(c) The healthcare professional's written opinion for post-exposure follow-up shall be limited to the following information:

(i) Statement that the employee has been informed of the results of the evaluation.

(ii) Statement that the employee has been told about any medical conditions resulting from exposure to blood or other potentially infectious materials which require further evaluation or treatment.

(d) **NOTE**: All other findings or diagnoses shall remain confidential and shall not be included in the written report.

(9) Information and Training

(a) Supervisors shall ensure that training is provided at the time of initial assignment to tasks where occupational exposure may occur, and that it shall be repeated within twelve months of the previous training. Training shall be tailored to the education and language level of the employee and offered during the normal work shift. The training will be interactive and cover the following:

(i) A copy of the standard and an explanation of its contents;

(ii) A discussion of the epidemiology and symptoms of blood borne diseases;

(iii) An explanation of the modes of transmission of blood borne pathogens;

(iv) An explanation of the RCUH Blood borne Pathogen Exposure Control Plan, and a method for obtaining a copy.

(v) The recognition of tasks that may involve exposure.

(vi) An explanation of the use and limitations of methods to reduce exposure, for example engineering controls, work practices and PPE.

(vii) Information on the types, use, location, removal, handing, decontamination, and disposal of PPEs.

(viii) An explanation of the basis of selection of PPEs.

(ix) Information on the Hepatitis B vaccination, including efficacy, safety, method of administration, benefits, and that it will be offered free of charge.

(x) Information on the appropriate actions to take and persons to contact in an emergency involving blood or other potentially infectious materials.

(xi) An explanation of the procedure to follow if an exposure incident occurs, including the method of reporting and medical follow-up.

(xii) Information on the evaluation and follow-up required after an employee exposure incident.

(xiii) An explanation of the signs, labels and color-coding systems.

(b) The person conducting the training shall be knowledgeable in the subject matter.

(c) Employees who have received training on blood borne pathogens in the twelve months preceding the effective date of this policy shall only receive training in provisions of the policy that are not covered.

(d) Additional training shall be provided to employees when there are any changes of tasks or procedures affecting the employee's occupational exposure.

(10) Record keeping

(a) Medical Records

(i) The RCUH is responsible for maintaining medical records as indicated below.

(ii) Medical records shall be maintained in accordance with OSHA Standard 29 CFR 1910.20. These records shall be kept confidential and must be maintained for at least the duration of employment plus 30 years. The records shall include the following:

(b) Training Records

(i) Supervisors are responsible for maintaining the following training records. These records will be kept at the Army Natural Resources Program.

(ii) Training records shall be maintained for three years from the date of training. The following information shall be documented:

1. The dates of the training sessions;

2. An outline describing the material presented;

3. The names and qualifications of persons conducting the training;

4. The names and job titles of all persons attending the training sessions.

(c) Availability

(i) All employee records shall be made available to the employee in accordance with 29 CFR 1910.20.

(ii) All employee records shall be made available to the Assistant Secretary of Labor for OSHA and the Director of the National Institute for Occupational Safety and Health upon request.

Standing Operating Procedure (SOP) for Four-wheel Drive Operations

1. PURPOSE. The purpose of this SOP is to outline steps to maximize safety while operating a four-wheel drive vehicle.

2. SCOPE. Includes procedures for four-wheel drive operation. Does not include procedures for vehicle accident reporting (see Fleet Management SOP for accident reporting procedures)

3. RESPONSIBILITIES.

   a) Natural Resource Management Supervisors: Review procedures with Natural Resource Staff to ensure understanding and compliance. Ensure staff has been screened for four-wheel drive proficiency and are operating vehicles in conditions within their skill levels. Ensure vehicles are safe to operate and equipped with all necessary gear for off road use.

   b) Army Natural Resources Program (ANRP) staff: Execute fieldwork in accordance with SOP.

   c) Failure to comply with this SOP may result in disciplinary action.

4. PROCEDURES. Staff perform most of their field work in remote areas. Many of these areas require operation of four-wheel drive vehicles to access. However; program staff are not involved in complex four-wheel drive operations and are not required to be technically advanced in application of four-wheel drive strategies. In all circumstances, if the terrain gets too difficult to drive, staff will stop and hike. This SOP outlines the procedures that govern four-wheel drive activities.

   a) Natural Resource Management Supervisors are responsible for the safety of their crews. Regarding four-wheel drive operations this requires the following:

      i) When staff are hired, their four-wheel drive experience must be evaluated through one on one screening by the Natural Resource Management Supervisor or a designated four-wheel drive experienced personnel within 3 months from their date of hire. This evaluation will include both an interview investigating past four-wheel drive experience (e.g. number of hours off road) as well as a field trial where staff will demonstrate their abilities in four-wheel drive operation.

      ii) It is left to the discretion of the supervisors to perform the evaluation in locations and situations that are typical of those challenges that employees will face in their operations. Supervisors should ensure that staff are evaluated in a range of environmental conditions from wet to dry. Evaluations can be performed opportunistically to take advantage of appropriate conditions.

      iii) Staff are prohibited from four-wheel drive operation until they are evaluated.

iv) Once the evaluation is completed the staff is rated as to their experience level based on performance. There are three levels; Experienced, Proficient and Novice.

v) Novice staff will continue to refine their skills under the guidance of Proficient and Experienced drivers.

vi) In challenging four-wheel drive situations, Experienced level staff must be operating vehicles and ideally another Experienced level staff should also be in the front passenger seat.

vii) On the job training will be continuously utilized to improve employee's skills. Whenever conditions permit Novice and Proficient level drivers should operate vehicles under the watchful eye of Supervisors or Experienced level drivers sitting in the passenger's seat advising and correcting as needed.

viii) Staff can be re-evaluated and moved to appropriate levels as seen fit by the supervisor or designated experienced driver. Staff identified as unsafe due to accidents or by the senior occupant will be considered a remedial driver requiring a re-evaluation before resuming daily off road operations.

ix) The following set of skills will be evaluated:

(1) Shifting vehicles from 2WD to 4WD. Proper engagement and disengagement of 4wd in different vehicles. (Floor shift, panel knob, hubs, etc)

(2) Appropriate use of 4WD High and Low functions and 1st, 2nd, 3rd gears and in 4th high and 4th low.

(3) Understanding the capabilities of project vehicles (e.g. jeeps vs. trucks, gear ratios and 4wd performance of SUVs vs. crew cabs)

(4) Operation of winch

(5) Safe hill climb/descent on loose substrates

(6) Safe hill climb/descent in muddy conditions

(7) Reaction to drift/slides on loose and muddy conditions

(8) Correct terrain navigation

(9) Driving in reverse including mirror use

(10) Understanding of common hand signals

(11) Avoidance of foreign objects, obstacles (large rocks, branches in the road, large puddles)

(12) Sloped/cambered roads

(13) Emergency braking (sudden stop to avoid a collision and control of vehicle during emergency braking)

(14) Non-emergency braking stops and vehicle control

(15) Speed changes (acceleration to climb hills, deceleration before steep hills, turns etc.)

(16) Crossing runoff/standing water areas

(17) Crossing gulches/dry stream areas

(18) Effects of various types of cargo loads (or lack of) on vehicle performance

(19) Night driving (as applicable)

x) In each of these skills the drivers will be evaluated on a four-point scale as follows:

(1) 0 = Unsatisfactory – score reflects an inability to perform the skill in a safe and controlled manner and/or in a reasonable time. Potential for an accident was high.

(2) 1 = Marginal – Skill was executed but not efficiently in a completely controlled manner, for example more than a reasonable amount of time was required or many mistakes were made before it was successfully completed

(3) 2 = Proficient – Skill completed effectively in a reasonable amount of time in a safe and controlled manner

(4) 3 = Expert – Skill completed with expert accuracy, control, and timing with high regard to personal safety and minimal risk to vehicular damage.

xi) Drivers will be evaluated, and overall score will be determined on a four point scale as follows:

(1) Unsatisfactory – as all skills are required a score of 0 in any area will result in an overall score of Unsatisfactory

(2) Marginal – as all skills are required a score of 1 in any area will result in an overall score of Marginal

(3) Proficient – To attain an overall score of Proficient a minimum of a 2 must be scored in all areas

(4) Expert – To attain this level one must score a 3 in all areas, as Expert level drivers may be used by supervisors as designated evaluators.

xii) For daily operations, drivers that have an overall score of Unsatisfactory or Marginal will only perform skills for which they scored Proficient or Expert in

unsupervised situations. However, ANRP will utilize on-the-job-training consistently throughout the year to improve staff's four-wheel driving skills.

xiii) Additional resources will be used to educate staff on four-wheel drive skills. These include:

(1) Vehicle/winch manuals

(2) Chapter 21 of Field Manual 305 21-305 (attached)

(3) Internet resources as available (https://safety.army.mil/drivertrainingtoolbox/sop.aspx)

b) Staff must conduct operations in accordance with this SOP. All personnel must clearly communicate their past experience to supervisors. In addition, all staff must understand their overall comfort level when it comes to four-wheel drive operations and ensure they do not operate beyond these limits. These limits should be communicated to supervisors so that they can ensure that their staff are not put in a situation where they may have to perform these tasks.

5. APPENDICES

a) Four Wheel Drive Evaluation Sheet
b) Four Wheel Drive Hand Signals
c) Off-Road Driving Field Manual

Standing Operating Procedure (SOP) for
Wildland Firefighting

1. PURPOSE. The purpose of this SOP is to identify procedures to be followed when The Army Natural Resources Program on Oahu (ANRP) is involved in wildland firefighting operations.

2. SCOPE. These procedures clearly outline the command structure, certification requirements, and voluntary assignment participation in wildland firefighting and identify guidelines to maximize personnel safety. RCUH reserves the right to terminate at any time its authorization for the ANRP staff to participate in wildland firefighting.

3. RESPONSIBLITIES.

   a) Senior Natural Resource Management Coordinators (SNRMC): Liaise with Incident Command System (ICS) officer regarding natural resources needing protection, provide contracted helicopter support and logistical planning and support. Review procedures with Natural Resource Management Staff prior to all firefighting operations at safety briefing at the baseyard. Participate in allowable activities under the ICS (under voluntary assignment) and under coordination through the SNRMC principally with Army Wildland Fire Section Supervisor and DLNR Protection Forester (currently Mr. Ryan Peralta).

   b) Natural Resource Staff (NRS): Execute firefighting operations in accordance with SOP under direction of Army Wildland Fire Section Supervisor and/or DLNR Protection Forester.

   c) Failure to comply with this SOP or directives from on-site incident commander/lead/supervisor/boss will result in disciplinary action. Any person who fails to follow the instructions of the Army and DLNR crews will be immediately removed from the incident and will not be allowed to respond to any further calls for firefighting assistance.

   d) A total suspension of firefighting activities by ANRP employees may occur if a work-related injury occurs during firefighting activities. A RCUH investigation will determine whether firefighting activities may or may not resume.

4. PROCEDURES.

   a) <u>QUALIFICATIONS/SCOPE OF WORK</u>: **ANRP staff are not permitted to engage in firefighting activities other than:**

      i) Helicopter managing
      ii) Logistics assistance
      iii) Planning operations

iv) Damage assessments, and limited mop up activities (e.g. opportunistic extinguishments while conducting damage assessments on a fully contained fire)

b) GENERAL STATEMENT OF PURPOSE: ANRP is uniquely qualified to advise and assist firefighting directed to protect natural resources. ANRP's extensive knowledge of the natural resources will enable program crews to work on site with other firefighting resources to optimize firefighting strategy for benefit of the resources. However, ANRP will only be involved where endangered species or native habitats are threatened by the fire or the Army Wildland Fire Section Supervisor considers our participation is important.

c) COMMAND STRUCTURE: The Command structure on fires comes from the Incident Commander through line and engine chiefs. There will likely be both City and County, Federal Fire as well as Army Wildland fire and DLNR units involved in controlling wildland fires. All ANRP employees will be under the immediate supervision of the respective agencies.

d) PRIMARY FUNCTION: ANRP employees will be used primarily for helicopter management and planning/logistics work. At no time, will you be called on to fight an active fire on the fire line.

e) VOLUNTARY ASSIGNMENT: Firefighting is an optional activity for ANRP employees who may decline to participate in any firefighting activities at anytime without any consequences. You should not answer the call for participation if you feel tired or you are not completely well. Firefighting will not affect your pay rate. No additional compensation will be provided for firefighting other than possible overtime pay for non-exempt employees.

f) ANRP SNRMC Responsibilities (Timekeeping, Pre-Deployment, Reporting to Incident Command, Accident Reporting, and Post-Deployment):

i) TIMEKEEPING: ANRP SNRMC will be responsible to ensure all ANRP employees' time is accurately reported for time reporting purposes. Compensable time will begin and end at the Baseyard. ANRP SNRMC will list all participants, including self, on pre-deployment and at post-deployment and sign off that everyone is accounted for.

ii) REPORTING TO INCIDENT COMMAND: ANRP SNRMC will document where and under whose supervision each employee is assigned by the Army Wildland Fire Section Supervisor or DLNR Protection Forester. This information should be noted on the post-deployment final report.

iii) ACCIDENT REPORTING: ANRP SNRMC will be responsible to report (using RCUH Supervisor's Report of Industrial Injury form) any accident/injury ASAP of occurrence to RCUH/PICHTR.

iv) POST-DEPLOYMENT: ANRP SNRMC will ensure all employees and equipment are accounted for.

g) REPORTING FOR FIRE FIGHTING DUTY: Upon reporting to the Incident Command the SNRMC is required to report to the Army Wildland Fire Section Supervisor and/or DLNR Protection Forester.

h) ANRP employees will not conduct firefighting operations in Unexploded Ordnance (UXO) areas.

RECOMMENDED GEAR FOR MANAGING FIRE SUPPRESSION HELICOPTER OPERATIONS

Pacmer radio/batteries	Kestrel weather station	Helmet
Helicopter radio/batteries	Binoculars	Nomex flight suit
I-Comm radio/batteries	Flashlight/headlamp	Gloves
List of radio frequencies	Extra food/water	Ear protection
Cell phone/charger	Electrical and duct tape	Eye protection
Heli-log	Gravel bag/sling strap/shackle	Leather boots
List of contacts and call signs	Leatherman/pliers	Dust mask
Maps incl. access pts.	Flagging/wind sock	Sunscreen

Standard Operating Procedure (SOP) for
Reporting Ground Accidents to DPW and IFSO

1. PURPOSE. The purpose of this SOP is to outline procedures for reporting RCUH/PICHTR staff ground-based accidents on Army Training Lands on Oahu.

2. SCOPE. Includes reporting procedures, forms and timeline.

3. RESPONSIBLITIES.

   a) Army Biologist/Natural Resource Section Chief: Review reports for completeness and provides guidance regarding report completion to the contractor.

   b) Natural Resource Management (NRM) Supervisors: Ensure reporting is conducted according to the required timeline.

   c) NRM Staff: Assist with paperwork preparation if necessary in order to meet reporting deadlines.

   d) Failure to comply with this SOP may result in disciplinary action.

4. PROCEDURES.

   a) Report the accident via email to the Directorate of Public Works (DPW) Administrative Office, Safety Officer immediately and cc the DPW Natural Resource Section Chief, the Chief of the Conservation and Restoration Branch, the Chief of the Environmental Division, and the Deputy Director of DPW. Outline in the email who was involved and what happened. This email can be used to notify the command of the accident if the Environmental Chief and DPW Director deem it appropriate. The Safety Officer will forward onto the Directorate of Installation Safety (DIS). If the accident occurs or needs to be reported after normal duty hours call DPW Admin office and leave a phone message. The DPW Environmental Staff should be contacted via phone regardless of the time of the accident.

   b) Determine the Class of the Accident:

      i) Class A. The resulting total cost of reportable damage is $1,000,000 or more; an Army Aircraft or missile is destroyed, missing, or abandoned; or an injury and/or occupational illness results in a fatality or permanent total disability.

      ii) Class B. The resulting total cost or reportable property damage is $200,000 or more but less than $1,000,000, an injury and /or occupational illness results in permanent partial disability, or three or more personnel are inpatient hospitalized.

iii) Class C. The resulting total cost of property damage is $20,000 or more but less than $200,000, a nonfatal injury causes any loss of time from work beyond the day or shift on which it occurred, or a nonfatal illness or disability causes loss of time from work or disability at any time (loss-time case).

iv) Class D. The resulting total cost of property damage is $2,000 or more but less than $20,000. Injuries that result in restricted work activity, medical attention, or first aid.

c) Reporting.

i) For Class A & B accidents. The U.S. Army Combat Readiness Center (USACRC) will be notified immediately via DPW Safety Officer telephonically of all Class A and B accidents. Complete the "Telephone Notification of Ground Accident" worksheet in AR 385-40. For these accidents, must complete a follow-up AGAR within 30 calendar days of the date of the accident as well as the appropriate Department of Labor form (within its proper time) for civilian personnel accidents involving injury.

ii) For Class C & D accidents. These accidents are to be reported on the U.S. Army Abbreviated Ground Accident Report Form (DA Form 285-AB, FEB 2009), abbreviated as AGAR within 7 days of the date of the accident (as reflected in the revised SOP-122). Attach the risk assessment, DA Form 7566, APR 2005, for the operation to the completed AGAR.

d) DPW will determine the next steps for the program. For serious incidents a "stand down" order may be issued requiring field operations to cease. In some cases, only the field operations related to the activity involved in the accident must be halted. Regardless, RCUH/PICHTR should look to DPW to determine the next steps for the program based on ISO recommendations and post incident investigations.

e) RCUH/PICHTR will conduct an after-action review with involved parties and may choose to conduct an after-action review with the entire natural resource crew.

5. ADDITIONAL RESOURCES.

a) DPW SOP 122 Safety Program
b) AR385-10
c) The Army Safety Program
d) DA Pam 385-40
e) USACRC use and preparation guides.

Standard Operating Procedure (SOP) for
Basic Body Mechanics: Proper Lifting Techniques

1. PURPOSE. The purpose of this SOP is to outline steps to maximize personnel safety while conducting work related activities.

2. SCOPE. This SOP includes proper body mechanics and lifting techniques.

3. RESPONSIBLITIES.

   a) Natural Resource Management (NRM) Supervisors: Review procedures with NRM Staff to ensure understanding and compliance. Ensure staff has completed all training necessary for the fieldwork being conducted on any given day. Ensure that risk assessment and safety plans are completed and incorporate SOP procedures. Conduct periodic observations of employees' lifting techniques. Observing staff performance and providing positive feedback is an excellent way to reinforce safe work habits.

   b) NRM Staff: Execute fieldwork in accordance with SOP.

   c) Failure to comply with this SOP may result in disciplinary action.

4. PROCEDURES.

   a) Preventing back injuries is a major challenge to employers and workers. According to the Bureau of Labor Statistics (BLS), more than one million workers suffer back injuries each year, with back injuries accounting for one out of every five workplace injuries and illnesses. One fourth of all workers' compensation indemnity claims are a result of back injuries. Back injuries produce pain and discomfort to workers, and can have a dramatic change in their productivity and lifestyles.

   b) Body mechanics refers to the way we move our body. Using good body mechanics at work and at home can prevent many of the causes of back pain. To minimize injury to your spine, you need to be proactive and learn some basic "preventive" body activities. As we age our spines change. Trauma, wear and tear, disease and poor body mechanics can alter the structural integrity of the spine.

      i) Preventive body mechanics

         (1) Avoid awkward or uncomfortable positions, bending and twisting, reaching and lifting, heavy lifting, pulling, overexertion, fatigue due to repetitive motion, and wet and slippery floors. One movement that tends to aggravate back pain, more than others is bending and twisting simultaneously. Reaching out over an obstruction to lift, hold, or lower an object is also especially bad for the back.

(2) Store at waist height or tilt the load. The heaviest and most frequently used items should be stored at waist height. This can help make it easier to face the object, get close, and pull it toward your body, while maintaining good posture. Lighter and less frequently used items can be stored on higher, or lower, shelves. Lifting which occurs below knee height or above shoulder height is more strenuous. For a long lift, such as floor to shoulder height, consider resting the load mid-way on a table or bench to change your grip. Obstructions which prevent body contact with the object being lifted increase the risk of injury. When practical, it is often quite helpful to tilt the item on edge with its long axis straight up, so that the center of the weight is as high as possible above the ground.

(3) Push, instead of pull. Always push, not pull, the object when possible. When you push an object, you use the muscles in your legs and back. When pulling, some people have the tendency to use their back muscles to yank and pull. It is easier to keep your back straight while pushing. Lean into the object using your body weight to help push the object. Of course, some items (such as hoses, chains, ropes, and cables) can't be pushed. When you need to pull things manually, think of it as a "sideways lift." Adopt a wide stance, try to keep your back straight, and use leg power to do the pulling.

Staff using proper lifting technique to "swamp" cut trees

ii) Engineering Controls

(1) Redesign the workstation, work area, or job task, to minimize lifting hazards. Some examples of engineering controls include:

(a) Raising, lowering or providing an adjustable working surface

(b) Using various types of material handling equipment to move items, i.e. hand-trucks, carts, hoists, conveyors, etc.

(c) Reducing the size and weight of items handled, by packaging in smaller quantities, or in less awkwardly shaped containers.

iii) Administrative Controls

(1) Carefully select, train, and observe workers so that they can perform their jobs safely. Suggested administrative controls include:

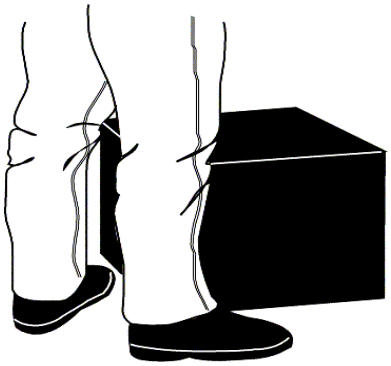
(a) Strength testing of existing workers, to prevent the assignment of workers to jobs that exceed their strength capacities.

(b) Physical conditioning or pre-shift stretching programs, to reduce the risk of muscle strain.

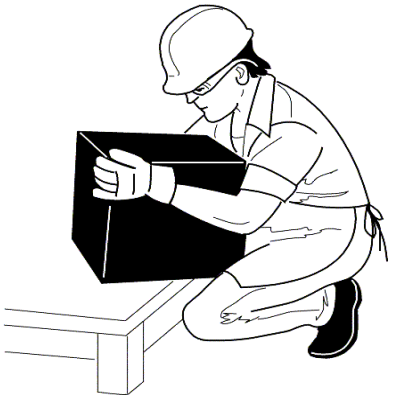
(c) Training employees to utilize lifting techniques that place minimum stress on the lower back.

iv) How to Lift Safely

(1) Before lifting, take a moment to think about what you're about to do. Examine the object for sharp corners, slippery spots or other potential hazards. Size up the weight and balance of the load, know your lifting limit, and don't try to exceed it. Ask for help, if needed, to conduct a “team” lift, or if possible, divide the load to make it lighter. Know where you are going to set the item down. Make sure the location and your path of travel are free of obstructions. Then follow these safe-lifting steps:



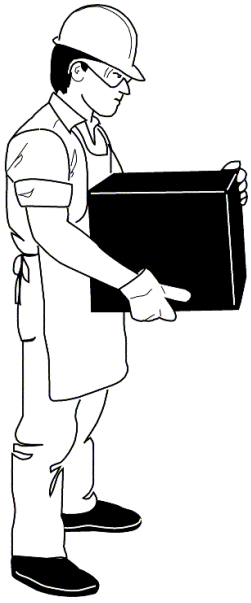
(a) Stand close to the load with your feet spread apart, about shoulder width, with one foot slightly in front of the other, to maintain your balance.



(b) Squat down, bending at the knees (not at your waist), keeping your back straight. Tuck your chin while keeping your back as vertical as possible.

(c) Get a firm grasp of the object before beginning the lift. The best grasp is a "palm grip" under the bottom edges of the object. Grasping the sides may allow the object to slip while being lifted or carried.

(d) Begin slowly lifting with your LEGS by straightening them. Keeping your head up and looking forward will help keep your back straight while lifting. Always lift straight up, keeping the object close to your body, and never twist your body during this step.



(e) Once the lift is complete, keep the object as close to the body as possible and maintain a firm palm grip. As the load's center of gravity moves away from the body, there is a dramatic increase in stress to the lower (lumbar) region of the back.

(2) If you must turn while carrying the load, turn or pivot using your feet. This will keep your back and torso aligned with your hips, which will avoid strains from twisting while carrying a heavy load. Lead with your hips as you change direction. Keep your shoulders in line with your hips as you move.

(3) To place or set the object down at a level below your waist, follow the same procedures in reverse order. Remember to keep your back as straight as possible, and bend at the knees.

v) Summary: Safe Lifting Basics.

(1) Using proper lifting techniques can help prevent back injuries. With a little practice, precautionary methods such as these can become good daily habits that can help prevent back injuries, both on and off the job.

(2) Remember, no approach will eliminate back injuries. However, a majority of injuries can be prevented by incorporating effective Administrative and Engineering controls.

(3) To evaluate a worker's lifting habits, consider the following variables: frequency of lifting, amount of weight lifted, duration of such activities, and type of lifting, as well as the worker's state of health, body size, age and general physical fitness.

(4) To help in the evaluation process, consider using the Applications Manual for the Revised NIOSH Lifting Equation, which gives an equation that you can use to factor all of these variables.

(5) Safe Lifting Basics Checklist:

(a) Plan the Lift
(b) Check the Load
(c) Bend at the Knees – Not at the Waist
(d) Get a Firm Grip
(e) Keep the Load Close
(f) Keep Head Up
(g) Lift with the Legs – Not the Back
(h) To Turn, Pivot the Feet – Not the Spine

Standing Operating Procedure (SOP) for Work Space Ergonomics

1. PURPOSE. The purpose of this SOP is to outline steps to maximize workstation comfort.

2. SCOPE. The checklist was developed to assist you in adjusting your workstation to obtain the optimal neutral body positions necessary to reduce potential workstation-related discomforts.

3. RESPONSIBLITIES.

   a) Natural Resource Management Supervisors: Review the checklist with Natural Resource Management Staff to ensure understanding and compliance. Ensure staff has completed the checklist.

   b) Natural Resource Management Staff: Execute checklist in accordance with the SOP.

   c) Failure to comply with this SOP may result in disciplinary action.

4. PROCEDURES. When using the checklist, all responses should be marked "Yes." Any section indicating a "No" response should be evaluated and corrected to minimize risk. It would be advantageous to have a partner observe and assist you when referencing the optimal body position diagram and making any workstation adjustments included in the checklist. After making any workstation adjustments, the checklist should be reviewed again to ensure that the changes made not only correct a deficiency, but also do not create another problem.

PERSONAL WORKSTATION CHECKLIST

Name: _____ **Date Conducted:** _____

Chair Adjustment

Yes	No	
☐	☐	**1. Is your chair height adjustable?**
☐	☐	**2. Does your chair support your lower back?**
☐	☐	3. **Is there room between the front edge of the seat pan and the back of your knees?**
☐	☐	**4. Do your feet rest flat on the floor or footrest?**
☐	☐	**5. Are your knees bent at approximately a 90-degree angle and positioned even with or slightly lower than your hips?**

Sitting with your feet flat on the floor (or supported by a foot rest) will help support your spine. Your knees should be bent at approximately a 90-degree angle and slightly lower than your hips. Maintain adequate clearance between your knees and the front edge of the seat to keep the chair from interfering with the circulation in your legs.

If the back of your chair is adjustable, raise or lower it so that the contour of the chair provides maximum lumbar (low back) support. If possible, adjust the tilt of the backrest to support your body in an upright position. There should be a slightly larger than 90 degree angle at the hip.

Work Surface & Keyboard Adjustment

Yes	No	
☐	☐	**1. With your chair adjusted properly, is your keyboard at approximately elbow level?**
☐	☐	**2. Are your arms resting at your sides at approximately a 90-degree angle, rather than stretched out in front of you?**
☐	☐	**3. Are your shoulders relaxed and not elevated when you work?**
☐	☐	**4. Are your wrists in line with your forearms and not bent upward, downward, or to one side or the other?**
☐	☐	**5. Is there clearance between the bottom of your work surface and the top of your thighs?**

Ideally, with your arms resting comfortable at your side, the home row of your keyboard (the row with the letters a,s,d....) should be at approximately elbow level.

Adjust your chair to the proper height, then adjust the level of your work surface or keyboard tray.

If your work surface is too high and cannot be adjusted, adjust the chair to bring your elbows to the home row level of the keyboard or consider an adjustable keyboard tray.

Monitor Adjustment

Yes	No	
☐	☐	**1. Is the viewing distance from your eyes to your computer monitor somewhere between 20 and 30 inches?**
☐	☐	**2. Is the top of your computer screen at, or just below eye level?**
☐	☐	**3. Is your computer monitor screen protected from excess glare?**
☐	☐	**4. If you wear bifocals or trifocals, are you able to look at the monitor without tilting your head?**

Once your chair and work surface are properly adjusted, adjust your computer monitor so that the top of the screen is at or just below eye level.

There should be a slight, but not excessive backward tilt to your monitor. However, if you tilt your monitor too far back, your monitor will reflect overhead light off of the screen and into

If you're by a window, position your monitor at a 90-degree angle to the window to cut down on glare. Also, try to position your monitor between ceiling lights.

People who wear bifocals or trifocals often end up tilting their heads back to read through the lower portion of their glasses. This can sometimes lead to neck, shoulder and back discomfort. Purchasing glasses specifically designed for the viewing distance to your terminal screen or lowering the computer monitor can help alleviate this problem.

Workstation Accessory Arrangements

YES	NO	
☐	☐	**1. Are your input devices (mouse, trackball, etc.) at the same level as your keyboard?**
☐	☐	**2. Are your input devices placed in a manner that does not require excessive reaching?**
☐	☐	**3. Do you have enough room on your work surface for all your computer accessories?**
☐	☐	**4. Do you have an adjustable document holder to hold reference materials?**
☐	☐	**5. Are you able to keep your arms from resting on any hard or square edges on your work surface?**

Rectangular work surfaces often don't allow enough space for computers and related accessories. Keyboard trays or similar devices are one option to increase desk space. However, these devices can sometimes force you too far away from your primary work surface, forcing you to reach for your mouse or other accessories or to put your mouse at a higher level than the keyboard, which may cause pain or discomfort to arms and shoulders. If your work surface is too high, and cannot be adjusted an adjustable keyboard tray can help you maintain proper wrist angle (see "Work Surface & Keyboard Adjustment" section for more information).

As you change tasks, remember to move primary materials/input devices in front of you. If you must frequently look at reference materials as you type, you should consider using a document holder to help you keep your head aligned over your spine and prevent or relieve neck, shoulder and back discomfort. If using a document holder, position it at the same height and distance as your monitor.

A padded wrist rest can help you keep your wrists in a straight and neutral position. Ideally, the wrist rest should be made of firm foam and constructed so that the pad height matches the front toe height of your keyboard.

Work Habits

Yes	No	
☐	☐	**1. Do you stand and take short and frequent breaks throughout the day to reduce fatigue?**
☐	☐	**2. Do you build variety into your day to break-up prolonged tasks?**
☐	☐	**3. Do you frequently change body positions while working?**
☐	☐	**4. Do you provide your eyes with vision breaks every hour?**
☐	☐	**5. Do you avoid resting your wrists while key-stroking?**
☐	☐	**6. Is your wrist neutral and pinch force grip avoided while mousing?**
☐	☐	**7. Do you use your arm muscles, not your wrist to move your mouse?**
☐	☐	**8. When key-stroking, are your hands relaxed, do you use a light touch?**
☐	☐	**9. Are you free of pain and/or discomfort while working?**
☐	☐	**10. Do you avoid cradling your phone receiver between your ear and shoulder?**

Periodic breaks should help alleviate fatigue and strain to your eyes and upper body. Taking a break does not mean that you have to stop working. Rather, it allows you to integrate other activities such as making phone calls or making copies.

Changing positions periodically helps maintain circulation and prevents putting pressure on any one area of the body for an extended period.

Vision breaks can be accomplished by focusing on an object at least 20 feet away. You can also close your eyes and cover them with your palms for 30-60 seconds. Blink your eyes often and take a break by alternating tasks when necessary.

When mousing, keep your wrist neutral and off the work surface or mouse pad and relax your grip. To avoid wrist strain, use the larger muscles of your arm to manipulate the mouse instead of your wrist.

When key-stroking, float your wrists, relax your hand and use a light touch on the keys.

Pay attention to how your body responds to pain. Pain that is continuous and doesn't go away overnight may indicate a more serious problem. If you experience pain or discomfort while working tell your supervisor. It is much easier to treat a problem in its early stages.

Talking on the phone with the receiver cradled between your ear and your shoulder can cause neck, shoulder and back pain.

Adjusting Your Workstation

- **Adjust lumbar support by moving the back rest up or down to match the inward curve of your spine. If your chair is not adjustable, a rolled up towel or a lumbar support cushion is recommended.**
- **Adjust the tilt of the back-rest and/or seat pan to keep your body supported in an upright, slightly forward or reclined position.**
- **Adjust the seat height for adequate leg clearance under the workstation and keep the keyboard at approximately elbow level.**
- **Keep feet flat on the floor or supported by a footrest.**
- **Adjust your monitor so that the top of the screen is at or just below eye level.**

Adjusting Your Body Posture

- **Keep your head in line with your shoulders and hips.**
- **Keep elbows close to your body.**
- **Place items used most often within 16 inches of your body.**
- **Keep wrists in a neutral position.**
- **Keep fingers in a relaxed position when working. Avoid extreme finger extensions. Use a light touch when pressing keys.**

Monitor at proper level.

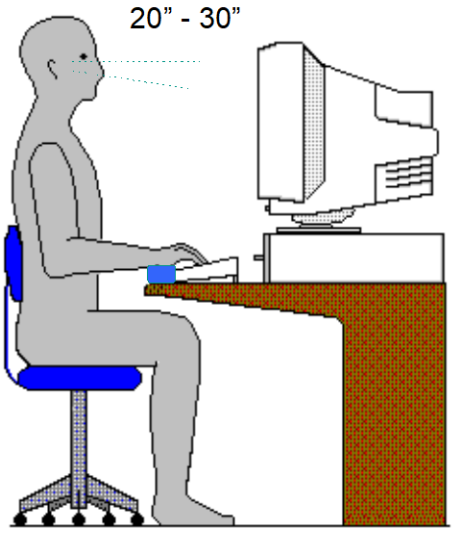
Elbows, at approximately 90º.

Wrists neutral.

Lumbar support.

Knees, even with hips.

Space between front of seat pan and knees.



Feet flat and supported.

Standing Operating Procedure (SOP) for Conducting Safety Behavior Observations/Inspections

1. PURPOSE. The purpose of this SOP is to outline procedures for conducting safety behavior observations and determining actions resulting from these inspections.

2. SCOPE. Includes forms for use in safety observations and inspections.

3. RESPONSIBLITIES.

   a) Senior Natural Resource Management (NRM) Coordinators: Review completed safety observation forms quarterly.

   b) NRM Supervisors: Review procedures with NRM Staff during safety briefings to ensure understanding and compliance.

   c) NRM Staff: Participate in safety behavior observations and take action to make any required changes by deadlines set by Supervisors.

   d) Failure to comply with this SOP may result in disciplinary action.

4. PROCEDURES.

   a) Field teams, led by supervisors, will conduct at a minimum, three safety behavior observations per quarter in the field or at the base yard. Program Specialists and Managers will conduct at a minimum, one safety behavior observation per quarter in the field or at the base yard; this metric may be changed by the SNRMCs.

   b) Safety behavior observations will be conducted to include all variety of natural resource management fieldwork with a variety of tools and issues.

   c) Forms will be used to track both safe and unsafe practices (see appendix). If unsafe practices are observed, they should be corrected immediately. The form may be used for observing a single worker or group of workers. General procedure for filling out the form:

      i) If using the blank version, write appropriate safety questions

      ii) Record the number of staff observed in the '# Obsv.' column.

      iii) Record the number of staff fulfilling the safety question in the '# Safe' column

      iv) Total both columns at the bottom of the form and divide the total Safe Observations by the Total Observations to get the percent safe rating.

d) SNRMCs, NRMCs, Specialists, and Managers will tailor each safety observation for the work site and task that is being observed. Safety observations can also take the form of documenting a safety training (e.g. safe webbing usage while hiking), debriefing, or safety discussion; in these cases, the safety observation may be documented via a memo or written notes, instead of the safety observation form.

e) Return completed forms (or alternate forms of documentation) to the Natural Resources Office Associate promptly. The forms will be reviewed by the SNRMCs quarterly.

5. APPENDICES

a) Safety Observation Form_Blank
b) Safety Observation Form_Sample Questions

Standing Operating Procedure (SOP) for
Firearms

1. PURPOSE: The purpose of this SOP is to outline procedures to ensure the safe operation of firearms while carrying out ANRP essential Invasive Vertebrate Management program activities in accordance to RCUH's 3.940 Firearms Policy. For the purpose of this document, a "firearm" is defined as any weapon which is designed to expel a projectile by the action of an explosive. This SOP will be reviewed annually and revised as necessary to improve program safety.

2. SCOPE: Firearms are vital tools needed to accomplish the ANRP goal of controlling invasive vertebrates. Firearms use is for the ANRP Invasive Vertebrate Management program when no other means of control is feasible or humane. The use of a firearm comes with heightened levels of responsibility, accountability, and liability. Policies and procedures to store, issue, use, and care for firearms must be established, and enforced to ensure the highest level of safety for all personnel recruited through the Research Corporation of the University of Hawaii (RCUH) and Pacific International Center for High Technology Research (PICHTR). Failure to comply with the RCUH 3.940 Firearms policy will result in an immediate suspension (i.e. "stand-down").

3. RESPONSIBILITIES:

   a) The ANRP Firearms Custodian:

      i) Must be a Regular Status RCUH employee (exception will be a DLNR employed firearms custodian if the project is using DLNR project-owned firearms) and will approve all firearms use within ANRP.

      ii) Verifies the employee firearms certifications – (1) Hawaii's Hunter Education class or equivalent; (2) the National Rifle Association (NRA) or equivalent firearms safety training, (Pistol/Rifle/Shotgun, as applicable),

      iii) Verifies ownership registration for all personal-owned firearms used in the program,

      iv) Maintains copies of employee's firearms certifications, firearms ownership registration(s), Wilderness First Aid/CPR training certification(s),

      v) Ensures the employee reads and understands this Firearms SOP and has signed the appropriate ANRP Firearms SOP Acknowledgement form,

      vi) Coordinate prior with the respective Provost Marshal's Office (PMO) at 655-7114/5555 (Schofield Barracks) or 438-8739 (Fort Shafter) before entry with firearms. Personnel will have a signed copy of the Exception to policy for Policy Memorandum USAG-Hl-68, Possession of Privately Owned Firearms on U.S.

Army Garrison, Hawaii (USAG-HI) Installations at all times while on US army installations.

vii) Obtain prior approval from Range Operations for firearm use on training ranges

viii) Insure all other ANRP project SOP protocols are followed,

ix) Investigate any safety procedure violations or incidents,

x) Revoke an approved employee's use of firearms for all ANRP activities should any unsafe situation or incident warrant such action, or due to any violation of the RCUH's policies and procedures.

b) Approval for firearms use will be strictly limited to employees who have successfully completed and passed firearms certification training, an annual criminal background check, and acknowledged that he or she has read and understands this Firearms SOP.

c) Any employee incident involving failure to comply with this or any other applicable ANRP SOP, Federal and State laws or indications of decreased firearms proficiency or safety, will result in an immediate revocation of permission to participate in ANRP firearms use by RCUH/PICHTR and may result in disciplinary action if the revocation involved policy or safety violation(s). The NRM Operations Manager will also revoke the employee's firearms use if the employee is under indictment for, has waived indictment for or been convicted of a felony or crime of violence (as defined in Hawaii Revised Statutes 134-1) or is prohibited from owning, possessing or controlling any firearm or ammunition by any other reason specified in Hawaii Revised Statutes 134-7. The NRM Operations Manager may also revoke the employee's firearms use if the employee is disciplined for work rule violation or work performance, placed on performance probation, or has an Annual Performance Evaluation rated at "Unsatisfactory". The decision to revoke an employee's firearms use will be reported immediately to the RCUH Director of Human Resources and the PICHTR Principal Investigator. Final determination of whether additional discipline or the duration of the revocation will depend on the facts and circumstances of each case.

d) Firearms-certified and approved ANRP employees are responsible and accountable for their actions involving firearms use under the ANRP Invasive Vertebrate Management program.

e) Any employee failure to comply with this Firearms SOP policy or procedures for firearm's storage, check-in/check-out, maintenance, transportation and field use, and additional safety measures may jeopardize his/her employment with RCUH/PICHTR.

f) Disciplinary Action and Operational Stand-down: Failure to comply with any part of this SOP will include: (1) An immediate safety stand-down of firearms use pending the completion of an investigation. Investigations will be conducted by RCUH/PICHTR. The Principal Investigator and the Director of RCUH's Human Resources must be contacted immediately; (2) Due to the serious nature of firearms use, any violation of this SOP or

RCUH policy will result in severe disciplinary action (including up to possible termination of employment).

g) Temporary Disqualification: An employee may be temporarily disqualified if the employee fails to self-disclose his/her disqualification; fails to pass the criminal record history background check; is disciplined for violation of RCUH policy, misconduct, or failure to follow established project or safety rules; or is under RCUH personnel investigation; or for other reasons deemed appropriate by the RCUH Director of Human Resources. The PI or project supervisor must report the temporary disqualification immediately to the RCUH Director of Human Resources. Employees deemed temporarily disqualified will be barred from (a) participating in any project/work activities involving the use of firearms and/or ammunition and (b) bringing any personal firearms or ammunition onto RCUH, UH, or project property. They may also be placed on a disciplinary suspension without pay pending investigation.

4. PROCEDURES:

a) REQUIREMENTS: Project firearms use by ANRP staff and personal firearms shall be limited to those identified and approved by the Firearms Custodian to accomplish assigned job duties and project needs. Staff using firearms must complete the following prior to being authorized to use firearms:

i) Pass the firearms safety certification(s) from the National Rifle Association (NRA) or equivalent (Pistol/Rifle/Shotgun, as applicable). A refresher course will be required at least once every five (5) years.

ii) Pass the State of Hawaii Hunter's Safety Course.

iii) Pass an annual criminal background check. Individuals under indictment for, has waived indictment for or been convicted of a felony, crime of violence (as defined in Hawaii Revised Statutes 134-1) or is prohibited from owning, possessing or controlling any firearm or ammunition for any other reason specified in Hawaii Revised Statutes 134-7 will be prohibited from possessing or using any firearms. Individuals arrested for any felony or crime of violence must inform the NRM Operations Manager immediately (i.e., first day of work or activity) and will be temporarily suspended from using any firearm until such arrest has been formally adjudicated.

iv) Provide a copy of ownership registration for all personal firearms approved by the Firearms Custodian for use in ANRP Invasive Vertebrate Management program.

v) Read and understand this Firearms SOP provided by the Firearms Custodian and sign the Firearms SOP Acknowledgement – Employee form annually.

vi) Abide by all state and federal laws relating to firearms, this Firearms SOP, and any other applicable RCUH/PICHTR/ANRP SOPs.

vii) Pass the Wilderness First Aid training every two years (or three years if applicable).

b) STORAGE :

i) There will be no ANRP project owned firearms.

ii) Storage of staff personal firearms on base will not be permitted.

iii) In field areas or other remote base camps where a gun safe is not available, the field supervisor or individual in charge is responsible to ensure that all firearms, accessories, and ammunition are stored in a secure and safe manner.

iv) All ammunition required for the ANRP approved staff personal firearms shall be stored in a gun safe and accessible to only the Firearms Custodian.

c) AUTHORIZED FIREARMS AND AMMUNITION:

i) Approved ANRP employees may bring their firearm to the workplace only when preparing for the immediate deployment to the field operation or returning from a field operation requiring the firearm. The workplace is defined as the office, baseyard, and/or field camping sites, and in a ANRP vehicle being used to transport staff from the baseyard to a work site requiring the firearm, and back.

ii) Only project-purchased ammunition will be used for personally-owned firearms. USE OF PERSONAL AMMUNITION IS PROHIBITED.

d) SAFE TRANSPORT: All safety precautions and procedures will be followed, including:

i) Prior to leaving the ANRP baseyard, the Firearms Custodian will inspect the ANRP staff-owned firearms to ensure they are clean and in working order; if the personal firearm has not been maintained and does not appear functional, the Firearms Custodian will disallow its use until the firearm is cleaned and in proper working order. The Firearms Custodian will issue the ammunition for the approved staff firearm at that time.

ii) When en route to the field meeting area from ANRP baseyard or from a location, all personal-owned firearms must be unloaded in their case with lock engaged, and placed in the vehicle trunk or under/behind the seat, or covered and out of view. Ammunition issued at the ANRP baseyard must be stored out of view, in a separate location, and not within any occupant's reach (State statute 134-5a and 134-6c).

iii) ANRP staff with firearms being driven in a state or private vehicle to an initial field meeting may not take their firearms out of their vehicle until instructed by the Field Supervisor. The meeting area is normally a location where all those participating in the ANRP managed operation initially meet; this location may also be the start of the operation. On some occasions, the meeting area may be used to consolidate vehicles prior to driving to the project area to lessen the number of vehicles on the

road or traversing private or government lands. For those occasions, the firearms may be transferred from one vehicle to another's safe/secured site.

iv) Only after this briefing will the ANRP staff be allowed to remove their approved firearm from the vehicle to start the operation.

v) Written or email approval must be obtained from any landowner before transporting and using a firearm on their property.

vi) When flying in OAS-approved helicopters, the firearm shall be unloaded, in its case with lock engaged and, if possible, transported in an external load.

(1) If external loads are not part of the helicopter operation, firearms and ammunition will be transported within the back-seat area or in an approved cargo pod of the MD500D or E model helicopter or rear cargo compartment for Bell or Eurocopter helicopters.

(2) For the MD500D/E handguns will be in a backpack and secured; rifles and shotguns will be in their case and secured in the back-seat area.

(3) Pilot must be notified ahead of time and give permission for the firearms and ammunition to be transported internally.

e) FIELD OPERATIONS:

i) Prior to use of a firearm in the field, a written checklist will be completed to ensure that all individuals will have and carry all safety equipment and PPE, including:

(1) First aid kit

(2) Radio or cell phone and spare battery; if the activity area has no radio or cellular phone coverage, an EPIRB or PLB will be taken.

(3) Ear and eye protection

(4) High visibility cap, and high visibility shirt or vest

ii) While in the field and being carried from point A (start of the hike) to point B (where it will be used), handguns must be unloaded, in their case and carried in a backpack; rifles and shotguns will be unloaded.

(1) When in an area where the firearms will be used, the firearms will be removed from their case. Handguns may be loaded and holstered (if personally available) but returned to their case unloaded for safety when not in imminent use. Rifles and shotguns will be loaded only when they will be used immediately or imminently.

(2) When the firearm is no longer being used for the operation, the empty casing(s) or unfired cartridge(s) are to be ejected and collected if practicable. The unloaded firearm is then to be placed in its carrying case and locked.

(3) There shall be no deviation when returning from ANRP managed operations with ANRP issued firearm and ammunition in the vehicle. The most direct route will be taken.

(4) No firearm shall be left unattended upon return to the ANRP base yard.

(5) The firearm will be stored unloaded in its locked case in the owner's vehicle until the close of business.

f) CHECKOUT AND CHECK-IN:

i) The Firearms Custodian shall issue ammunition to the employee and update the appropriate ANRP Ammunition Inventory Sheet. After the operation, ANRP staff will return all unused rounds and if practicable to collect, the empty casing(s) and/or ejected unfired cartridge(s) to the Firearms Custodian; the ANRP Ammunition Inventory Sheet will be updated as necessary.

g) ADDITIONAL SAFETY MEASURES:

i) ANRP approved staff are required to maintain their personal firearm in a safe operable condition; if in doubt, they are responsible for having their firearms checked by a reputable certified gunsmith or individual.

ii) Know how to use the firearm safely. Know the basic parts: how to safely open and close the action, and how to remove ammunition from chambers and/or magazines.

iii) Carry only one type of ANRP issued ammunition to avoid mixing different types.

iv) Employees are responsible for matching the ammunition with the firearm and know the maximum range of the ammunition.

v) During a ANRP operation:

(1) Know your target! Never rush a shot and at NO TIME take a shot without positively identifying the target and the background.

(2) Wear eye and ear protection as appropriate.

(3) Never fire at surfaces that can cause a bullet, shot, or slug to ricochet, such as water or hard flat surfaces.

(4) If you notice an employee using a firearm and showing signs of fatigue, stop the operation and have that person unload their firearm and place it back in the case.

(5) Maintain radio or verbal communications at all times.

(6) Wear bright-colored safety vest or T-shirt and cap at all times during the operation.

(7) Carry the firearms in a safe and secure manner with an empty chamber when not in use.

(8) Always point the muzzle in a safe direction during the operation.

vi) If the cartridge fails to fire when the trigger is pulled, keep the firearm pointed in a safe direction as it might still fire. Do not attempt to open the action to remove the cartridge for at least 30 seconds. Contact the Firearms Custodian as soon as practicable; do not use that firearm until the Firearms Custodian has cleared it for use.

vii) If you notice anything unusual when a shot is fired, such as a difference in recoil or in noise, stop using the firearm immediately. Keep the muzzle pointed in a safe direction, keep your finger off the trigger, and unload the firearm after 30 seconds. With the action open, safely inspect the barrel for obstructions. Contact the Firearms Custodian as soon as practicable; do not use that firearm until the Firearms Custodian has cleared it for use.

h) SEMI-ANNUAL SITE INSPECTIONS: The Principal Investigator (PI) and/or his designated representative will semi-annually inspect the ANRP ammunition inventories. They will notify the NRM Operations Manager and Firearms Custodian prior to the inspection. The semi-annual inspection will include:

i) Examining each firearm to ensure it is being maintained, such as the firearm is clean, there are no broken or missing parts, and the action smooth during dry firing. The PI/designated representative will verify that he has inspected the firearm and the Chain of Custody Form is accurate by signing and dating each firearm's form.

ii) Inventory each type of ammunition via the Ammunition Inventory Sheet to ensure the amounts on-hand are reflected accurately on the inventory sheet. The PI/designated representative will sign and date each Ammunition Inventory Sheet to verify its accuracy. If the totals do not match, the PI/designated representative will inquire with the Firearms Custodian to resolve the difference.

i) **Reviews and Updates**: This SOP will be reviewed and updated annually (before July 1st of the year). The SOP may be reviewed at any time if additional procedures or safety updates will improve the document; an electronic update will be sent to the PI for his review and approval. A new signature page will be completed for final approval.

5. APPENDICES
    a) Ammunition Inventory Form
    b) Firearms Field Checklist

ANRP SOP – Firearms

Signature Page

Approved by/Date:

Dr. David Duffy, Principal Investigator
Pacific Cooperative Studies Unit

Approved by/Date:

Dennis Teranishi, Principal Investigator
Pacific International Center for High Technology Research

Submitted by/Date:

Dr. Clifford Smith/NRM Operations Manager
The Army Natural Resources Program on Oahu

Submitted by/Date:

Matthew D. Burt, Firearms Custodian
The Army Natural Resources Program on Oahu

Submitted by/Date:

Jobriath Rohrer, Firearms Custodian (backup)
The Army Natural Resources Program on Oahu

PACIFIC COOPERATIVE STUDIES UNIT/
PACIFIC INTERNATIONAL CENTER FOR HIGH TECHNOLOGY RESEARCH

FIREARMS SOP ACKNOWLEDGEMENT - Employee

DATE: _____

TO: Dr. Clifford Smith, NRM Operations Manager

Matthew D. Burt, Firearms Custodian

Jobriath Rohrer, Firearms Custodian (back-up)

FROM: _____
(Employee Name)

I acknowledge reading and understanding the ANRP SOP Firearms. I further acknowledge that I will abide by the policies and procedures of this SOP. I understand that failure to self-disclose any disqualification during the annual re-certification criminal history background check will result in severe disciplinary action.

If I am using my own personal firearm for the ANRP Invasive Vertebrate Management program, I will submit the required certifications and ownership registration papers for applicable firearm(s), and present my firearm and lock for inspection by the Firearms Custodian prior to each use. I also acknowledge that my firearm and accessories (e.g. lock, scope, case, strap, etc.) are in operable condition for the ANRP Invasive Vertebrate Management program; should an item become damaged during the activity I will replace or repair the item personally, at no cost to the project.

If I fail to follow any ANRP SOP and/or RCUH policy, I acknowledge that my use of firearms will be revoked and disciplinary action may be taken.

_____ _____

Signature Date

Standard Operating Procedure (SOP) for
Safe Use of Rock Hammer Drill

Using the Rock Hammer Drill to install a new section of fence

1. PURPOSE. The purpose of this SOP is to outline steps to be followed for the safe use of power tools.

2. SCOPE. Includes procedures for field operations with power tools.

3. RESPONSIBLITIES.

   a) Natural Resource Management Supervisor: Ensure that risk assessments and safety plans are completed incorporating procedures. Review procedures with Natural Resource Management Staff quarterly to ensure understanding and compliance.

   b) Natural Resource Management Staff: Use power tools in accordance with SOP. Failure to comply with this SOP may result in disciplinary action.

4. PROCEDURES. Read all manufacturer's instructions carefully before operating a power tool. The following safety precautions should be observed by all users of power tools:

   a) Work Area

      i) Do not operate power tools in explosive atmospheres, such as in the presence of flammable liquids and gases.

      ii) Keep by-standers and visitors away while operating a power tool.

   b) Electrical Safety

      i) Double Insulated tools are equipped with a polarized plug (one blade is wider than the other). This plug will fit in a polarized outlet only one way. If the plug does not fit fully in the outlet, reverse the plug. If it still does not fit, contact a qualified electrician to install a polarized outlet. Do not change the plug in any way.

      ii) Don't expose power tools to rain or wet conditions.

      iii) Do not abuse the cord. Never use the cord to carry the tools or pull the plug from an outlet. Keep cord away from heat, oil, sharp edges or moving parts. Replace damaged cords immediately.

      iv) When operating a power tool outside, use an appropriately rated outdoor extension cord marked "W-A" or "W."

      v) Inspect the power cord itself and attachment points prior to and after each use for wear or damage.

      vi) Read the user manual for a complete list of precautions.

   c) Personal Safety:

Required PPE	Suggested PPE	Required Training
• Protective gloves • Eye and hearing protection	• Long sleeves can reduce exposure to dust that can cause skin irritation	• Evaluation by Ungulate Manager

      i) Stay alert, watch what you are doing and use common sense when operating a power tool. Do not use tool while tired or under the influence of drugs, alcohol, or medication.

      ii) Dress properly. Do not wear loose clothing or jewelry. Contain long hair. Keep your hair, clothing, and gloves away from moving parts. Closed toed shoes required.

      iii) Avoid accidental starting. Be sure switch is "OFF" before plugging in.

iv) Remove adjusting keys or wrenches before turning the tool “ON”.

v) Do not overreach. Keep proper footing and balance at all times.

vi) Use safety equipment. Always wear eye and hearing protection.

vii) Use the correct tool for your application.

d) Tool Use and Care.

i) Firmly grasp the trigger handle and auxiliary handle (if provided) to maintain control. Always hold or brace the tool securely. Brace against stationary things for maximum control.

ii) In a binding situation, the tool will react in the opposite direction of the turning bit. When drilling into the workpiece (clockwise), the tool will try to spin counterclockwise.

iii) Don’t force the tool– apply enough pressure to keep the bit cutting or chipping smoothly. If the motor slows down, relieve the pressure. Too much pressure can damage the bit and cause you to lose control of the tool.

iv) If the bit binds in the workpiece, release the trigger immediately. Unplug the tool, and then free the bit from the workpiece.

v) Do not use a lock-on button when drilling in warped, pitched, knotty, or imbedded materials (e.g., reinforcing bars in concrete) where binding may be more common. Do not try to free a jammed bit by starting and stopping the tool.

vi) As you get close to breaking through the workpiece, reduce pressure and allow the bit to pass through the hole easily.

vii) Always keep a firm footing when using power tools. Be sure you have balance and control before you start the job.

viii) Remove material or debris from the area, especially if it could be ignited by hot chips or friction.

ix) Do not use tool if switch does not turn it “ON” or “OFF”.

x) Disconnect the plug from the power source before making any adjustments, changing accessories, or storing the tool.

xi) Maintain tools with care. Keep cutting tools sharp and clean.

xii) Check for misalignment or binding of moving parts, breakage of parts, and any other condition that may affect the tools operation. If damaged, have the tool serviced before using.

xiii) Use only accessories that are recommended by the manufacturer for your model.

e) Service

i) Tool service must be performed only by qualified repair personnel.

ii) When servicing a tool, use only identical replacement parts. Follow instructions in the Maintenance section of this manual.

f) Rotary Hammer Safety Rules

i) Hold tools by insulated gripping surfaces when performing an operation where the cutting tool may contact hidden wiring or its own cord.

ii) Wear ear protectors when using the tool for extended periods.

iii) Use a metal detector to determine if there are gas or water pipes and explosive ordnances hidden in the work area or call the local utility company for assistance before beginning the operation.

iv) Always use the side handle for maximum control over torque reaction or kick-back. Never attempt to operate this tool with one hand.

v) Always wear safety goggles or eye protection when using this tool. Use a dust mask or respirator for applications which generate dust.

vi) Use thick cushioned gloves and limit the exposure time by taking frequent rest periods.

vii) Position the cord clear of rotating bit. Do not wrap the cord around your arm or wrist.

viii) Position yourself to avoid being caught between the tool or side handle and walls or posts.

ix) Do not strike the bit with a handheld hammer or sledge hammer when attempting to dislodge a bound or jammed bit.

x) Never place the tool down until the bit or accessory has come to a complete stop. Do not use dull or damaged bits and accessories.

xi) When removing the bit from the tool avoid contact with skin and use proper protective gloves when grasping the bit or accessory.

xii) Do not run the tool while carrying it at your side.

5. APPENDICES

a) HILTE Operating Instructions

Standard Operating Procedure (SOP) for
Safe Use of the Chipper

1. PURPOSE. The purpose of this SOP is to outline steps to be followed for the safe use of chippers in the field.

2. SCOPE. Includes procedures for field operations with chippers.

3. RESPONSIBLITIES.

   a) Natural Resource Management (NRM) Supervisors: Review procedures with NRM Staff to ensure understanding and compliance during safety briefings. Ensure staff has all appropriate training.

   b) NRM Staff: Use chipper in accordance with SOP.

   c) Ensure that risk assessment and safety plans are completed incorporating procedures.

   d) Failure to comply with this SOP may result in disciplinary action.

Chipper at Palikea North Snail Enclosure Site

4. PROCEDURES. Read all manufacturer's instructions carefully before operating chipper. The following safety precautions should be observed by all users:

   a) General Considerations.

      i) Do not operate chipper when fatigued or distracted. Using a chipper requires the full attention of the operator and any other personnel in the nearby area.

ii) Be aware of all other personnel in area whenever chipper in use.

b) Product information

i) Model: 65XP Brush Bandit.

ii) Engine: Caterpillar, CAT T3, model C1.5, diesel

iii) 1 year warranty, beginning 28 Jan 2009

c) Training.

i) Watch safety DVD provided by Bandit.

ii) Read Bandit Accident Avoidance Booklet and Safety Procedures section of operation manual.

iii) Read and sign this SOP.

iv) Consult Field Use Checklist before use; keep copy with machine for reference (see appendix).

d) Protective equipment required for chipper use.

Required PPE	Suggested PPE
• This applies to Staff working directly with chipper, i.e., feeding material into the hopper. • Snug fitting clothing. NO loose fabric, jewelry, watches, hair, or other items which could be caught in chipper or debris. • Snug-fit gloves • Hard hat • Hearing protection • Safety glasses • Safety footwear	• Hearing protection should be worn when working around chippers.

i) Prolonged exposure to excessive noise is fatiguing and could lead to impaired hearing. The use of proper ear protection can reduce this potential hazard.

e) Fuel considerations.

i) Never let the engine run dry; refill the engine before fuel runs out.

ii) Don’t store fuel for long periods of time; moisture can get into the fuel and cause operational problems.

iii) Re-fuel only where there is good ventilation.

iv) Transport fuel in approved metal cans and MSR bottles.

v) The chipper runs on diesel fuel. Diesel fuel is considered a hazardous material. PPE (gloves, eye protection) should be worn when handling diesel fuel. Biodiesel may be used; this option will be investigated as biodiesel is much less hazardous than regular diesel.

vi) Report any fuel spills immediately by calling the DPW Hazardous Waste Branch (656-1111).

f) Operation guidelines.

i) Do not allow other persons to be near the chipper, particularly the infeed tray and outflow tray when chipper is in use. Do not, however, operate the chipper unless another coworker is present to respond to an incident.

ii) Do not begin operations until all personnel working on project have been briefed on a work plan, are clear on work roles, and understand basic safety.

iii) Ensure chipper is secured and will not roll or move.

iv) Keep a fire extinguisher with the chipper whenever it is in use.

v) Do not operate a damaged, poorly functioning or out-of-adjustment chipper.

vi) Perform a pre-operation and after-operation check of the chipper; follow the Field Use Operation Checklist. Ensure that all warning stickers are in place and visible. Ensure that no tools or other foreign objects are in the chipper (especially the infeed tray) or are unsecured.

vii) Operators must be within reach of feed controls and shut-off devices whenever the chipper is in use.

viii) Direct the discharge chute away from personnel, areas of activity, and ideally downwind.

ix) Do not place one's body on the chipper in any way when it is in use.

x) NEVER reach into the infeed hopper area of the chipper. Feed-wheels are built to pull in large cumbersome trees; they do NOT let go. Use the wooden push paddle to push debris into the infeed hopper. Use the reverse bar to clear jammed items. There is a Last Chance Stop cable; do not assume that it will save you; you should never be within 3 ft of the Last Chance Stop cable.

xi) Do not feed the following into the hopper: vines, vine-like material, wires, stones, nails, metal, or materials which contain metal objects.

xii) Stand to the side of the infeed hopper when feeding material to the chipper. Be aware that material can rotate and move rapidly once it is being pulled in by the feed-wheels. Back away from the chipper to ensure that you are not hit by branches. Keep a clear escape path. Always feed the larger end of the tree/brush into the hopper first.

xiii) Keep engine RPMS at full throttle for all material being chipped.

Crew conducting a safe chipper operation

g) Maintenance.

i) Follow maintenance directions outlined in the manufacturer's operation and parts manual. This maintenance shall be conducted by approved staff. Only staff familiar with machine operation, machinery maintenance, and briefed by Allied Machinery will be approved.

ii) Always ensure that the engine is off, the disc has come to a full stop, the disc lock pin has been installed, the battery is disconnected, and the key is removed from the ignition before starting any maintenance.

iii) When resuming operations, ensure that the chipper hood is closed and locked with the hood pin, the disc lock pin has been removed, the battery is connected, and all tools, etc. have been removed.

iv) The chipper will be taken to a suitable repair shop for any complex maintenance operations. Also, any repairs or troubleshooting required will be conducted by a qualified mechanic. If needed, the vendor can send a mechanic into the field.

v) Basic maintenance tasks which can be done by staff are outlined in the Bandit Checklist: Maintenance, attached as an appendix.

h) Transport.

i) All transportation procedures outlined by the manufacturer in the operation manual shall be followed. These include:

(1) Chipper is turned off, debris removed, feed-wheel lowered, all controls turned to "off,' infeed pan to hopper folded and latched, tools and movable parts secured and nothing dragging on ground.

(2) Ensure that the hitch and coupling sizes match. Secure and lock hitch. Lift foot pad jack and secure. Cross safety chains under hitch, leaving slack, and latch to hitch. Plug in electrical cord and check to make sure lights work. Check tire pressure.

ii) The towing vehicle must be sized to handle the hitch weight, towing weight, and braking weight required by the chipper.

iii) The towing vehicle shall be driven responsibly, following all speed regulations for equipment towing. Drivers will be reviewed to ensure that they are competent in driving a trailer, including reversing the trailer, see SOP #35, Trailer Use.

iv) The following additional considerations shall be taken into account when the chipper is flown into remote work sites.

(1) Only experienced, helicopter-use trained staff will sling the chipper.

(2) The weight of the chipper is approximately 2800 lbs. Only helicopters rated to carry this amount of weight will be used in sling operations. Helicopters with this capability are the Huey or Blackhawk. Pilots will be briefed on the weight of the chipper.

(3) The chipper shall be rigged with at least 3 straps to create a stable flying and landing platform.

(4) All movable parts will be secured or removed prior to flight. Parts that are removed will be flown in an approved helicopter bag or sling.

(5) Fuel will be removed prior to flight.

5. APPENDICES (digital only)

a) Chipper Field Use Checklist
b) Chipper Operation Gear List
c) How to Chipper (digital only)

Standard Operating Procedure (SOP) for
Safe Use of Forklifts

1. PURPOSE. The purpose of this SOP is to outline steps to be followed for the safe use of forklifts.

2. SCOPE. Includes procedures for operations with forklifts.

3. RESPONSIBLITIES.

   a) Natural Resource Supervisors: Review procedures with NRS to ensure understanding and compliance during safety briefings. Ensure staff is certified.

   b) Natural Resource Staff: Execute forklift operations in accordance with SOP.

   c) Failure to comply with this SOP may result in disciplinary action.

4. PROCEDURES.

   a) Only trained personnel with current authorization are allowed to operate Forklifts. Authorization requires successful completion of initial classroom training, hands-on work-area specific training (practical), and a driving test (evaluation). Recertification must be accomplished at least every three years.

   b) The operator should conduct a pre-start visual check with the key off and then an operational check with the engine running. The forklift should not be operated if the inspections show that the vehicle may not be safe to operate.

      i) Pre-operational inspection will check a variety of items, including but not limited to:

         (1) Fluid levels -- oil, water, and hydraulic fluid.

         (2) Leaks, cracks or any other visible defect including hydraulic hoses and mast chains. NOTE: Operators should not place their hands inside the mast. Use a stick or other device to check chain tension.

         (3) Tire condition and pressure including cuts and gouges.

         (4) Condition of the forks, including the top clip retaining pin and heel.

         (5) Load backrest extension.

         (6) Finger guards.

(7) Safety decals and nameplates. Ensure all warning decals and plates are in place and legible. Check that information on the nameplate matches the model and serial numbers and attachments.

(8) Operator manual on truck and legible.

(9) Operator compartment. Check for grease and debris.

(10) All safety devices are working properly including the seat belt.

ii) The operational inspection includes:

(1) Accelerator linkage

(2) Inch control (if equipped)

(3) Brakes

(4) Steering

(5) Drive control: forward and reverse

(6) Tilt control: forward and back

(7) Hoist and lowering control

(8) Attachment control

(9) Horn

(10) Lights

(11) Back-up alarm (if equipped)

(12) Hour meter

iii) Passengers are not permitted on or in the forklift or load.

iv) Fill fuel tanks out of doors while the engine is off.

v) Operators must wear seatbelts on all such equipped lifts

vi) Forklifts will be equipped with an audible back-up alarm when possible if not possible then a spotter will be used.

c) Mounting and Dismounting

i) Be sure that your hands are clean and dry to prevent slipping when grabbing handhold.

ii) Grasp handhold and get a good grip. Never grab the steering wheel because it could cause you to lose balance if it moves.

iii) Wear appropriate footwear to prevent skids. Always be careful with your footing when mounting and dismounting vehicle, check your shoes for grease before entering the vehicle.

iv) Pull or lower your body carefully into or out of cab. Dismounting is the opposite of mounting -- do not jump.

d) Safe Handling Preparation

i) Secure the load so it is safely arranged and stable. Do not carry damaged merchandise unless it has been secured by wrapping or banding.

ii) Do not exceed the safe load capacity of a forklift at any time. Do not counterweight a forklift to increase its lifting capacity.

iii) When unloading trucks or trailers, the brakes on the vehicle must be set (locked) and the wheels chocked.

iv) No person is permitted to stand or walk under elevated forks.

e) Picking Up the Load

i) Approaching

(1) Approach the load slowly and carefully.

(a) Stop 20 to 30 cm (8 to 12 inches) in front of the load. (Figure 4)

(b) Be certain that the truck is placed squarely in front of the load and that the forks are at the correct height.

(c) Set the direction control to neutral

(2) Do not raise or lower the forks unless the forklift is stopped and the brake is set.

(3) Prior to raising the load, ensure there is adequate overhead clearance. Vision is obstructed after the load is elevated.

(4) Use the inching pedal to creep the load to the stack.

ii) Mast Position

(1) Use extreme care when tilting loads. Do not tilt forward with forks elevated except when picking up or depositing a load. When stacking or tiering, tilt backward only enough to stabilize the load.

(2) Use extra caution when handling loads that approach the truck's maximum rated capacity:

(a) Tilt the mast back and position the heaviest part of the load against the carriage.

(b) Travel with the mast tilted back to keep the load stable.

(3) Tilt the mast forward cautiously when positioning the load onto the stack.

(4) Never travel with the load tilted forward. Tilting the load forward increases the load distance and makes the load less stable.

iii) Fork Position

(1) Level the forks before inserting them into the pallet. Do not lift a load with one fork.

(2) The forks must be placed under the load as far as possible. Center the load as nearly as possible. Distribute the heaviest part of the load nearest the front wheels of the forklift.

(3) Slide the forks into the pallet until they are fully under the load. The forks should be at least two-thirds the length of the load

(4) Be careful that the forks do not go through to the other side where pallets are closely stacked.

(5) Center the weight of the load between the forks. Adjust the forks to distribute the weight evenly. Note that forks are adjustable either manually or with a fork positioner.

(6) Tilt the mast back carefully to stabilize the load.

(7) Pick up an off-center load carefully. There is a greater danger of a tipover.

iv) Lifting Load

(1) Check that there is adequate overhead clearance before raising the load. This is especially true when high tiering or in a confined space like a truck trailer. There must be sufficient headroom under overhead installations, lights, pipes, sprinkler systems, etc.

(2) Carefully lift the load up above the lower stack about 10 cm (4 inches).

(3) Lift the load clear and then tilt the mast back slightly to rest the load against the load backrest extension.

(4) Ensure that the load does not catch on any obstructions.

(5) Slowly return the lift control lever to the neutral position.

v) Lowering the Load

(1) Ensure the load is secured before moving.

(2) Carefully tilt the mast backward to stabilize the load.

(3) Slowly move the truck to 20 to 30 cm (8 to 12 inches) away from the stack.

(4) Stop the truck.

(5) Return the mast to the vertical position before lowering the load.

(6) Lower the load so that its lowest point is 15 to 20 cm (6 to 8 inches) from the floor.

(7) While traveling, keep the load at a safe travel height.

f) Moving the Load

i) The operator's view should not be obstructed by the load. In the event of a high load, the forklift should be driven in reverse.

ii) Operators must look in the direction of travel.

iii) The forks should not be operated while the forklift is traveling.

iv) When the forklift is not carrying a load, the operator must travel with the forks as low as possible (maximum of 4 inches on paved surfaces). When carrying a load, it should be carried as low as possible (consistent with safe operation, 3 to 12 inches above the surface).

v) On a downgrade, the forklift should be driven in reverse, and the forks raised only enough to clear the surface.

vi) On an upgrade, the forklift must be driven in the forward direction, following the load, and the forks raised only enough to clear the surface.

vii) Use extra care when handling long lengths of bar stock, pipe, or other materials.

viii) Avoid sharp or fast end-swings.

ix) Compressed gas cylinders must be moved only with special pallets designed for this purpose.

x) Operators should avoid making jerky starts, quick turns, or sudden stops. The operator is not permitted to use reverse as a brake.

xi) Forklifts should be driven on the right side of the road or aisle-way.

xii) Forklifts must be operated at a safe speed with due regard for traffic and conditions.

xiii) Slow down on wet and slippery surfaces and at cross aisles or locations where vision is obstructed.

xiv) Operators entering a building or nearing a blind corner must make their approach at reduced speed, sound the horn, and proceed carefully.

xv) Standard arm signals will be used at all times.

xvi) Operators must give pedestrians the right-of-way at all times.

xvii) Operators must not drive toward any person who is in front of a fixed object or wall.

xviii) Operators should not put their fingers, arms, or legs between the uprights of the mast, or beyond the contour of the forklift.

xix) Operators must drive with both hands on the steering wheel. Horseplay is prohibited. Do not drive with wet or greasy hands.

xx) No person is permitted to ride as a passenger on a forklift or on the load being carried.

g) Parking

i) Forklifts must be safely parked when not in use. The controls must be neutralized, power shut off, brakes set, key removed, and the forks secured in a lowest position, flat on the surface, and not obstructing walkways or aisles.

ii) A forklift may not be left on an incline unless it is parked safely and the wheels blocked.

iii) Forklifts may not be parked in areas that will block exits, stairways, fire extinguishers or any other emergency equipment.

Standing Operating Procedures (SOP) for
Herbicide Ballistic Technology Operations: Ground and Aerial Herbicide Application

1. PURPOSE. The purpose of this SOP is to outline safe procedures and methods to follow when conducting Herbicide Ballistic Technology (HBT) operations.

2. SCOPE. Includes procedures for field operations of HBT.

3. RESPONSIBLITIES.

   a) Natural Resource Management Coordinator: Review procedures with designated Applicator and any other staff involved in HBT operations to ensure understanding and compliance. Conduct safety briefings prior to any HBT operation. Ensure staff has all appropriate certifications.

   b) Applicator: Execute HBT operations in accordance with SOP. The designated Applicator shall be the only Applicator of HBT. During field operations, the Applicator will be responsible for the safe application and reloading of HBT systems.

   c) Support staff: Execute HBT operations in accordance with the SOP. Provide field assistance to Applicator, under the direct supervision of the Applicator.

   d) Helicopter Manager: In aerial operations, the Heli-Manager is responsible for the overall safety of the helicopter components of the HBT operation.

   e) Designated Flight Follower: In aerial operations, the DFF shall flight follow the helicopter by monitoring the radio communications, and if available, through the AMD-approved Contractor or On Call vendor's Automated Flight Following. If no AFF is available, radio communication will be made between the DFF and helicopter every 15 min at minimum.

   f) Helicopter Pilot: Execute aerial operations in accordance with the SOP and all relevant ANRP helicopter use policies and contracts. During HBT operations, the pilot shall exercise final responsibility for all in-flight decisions, including: cancelling the operation; determining whether the target site is safe to approach based on weather, terrain, etc.; and determining whether the Applicator is operating safely. In addition, the pilot may, with cause, deny flight status to any involved staff.

   g) Failure to comply with this SOP may result in disciplinary action.

4. PROCEDURES.

   a) General Considerations

i) HBT is a method of delivering discrete amounts of herbicide to target weed species. Adapted from commercial paintball equipment, HBT systems include projectiles filled with herbicide, propellant, and a marker. HBT may be applied from the ground or aerially.

ii) Compliance with SOP No. 2 Helicopter Field Operations, SOP No. 7 Pesticide Use, and Helicopter Safety and Management Plan is required.

iii) Definition of basic HBT terms:

(1) **Accuracy**- A ratio of projectile hits/misses within the target area, which should be >95% during operations.

(2) **Applicator** - administers HBT application.

(3) **Dose**- A measure of herbicide volume and concentration necessary to cause a negative effect on the weed target. Dose will be administered in projectile-units per target area.

(4) **HBT**- An acronym for Herbicide Ballistic TechnologyTM, which is a concept for pneumatically administering encapsulated herbicide aliquot projectiles to weed targets with long-range accuracy.

(5) **Hopper**- A projectile retention and delivery magazine that typically retains 150-200 units when loaded. The hopper consists of a ventral feed neck for direct gravity flow of projectiles into the marker breach, and a dorsal lid for reloading with 150-unit pods. Hopper systems can be passive or active feed, with internal battery powered agitators.

(6) **Marker, Pneumatic applicator** - A gas charged (CO2 or high-pressure air) projectile delivery system consisting of a bolt and valve assembly to channel metered gas charges for directional propulsion of HBT projectiles. This document will use marker, the term used by the paintball industry.

(7) **Pod** - A projectile retention vessel and ammunition stockpile unit for reloading the hopper. The capacity is often comparable to the hopper so that one pod will fill the hopper. The pod usually consists of a cylindrical tube with a wide-mouth spring-loaded lid for open transfer of projectiles into the hopper. Pods are sometimes used as a unit of measure in calculating HBT application rates. Operations are determined by increments of pre-loaded pods.

(8) **Projectile** - A frangible 0.68 caliber bifurcated gelatin capsule with spherical dimensions and active liquid herbicidal fill components designed for lethal plant-physiological disruption. May be referred to as **unit** or **units**.

(9) **Propellant** - High pressure air (HPA) and CO2 are the most common propellants with a marker. HPA is the preferred source for consistent projectile propulsion. HPA is stored in **tanks** of varying capacities ranging

from 48 cubic inches to 80 cubic feet. A flexible, coiled remote line often serves as the connection between the tank and the marker. Markers operate with pressures ranging from 200-800psi in order to achieve a muzzle velocity of 300 feet per sec. Pressures are often preset by the factory and generally are not modified. May also be referred to as **air** in this document.

Tank attached directly to marker

Tank attached to marker via remote line

(10) **Range** - The travel distance for projectiles to reach a target with minimum threshold velocity to achieve projectile rupturing upon impact. The typical horizontal range for 0.68 caliber projectiles with an initial muzzle velocity of 300 ft per second is approximately 100 ft. The range could be extended from a helicopter platform with a downward trajectory on the target.

(11) **Target** - An individual or small satellite population of invasive alien plants designated for treatment.

(12) **Target Acquisition, TA** - In aerial operations, a pilot maneuver to position the aircraft within hazard-free airspace and to bring the Applicator's target window within range and trajectory for discharging projectiles.

(13) **Trajectory** - The flight path of a discharged projectile influenced by the ballistic integrity of the projectile, muzzle velocity, wind dynamics and angle relative to gravity. It is expected that the trajectory of a projectile is with a clear line of sight to the target.

(14) **Tank** - A pressurized vessel for retention of the gas propellant to be metered through a regulator valve. Tanks are most often manufactured out of aluminum or spun carbon fiber. Depending on the tank, standard pressure is 3000 psi, but some tanks are also designed to maintain 4500 psi. A 72 ci/3000 psi tank is enough propellant to discharge >1000 units.

b) Product Information

i) HBT systems consist of a marker, projectiles, and propellant.



ii) Markers: a variety of marker brands may be used, including Tippmann. Once markers are purchased, specifications of markers purchased by the program shall be detailed here.

iii) Projectiles: manufactured by Nelson Paint Company, HBT projectiles are biodegradable gelatin capsules filled with herbicide. Various active ingredients and surfactants, at various mix rates may be encapsulated. Active ingredients include triclopyr and imazapyr. Only formulations covered by appropriate EPA Experimental Use Labels or Special Local Needs (SLN) 24(c) labels will be used, for example, SLN 24(c), HBT-IMAZ, by Wilbur Ellis, EPA no. 86199-MI-001.

iv) Propellant: compressed air and tanks will be approved by a certified SCUBA shop. Tanks may be made of metal or carbon fiber.

c) Certification/Training

i) All NRS involved in HBT operations must possess valid State of Hawaii Restricted Use Pesticide certification, Hazcom, and First Aid training.

ii) Applicators should be familiar with the operator's manual and manufacturer's safety guidelines for the marker and shall demonstrate proficiency in safe marker handling and accuracy in application. In the year prior to an application, the Applicator shall achieve 80% accuracy in hitting a 12" plate from 50 ft, 70% accuracy in hitting an 12" plate from 100 ft, and have fired 1000 projectiles (paint or herbicide) in the last quarter. For aerial applications, Applicators must be Crewmember certified.

d) Personal Protective Equipment (PPE).

i) Both Applicator and support staff shall wear all required PPE. If staff are not handling projectiles, nitrile gloves are not required. During helicopter operations, ground crew shall wear nitrile gloves when the helicopter has shut down and they are handling potentially contaminated gear. When the helicopter is operating, nomex or leather gloves shall be worn. Applicators on board the helicopter shall

always wear nomex gloves. Since projectiles are encapsulated herbicide, contamination is only an issue if a projectile ruptures.

Required PPE: Ground Operations	Required PPE: Aerial Operations	Required Training
• Eye protection which covers the entire eye cavity. • Nitrile gloves, when handling projectiles • Barrel cover/ swab • Long shirt, long pants, shoes, socks	• Nomex flight suit • Nomex/leather gloves • All leather boots above the ankle • Non-synthetic garments (cotton, wool) • Flight helmets (on-board helicopter) • Hard hat with eye and hearing protection (ground crew). • Barrel cover/swab	• Hawaii Restricted Use Pesticide Applicator's license • HAZCOM • Demonstrated proficiency and safe handling of markers • First Aid • B-3, Crewmember (aerial operations only)

e) Storage

i) Marker: Markers may be contaminated with pesticides, and shall be clearly labeled as such. They shall be stored in a sturdy, ventilated, locked storage locker in the pesticide storage area at West Base. Access to the locker will be limited.

ii) Propellant and Tanks: See Appendix, Care and Maintenance of Propellant Tanks. Only compressed air shall be used, as compressed CO2 may contain propane. Compressed air tanks shall be secured in a locked storage area at West Base. All tanks should be kept out of direct sun. Caustic cleaners/strippers should never be used on tanks. Tanks will not be overfilled or modified. Tanks will be maintained and filled by professionally trained personnel at a certified scuba shop or equivalent. This includes annual visual and computerized inspection (VIP) for cracks, pitting, or other deformation, and hydrostatic treatment every five years. All tanks will be depressurized prior to long term (six month or more) storage. Inspection logs shall be maintained for all tanks.

iii) Projectiles: manufacturer's recommendations will be followed for storage and handling. Projectiles shall be stored in the pesticide storage area in the sump at West Base. They should be kept cool and dry, in an insulated container. Desiccant may be used to minimize moisture. Heat and moisture can compromise the gelatin skin of the projectiles, causing them to rupture in the barrel of the marker. This can contaminate both the marker and the Applicator with pesticides. Projectiles do not retain integrity indefinitely. Projectiles will be used in a timely manner with older stock used first.

f) Ground Transport

i) HBT equipment shall be secured to prevent movement during transit. In particular, compressed air tanks should be strapped or otherwise secured. Projectiles should be kept in a cooler or other insulated container; they should be clearly labeled as pesticides. Markers and other potentially contaminated equipment should be

transported in a container labeled "Contaminated with Pesticides." All equipment should be protected from sun/heat. HBT equipment should not be left unattended in the back of a truck.

g) Basic Handling and Operation Guidelines

i) Prior to conducting an HBT operation, all staff shall be briefed by the NRMC as to goal, target weed species, location of refilling stations, application zones, and safety.

ii) Inspect all equipment prior to operations. Never use a damaged or out of date tank. Ensure that the marker is functioning properly. Inspect projectiles and ensure that gelatin skins are not broken or leaking. Do not alter/modify equipment without assistance from a qualified professional.

iii) Always exercise care when connecting and disconnecting tank to marker.

iv) Always assume a marker has projectiles and is pressurized. Projectiles can be in the barrel, even if the hopper has been emptied. Likewise, even when the propellant is detached, a small residual air charge often remains in the valve until manually depressurized.

v) Never look down the barrel of a marker.

vi) Always keep the trigger safety on until just before firing. Communicate to support staff when the trigger safety is switched on or off. Use a trigger guard where feasible.

vii) Always use a barrel blocking device when carrying a marker. Remove just before firing, and replace promptly. Barrel blocking devices shut off the barrel, ensuring that if a marker is accidentally fired, no projectiles will be deployed.

viii) Never point a marker at another person. HBT is not paintball and is not a game. Being hit with a projectile can be painful, particularly from close range. Being hit in the eye can result in loss of vision. Also, projectiles are filled with herbicide, not non-toxic paintball filler. Keep markers pointed at the ground.

ix) If a projectile ruptures and NRS are contaminated with herbicide, it should be washed off with soap and water as quickly as possible.

x) HBT projectiles may be applied in a variety of ways. They may be shot at the trunk of trees or at the crown, at the apical meristem of Australian tree fern (Sphaeropteris cooperi), or at the core of shrubs. Different target species respond best to different HBT treatments. Always apply the most effective treatment known.

Scoping HBT treatment sites across a narrow gulch

h) Ground Operations

i) Ground-based operations may involve several Applicators and support staff. All personnel in the area of an HBT operation should have good communication with each other. If staff are beyond easy talking distance, radio contact is required. All staff should be aware of the locations of all other staff. GPS units may be used to track staff locations. See pre-ground operation pre-flight checklist, attached as appendix.

ii) Staff must ensure that they are not pointing the marker at other personnel. Once a target has been identified and the Applicator is in place, s/he shall communicate to all nearby personnel, notifying them that s/he is going to turn the safety off and begin discharging. Nearby personnel must respond before the Applicator can continue. At the conclusion of discharging, the Applicator shall again communicate with nearby personnel, notifying them that the safety is on. These strict communication rules may be relaxed if staff are in different gulches or otherwise protected by terrain, are over 500m apart, and notify each other if crossing into a new location. The Applicator shall consider prevailing wind conditions when determining whether or not to proceed with an application, as herbicide drift is also a hazard to nearby staff.

iii) Reloading. Depending on the operation, staff may set-up and use a designated reloading station, or may reload from their firing locations. In either case, the same safety precautions apply.

(1) Ensure the safety is on and the barrel blocking device is on.

(2) Projectiles: open the hopper, insert pod. As the pod is pressed down onto the mouth of the hopper, it will automatically open and release all projectiles. Ensure the pod is empty. Remove pod and close hopper.

(3) Propellant:

(a) IMPORTANT: Close tank by unscrewing valve pin (opposite thread rotation)

(b) Depressurize marker connection with slide check release (pull back slide check)

(c) Disconnect marker and decompress bolt (or electronically power off)

(d) Depressurize remote line (push slide check forward). Warning! If valve pin is still screwed in, the tank will depressurize at 1000 psi, whipping the remote line hazardously.

(e) Connect marker to new tank

(f) Pressurize remote line by opening tank with pin valve screwed in and slide check pulled back

(g) Compress bolt and pressurize marker (push in slide check)

i) At the conclusion of operations for the day, disassemble the marker system.

i) Ensure that the marker safety is on and barrel blocking device is on.

ii) Bolt decompressed (or electronically powered off)

iii) All tanks closed (valve pins unscrewed)

iv) All remote lines depressurized and secured to the connected tank

v) Disconnect marker from the remote line

vi) Check hopper for remaining projectiles

vii) Empty projectiles from hopper to pod

HBT trial underway

j) Aerial Operations

i) Flight mission planning: Missions shall be planned based on target priorities and overall weed control objectives. Plans will include contingencies should weather in the original area not allow for HBT operations; use of the Risk Assessment form will determine the go/no-go decision for the operation. The goal for each flight mission is to SAFELY treat a maximum number of incipient weed targets with HBT. Pre-flight surveys and target maps are valuable to mission planning. The weed control area should mapped, but specific target points do not need to be mapped within the weed control area. Maps must be available to the Heli-base Manager and Designated Flight Follower.

ii) Applicator equipment and ensemble:

(1) Safety First! Trials will be conducted to identify a standard, safe way to assemble an HBT marker system in a helicopter, with temporary attachments (straps, holsters, etc) to the aircraft, marker and Applicator. The Heli Manager,

Applicator, and support staff will use configurations that will ensure safe and efficient HBT flight operations.

(2) The basic components necessary for the Applicator to administer an HBT application include the marker with loaded projectile hopper and propellant tank reservoir. The three limiting factors in an aerial HBT flight are projectiles, propellant and helicopter fuel. Only quantities of projectiles and propellant that can be safely stored within reach of the Applicator and used during one flight should be carried during a flight; gear should be minimized to what is necessary. All personnel on a flight should be aware of the helicopter's fuel limitations and halt HBT operations to allow adequate time/fuel for the pilot to return to refuel.

(3) All components of the marker system must be:

(a) Secured inside the aircraft during flight operations with minimum potential for position shift or accidental detachment.

(b) Reachable from the Applicator's seated position, but should not impede egress in an emergency.

(c) Quickly and easily jettisonable, using a reliable quick-release mechanism, such as existing seat belt restraints, in case of an emergency.

(d) The HBT system shall be installed under the supervision of the Pilot, Heli-Manager, and Applicator at the beginning of operations, before the first application flight, with the helicopter shut down and rotors stopped.

(4) HBT in-flight gear configuration:

(a) The Applicator will hold the marker while in use. When the Applicator requires both hands free to load projectiles or change tanks, the marker will be secured to the helicopter or Applicator with a detachable single point sling or similar design using a load bearing nomex harness.

(b) The marker will either be directly threaded to the tank (<114 cubic inches) as a single unit or will be connected to a secured stationary tank with a flexible coiled high pressure remote line. The remote line should consist of a pin valve on the tank and a slide check with quick disconnect on the marker for rapid disengagement.

(c) The onboard projectile repository will consist of individual pods (120-150 projectiles per pod) compartmentalized within a retention device secured to the aircraft. Each pod will have a mechanically-activated spring lid to ensure contained transfer of the projectiles into the hopper.

(d) One example of a retention device which meets all above requirements is a milk crate, packed with padding, pods and tanks, secured in the seat next the Applicator using the existing seat belt.

(5) Applicator position. Aerial operations shall use one Applicator. Configuration may vary slightly depending on the helicopter model. In a Hughes 500, the Applicator shall be positioned sitting facing forward, in the rear seat of the aircraft, directly behind the pilot, and shall have a standard 3 or 5-point seat belt which fastens with a metal-to-metal mechanism. The doors of the aircraft shall be removed.

(6) In-flight Communication: The Pilot and Applicator shall have full communication during all operations. The Applicator shall have both momentary ("keyed") and locking ("hot mic") microphone activation; the Heli-Manager should ensure that the helicopter used has this capability. Whenever possible, a foot pad key should be available for the Applicator, as opposed to a hand key.

iii) Pre-flight checklist: Along with standard pre-flight checks, the Heli-Manager will also ensure that the equipment and Applicator are fully prepared. Fill out Pre-Flight Checklist in attached appendix:

(1) Projectile inventory is adequate for achieving operation goals.

(2) Projectiles are housed within a temperature-and moisture-resistant container on the ground, and enough pods are present to facilitate reloading.

(3) Propellant fill station on the ground is fully pressurized and adequate for achieving operation goals.

(4) Projectiles are visually inspected for integrity to maintain true trajectory.

(5) Run a full pod of projectiles through the hopper (detached) to be sure that there are no obstructions.

(6) On the ground, pressurize the marker and administer a series of gas discharges with an empty breach.

(7) A spill kit is present at the staging site.

(8) Water and soap present for washing.

(9) The Pilot is briefed as to the pesticides carried aboard the helicopter, as per AMD Hazmat policy.

iv) In-flight safety: All safety procedures during helicopter flight operations as outlined in SOP no. 2 apply. Added safety procedures specific to HBT operations include:

(1) Always assume that the marker is pressurized and loaded.

(2) When holding the marker, the Applicator shall always be conscious of the locations of all personnel.

(3) The Applicator shall maintain continual verbal notification on the status of the marker safety being on or off.

(4) The Applicator shall always have the safety on, and barrel pointed down and away from other staff, the Pilot, and the helicopter. While in flight, the Applicator shall always keep the barrel pointed within the imaginary target window.

v) In-flight HBT operation:

(1) Personnel onboard during an HBT flight include the Pilot, Applicator, and data support staff (DS).

(2) The DS will record pertinent data (e.g. # of targets, projectiles per target, target density in given area), track the operation with a GPS, assist in spotting target weeds, and monitor the right side/rear of the helicopter for potential obstructions.

(3) Prior to takeoff, the Applicator will pressurize the marker, load the projectile hopper and maintain the system in safety mode as described above.

(4) The Applicator should monitor projectile and propellant levels throughout the flight.

(5) All personnel are responsible for visual target identification (TID).

(6) The pilot will position the aircraft so that the Applicator can acquire the target and discharge projectiles.

(7) The following series of steps illustrates a safe and effective treatment:

(a) Pilot to Applicator TID announcement

(b) Pilot survey of surrounding airspace for hazard-free path to final target acquisition (TA) position

(c) Pilot maneuvers aircraft within target range and clear line of sight trajectory

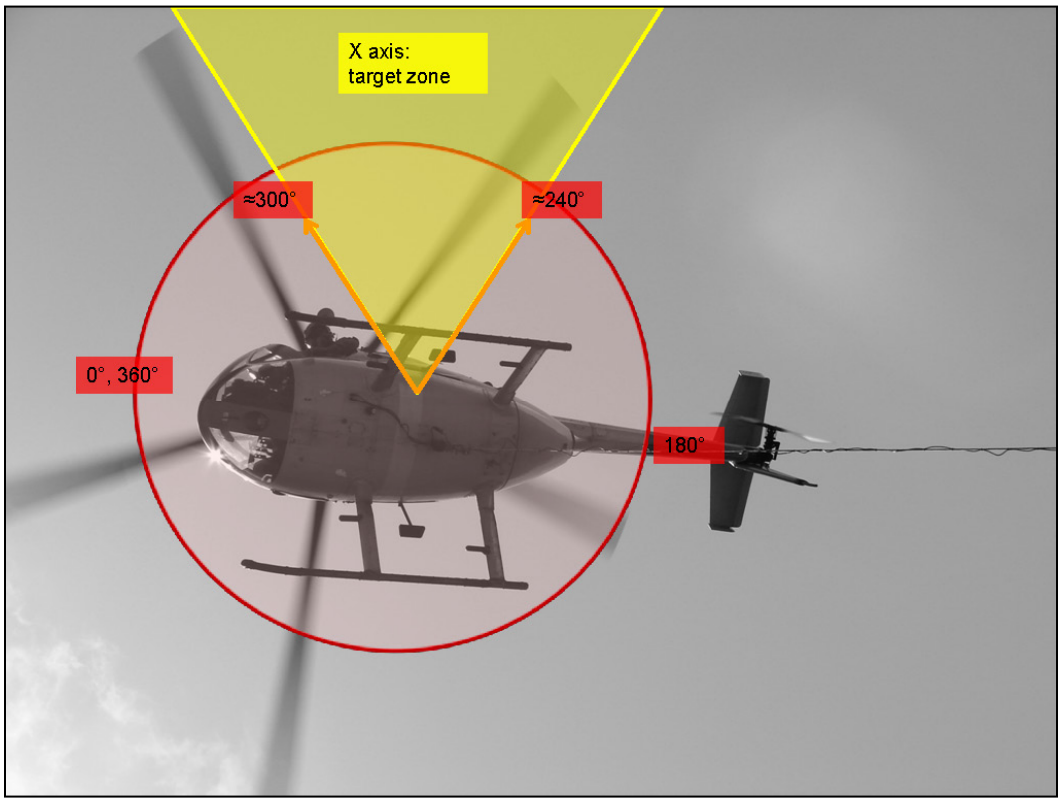
(d) Pilot requests target validation from Applicator (TA complete upon acknowledgement)

(e) Applicator requests permission from the Pilot to discharge projectiles

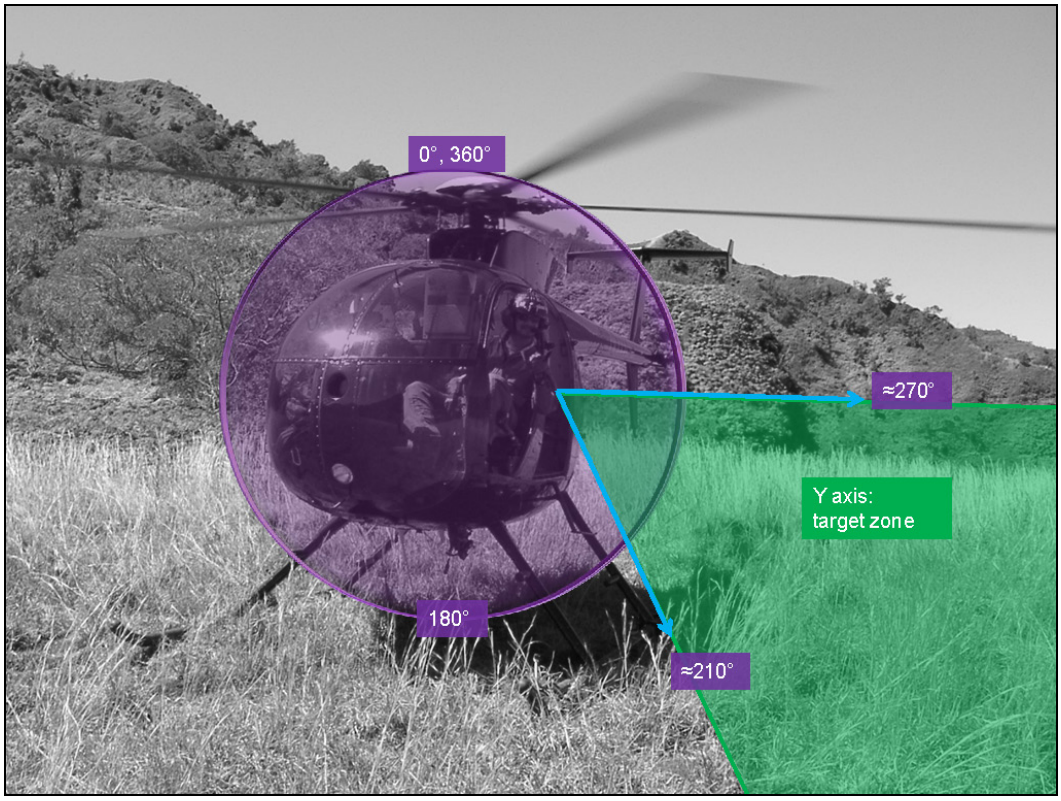
(f) Once Pilot permission is granted, the Applicator takes aim and switches off the safety, notifying the Pilot that the safety has been switched off. The Applicator then discharges projectiles at the weed target.

(g) Upon completion, the Applicator switches the marker back to safety mode and notifies the Pilot that the target has been treated and that the safety is switched on.

(h) The pilot proceeds with moving into position on the next target.



X-axis: roughly 240º-300º, leaving ample buffer towards the pilot, and towards the tail.



Y-axis: roughly 210º-270º, or eye-level to skid.

vi) In-flight reloading: The Applicator is responsible for all in-flight reloading of projectiles and propellant. Properly installed, conveniently positioned pods and tanks allow for quick, simple, and clean reloading.

(1) To reload the hopper, the Applicator will first set the marker safety on and secure it to a detachable single point sling such that both hands are free. The Applicator will open the top lid to the hopper and slide the pod over the mouth. The pod will automatically open via a spring-loaded mechanism as it closes the union with the hopper. This closed transfer system is a contingency to mitigate accidental spillage of loose projectiles within the aircraft. The empty pod will be placed back in the retention device.

(2) The Applicator should change tanks when the gauge reads <1000 psi. To safely change tanks in-flight, the Applicator will notify the pilot of a tank change, then follow the sequence of steps outlined above in section h. Ground Operations, (3) Reloading, c. Propellant.

vii) Landing preparations and marker system disassembly: On all return flights back to the Heli-Base, whether to re-fuel and re-load or to conclude operations for the day, the Applicator will commence with the depressurization procedures as described above. Prior to landing the following system checks must be in place:

(1) Marker safety on
(2) Bolt decompressed (or electronically powered off)

(3) All tanks closed (valve pins unscrewed)
(4) All remote lines depressurized and secured to the connected tank
(5) Disconnect marker from the remote line
(6) Keep remaining projectiles in the hopper

viii) Ground-Based Reloading. HBT flight operations are limited by space available to store projectiles and propellant, as well as flight time between refueling. Projectile and propellant reloading should synchronize with helicopter refueling to maximize efficiency. The best approach to reloading consists of a complete swap of empty pods and tanks for full ones. Support staff can assist the Applicator with this change out.

(1) Empty pods and tanks may be refilled by ground support staff during flights. Both could be refilled by the time the helicopter again needs to refuel, facilitating easy reloading for the Applicator.

(2) Tanks can be re-filled with a cascade series of large capacity 3000 psi scuba tanks, see Appendix. Tanks shall not be re-filled in the helicopter, only on the ground.

(3) Projectiles should remain in their original container until needed to fill the pods for the next flight. This will minimize any damage to the projectile skins.

ix) Remove and disassemble HBT system after the final flight of the day, after the helicopter has completely shut down, with rotor stationary. Disconnect straps and holsters for each component of the marker system from the aircraft. Return projectiles to their original storage container. Tanks may be safely stored while pressurized.

k) Maintenance

i) Before beginning any maintenance, the Applicator shall disconnect marker from propellant, ensure that valve is depressurized, and ensure that no projectiles remain in the barrel. The Applicator is responsible for ensuring maintenance tasks are completed.

(1) Marker: follow manufacturer instructions for maintenance and inspection of marker. Visually inspect all O-rings for cracks/deformities, replace as needed, and lubricate with oil, wipe off excess. Visually inspect bolt mechanism for dirt/debris and signs of wear. Clean bolt, lubricate worn areas, and replace if damaged. Unscrew barrel and visually inspect interior and exterior for dirt and signs of wear. Clean using squeegee or barrel swab.

(2) Propellant: See Appendix, Care and Maintenance of Propellant Tanks. Visually inspect tank, ensure that O-ring has no cracks or deformities. Attach tank to marker and listen for sounds of air leaks, or use soapy water to inspect for leaks. If a flex hose is being used, ensure that the quick-disconnect mechanism is working properly. Ensure that tank has current VIP.

(3) Filling marker tanks from large storage SCUBA tanks: only trained personnel will fill marker tanks. Tanks will be inspected prior to filling. Eye and ear protection will be worn. See attached Appendix.

(4) All other HBT gear, such as harnesses, barrel blocking devices, hoppers, pods, etc, will be inspected for damage prior to and at the completion of each HBT operation.

5. APPENDICES

a) Care and Maintenance of Propellant Tanks
b) Filling Propellant Tanks
c) HBT Pre-Flight Checklist
d) HBT Pre-Ground Operations Checklist

RCUH-PICHTR April 2019
SOP No. 30

Standard Operating Procedure (SOP) for
Collection of Natural and Cultural Materials

1. PURPOSE. The purpose of this SOP is to outline responsibilities when working in the field: what we can and cannot do; procedures for reporting unanticipated discoveries; procedures for taking anything other than work related material from the field.

2. SCOPE. The ANRP, ACRP and PTACRP programs conduct important conservation activities in many areas on lands belonging to the federal and state governments and agencies as well as private landowners. Everything on those lands belongs to those owners. We are given permission to carry out our work in support of their and our programs objectives. These activities are governed by agreements between the US Army and the landowner which govern many activities including property rights. There are very specific statements in most of these agreements that restrict our usage of their property by which we must abide. Our failure to do so could result in our not being allowed to continue to work in the area with unknown subsequent impacts on the overall program.

   a) Definition of what we can do in each area in which we work.

   b) Identification of specific landowner provisions restricting our work in the area.

   c) Procedures for:

      i) Conservation, documentation and reporting unanticipated natural or cultural resource discoveries;

      ii) Collecting material outside the work program;

3. RESPONSIBLITIES.

   a) Natural Resource Supervisors: Review procedures with NR staff to ensure understanding and compliance during safety briefings. Report all discoveries immediately to Senior Natural Resource Coordinator.

   b) Natural Resource Staff: Prevent disturbance of discovery and the immediate environment, document the resource and its position, and report to field supervisor.

   c) Failure to comply with this SOP may result in disciplinary action.

4. PROCEDURES. ANRP shall take every reasonable precaution to preserve and leave unaltered all places, if any, of historic and/or archaeological interest, including without limitation, structures and sites listed on the Hawaii State Register of Historic Places and/or the National Register of Historic Places, ponds, reservoirs, heiau, altars, agricultural terraces, loʻi, walls, auwai, house platforms, imu, petroglyph sites, cemeteries, and all objects, if any, of historic and/or archaeological interest, including, without limitation, antiquities and

specimens of Hawaiian or other ancient art or handicraft which may be found in or on the Licensed Area. Upon the discovery of such objects or items or of any human remains in or on the Licensed Area, Licensee shall leave the same untouched and shall immediately notify Licensor of the type and location of such discovery. All objects found on the Licensed Area, whether found by Licensor or Licensee, shall belong to and shall remain the property of Licensor, subject to applicable laws. Licensee shall respect and recognize any and all rights of Native Hawaiians to exercise traditional rights, customs, practices, prerogatives, privileges and usufructs on or in the Licensed Area in accordance with law.

a) Before operation

   i) Every quarter ensure this SOP is reviewed with all field personnel.

   ii) Prior to working in an area review the location of all endangered species and cultural sites in the project area.

   iii) Ensure that all field personnel fully understand the potential consequences of failure to comply with this SOP.

b) Inadvertent discovery of human remains, associated cultural resources, or previously unidentified or unanticipated cultural resources on or in any management area

   i) Stop all management activities in the immediate area (radius of five feet), take reasonable precautions to protect the area and report the find to the field supervisor.

   ii) With the exception of possible or known human remains, photograph the object in situ and record the GPS. **DO NOT PHOTOGRAPH POSSIBLE OR KNOWN HUMAN REMAINS.**

   iii) Report the find up the chain of command and leave the area until a cultural resources specialist has visited the site.

   iv) If the discovered cultural resource appears to include human remains, the local police must be notified. If the police determine that the discovery constitutes a crime scene, the police takes charge of the scene.

c) Under no circumstances may cultural objects, biological or geological materials be removed from the area without specific permission of the landowner or their agent. The project supervisor should consult the landowner in the field for permission if it is necessary to protect the resource. If oral permission is received, then follow-up written permission must be completed within 48 hours of removal from the field. All materials must be handed over to the respective landowner or their agent.

d) If materials are for personal use it is very important that the agreement for such use is agreed to both by the landowner and one of the senior natural resource or cultural resource coordinators or specialists. The collection must be verified and recorded officially by the respective landowner.

e) PERTINENT REGULATIONS:

i) Federal

(1) US Fish & Wildlife Service: Laws & Policies | Regulations and Policies | Interagency Policy for ESA Section 9 Prohibitions

(a) Section 9 of the Act prohibits certain activities that directly or indirectly affect endangered species. These prohibitions apply to all individuals, organizations, and agencies subject to United States jurisdiction. Section 4(d) of the Act allows the promulgation of regulations that apply any or all the prohibitions of section 9 to threatened species. Under the Act and regulations, it is illegal for any person subject to the jurisdiction of the United States to take (includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect; or to attempt any of these), import or export, ship in interstate or foreign commerce in the course of commercial activity, or sell or offer for sale in interstate or foreign commerce any endangered fish or wildlife species and most threatened fish and wildlife species. It is also illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally. With respect to endangered plants, analogous prohibitions make it illegal for any person subject to the jurisdiction of the United States to import or export, transport in interstate or foreign commerce in the course of a commercial activity, sell or offer for sale in interstate or foreign commerce, or to remove and reduce to possession any such plant species from areas under Federal jurisdiction. In addition, for endangered plants, the Act prohibits malicious damage or destruction of any such species on any area under Federal jurisdiction, and the removal, cutting, digging up, or damaging or destroying of any such species on any other area in knowing violation of any State law or regulation, or in the course of any violation of a State criminal trespass law.

(2) U.S. Army: ANRP use of Army property is restricted to -

(a) Installing, repairing and maintaining conservation ungulate fencing;

(b) Performing feral animal control activities;

(c) Installing protective barriers for the protection of endangered tree snails;

(d) Collecting, reintroducing and augmenting endangered snails and plant species for propagation;

(e) Weed control and forest restoration (planting work);

(f) Conducting small mammal control activities, including but not limited to, trapping and the use of toxicants;

(g) Biological surveying;

(h) Monitoring the success of the foregoing conservation activities and the stabilization of the endangered species identified under the OIP and MIP;

(i) Implementing fire controls and erosion controls;

(j) Monitoring, banding, endangered bird species

(k) Monitoring endangered fly and bat species

(l) Conducting community and outreach services

(3) Hawaii Department of Land and Natural Resources: Hawaii Administrative Rule §13-104-4 Preservation of public property and resources- The following activities are prohibited within a forest reserve:

(a) To remove, injure, or kill any form of plant or animal life, either in whole or in part, except as authorized by the Board or authorized representative or as provided by rules of the Board;

(b) To remove, damage, or disturb any natural feature or resource (e.g. natural stream beds) except as authorized by the board or its authorized representative;

(c) To remove, damage, or disturb any historic or prehistoric remains;

(d) To remove, damage, or disturb any notice, marker, or structure;

(e) To enter, occupy, or use any building, structure, facility, motorized vehicle, machine, equipment, or tool within or on forest reserve except as authorized by the board or its representative;

(f) To engage in any construction or improvement except as authorized by the board.

(g) To sell, peddle, solicit, or offer for sale any merchandise or service except with written authorization from the board.

(h) To distribute or post handbills, circulars, or other notices.

(i) To introduce any plant or animal except as approved by the Board.

(j) To enter or remain within forest reserves when under the influence of alcohol, narcotics, or drugs, to a degree that may endanger oneself or endanger or cause annoyance to other persons or property. The use or possession of narcotics, drugs or alcohol within forest reserves is prohibited. [Eff 9/28/81; am and comp 10/15/93] (Auth: HRS §183-2) (Imp: HRS §§183-2, 183-17)

(4) Board of Water Supply, Kamehameha Schools/Bishop Estate and Hawaii Reserves Inc.

(a) Agreements are essentially the same as the above federal and state permissions and exclusions.

Standard Operating Procedure (SOP) for Respirator Use

Greenhouse staff using full face respirator

1. PURPOSE. The purpose of this SOP is to ensure the protection of staff from respiratory hazards through the proper use of respirators. Respirators are to be used when engineering controls (e.g. ventilation or substitution of less toxic materials) are not feasible or when required according to product labels.

2. SCOPE. Provide directions for the training, use, maintenance, and storage of respirators used for ANRP.

3. RESPONSIBLITIES.

   a) Natural Resource Management Supervisors: Review policy and procedures with staff and during recruitment for new staff to ensure understanding and compliance. Supervisors will ensure each employee has appropriate training in respirator use, the availability of appropriate respirators and parts, provides adequate storage facilities and ensure proper respirator equipment maintenance. Supervisors must be aware of tasks requiring the use of respiratory protection, and ensure all employees in such work use the appropriate respirators at all times.

   b) Natural Resource Staff: It is the responsibility of each respirator wearer to read and understand this SOP and wear his/her respirator when and where required and in the way he/she was trained. Respirator wearer must report any malfunctions of the respirator to his/her supervisor immediately. The respirator wearer must guard against damage to the respirator, clean/maintain the respirator as instructed, and store the respirator in a clean, sanitary location.

   c) Failure to comply with this SOP may result in disciplinary action.

4. PROCEDURES.

   a) <u>UH REQUIRED AND VOLUNTARY USE</u>

      i) Respiratory protection devices are issued by UH Natural Resource Management Supervisors. Respirators are issued only to those UH employees who have been fit tested and received appropriate training in its use. Only new cartridges, canisters, or filters shall be used when a respirator is first issued. Respirator types shall be chosen by supervisors appropriate to the health hazards posed by contaminants

      ii) If an employee is **REQUIRED** to by label or **VOLUNTARYILY** chooses to use a non-disposable, tight fitting facepiece (i.e. rubber half-face) then the employee must comply with all requirements of the University of Hawaii's respiratory protection program as follows.

         (1) Respirator users shall be evaluated by a licensed health care professional to determine if they are physically able to perform work while using a respirator.

         (2) Respirators shall be selected based upon the contaminant hazards presented to the wearer.

         (3) Training shall be provided annually and include information on: selection of respirators; inspection, maintenance, storage and cleaning of respirators; limitations and emergency procedures; and methods of donning, adjusting and fit-checking.

(4) NIOSH - certified respirators must be used.

(5) All negative pressure respirators shall be fit-tested on an annual basis.

(6) Compressed air used for supplied air respirators shall comply with the air quality requirements for Grade D Breathable Air described in CGA Commodity Specifications G-7.1-1989.

(7) Current records for training, fit-testing, medical evaluation and hazard assessments should be maintained by the supervisors. Records will be kept in the ANRP training database with exceptions for any confidential medical information.

iii) Each employee must perform positive and negative user seal checks on tight fitting respirators before each use.

iv) Staff shall notify their supervisors immediately if any respirator damage or defects are found on respirators in their custody.

v) Sealing Problems: No employee can wear a respirator, in the workplace for either routine or non-routine task if he has facial hair which interferes with the seal and/or normal functioning of the exhalation valve of the facepiece. If eyeglasses or goggles must be worn with a respirator, they must not adversely affect the seal of the facepiece

b) <u>PICHTR VOLUNTARY USE</u>

i) The project will provide non-disposable, tight fitting facepiece (i.e. rubber half-face respirators to PICHTR staff upon request. Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for staff. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, staff may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. You need to take the following precautions to be sure that the respirator itself does not present a hazard.

(1) Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.

(2) Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.

(3) Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.

(4) Keep track of your respirator so that you do not mistakenly use someone else's respirator.

5. APPENDICES

a) University of Hawaii at Manoa, Respiratory Protection Program, 2018.

Standard Operating Procedure (SOP) for Trailer Towing Operations

1. PURPOSE. The Purpose of this SOP is to outline the procedures for conducting a safe Trailer Tow field operation.

2. SCOPE. This SOP identifies the Staff responsibilities, duties, and safety procedures for the use of the ANRP Trailer in field operations.

3. RESPONSIBILITIES

   a) Senior Natural Resource Management Coordinator (SNRMC) or designee: Review procedures with Natural Resource staff to ensure understanding and compliance. Ensure that authorized staff are trained and screened for driving the Trailer proficiently. Ensure that authorized staff have received an examination of their knowledge and capabilities while towing the trailer for ANRP at any capacity. All authorized personnel must be cleared by management staff prior to use.

b) Authorized Trailer Drivers: Responsible for conducting Trailer Tow operation in accordance with this SOP. Only authorized and trained individuals may conduct Trailer Tow operations. No unauthorized/trained individual may operate a vehicle with the trailer attached unless specifically approved by a (SNRMC). Authorized staff must read and comprehend this SOP before they are tested for authorization with using the trailer.

c) ANRP Staff assisting with Trailer Tow operations must safely participate in accordance with this SOP. Staff should be thoroughly briefed on trailer attachment and towing procedures in an effort to assist with the operation prior to the operation taking place. Ensure that the operation is being conducted safely and each participant is performing according to all appropriate safety policies.

d) Failure to comply with procedures in this SOP may result in disciplinary action.

4. PROCEDURES. ANRP staff performs most of their field work in remote areas. In order to move larger items such as fencing gear or plant boxes to be used in the field, ANRP has a flatbed trailer. The following procedures outline the proper and safe use of the trailer in tow.

a) Regulatory Requirements: The trailer requires a current registration, license plate and safety inspection. All safety and registration paperwork is to be monitored and obtained by the SNRMC or designee.

b) Trailer Safety Policies

i) Staff and Trailer operation safety are a top priority. Staff and Trailer safety will not be compromised to fulfill mission goals.

ii) The authorized driver will ensure the overall safety of the mission, as well as brief any non-familiar personnel with a safety and operational briefing prior to that staff members first time assisting with operations.

iii) ANRP shall conduct driving/attachment tests to determine the drivers' capability of using the Trailer in a safe and controlled manner. Staff will be evaluated on:

(1) Hitching: Staff will be assessed on their ability to safely hitch and unhitch the trailer. Visual checks of the trailer should be completed before reversing the vehicle and once hitched all lights should be checked to ensure electrics are working correctly.

(2) Driving Ability: Staff will be assessed on their ability to handle the vehicle (w/trailer) in a safe competent manner. They must show that they have a full understanding of the skill set involved in towing and of the application of those skills, and can demonstrate proper control in a wide variety of situations. These skills include:

(a) Making turns

(b) Merging into traffic

(c) Changing lanes

(d) Proper speed

(e) Proper use of signals

(3) Reversing: Staff will be assessed on their ability to reverse.

(a) Straight

(b) On turns

(4) Proper use of Gain control while towing.

iv) Trailer operations will be terminated under any of the following conditions:

(1) Driver is not authorized to drive the trailer

(2) Weather conditions make the operation unsafe

(3) Using the trailer unnecessarily for an operation that could be completed otherwise (especially if it adds an element of danger using the trailer).

(4) The trailer is damaged beyond its regular capabilities (Blown Tire/Accident).

v) Under no circumstances should there ever be personnel on a trailer that is in motion. Doing so will result in disciplinary action.

c) Loading/Weight Distribution: The way in which the weight is loaded and distributed on the trailer is paramount for a successful tow operation. Trailers have 1 point of attachment on the vehicle towing them and a second contact point with the ground. Improper loading on the tongue (or rear) of the trailer results in an upward force on the trailer hitch. Ultimate responsibility for loading and unloading falls on the authorized user of the trailer.

i) The operational capacity for the trailer during regular operations is 2 tons (4,000 lbs). Any and all operations that exceed the operational capacity (4,000 lbs) require approval from an SNRMC. A detailed action plan must be given to the authorizing SNRMC either written or verbal prior to the operation and the subsequent approval is to take place prior to the operation in its entirety.

ii) Signs have been placed on the sides of the trailer identifying the zone which should have nothing loaded on it. This zone consists of the last 2 feet of the trailer going toward the taillights. Under no circumstances should the majority of the weight loaded onto the trailer be in the “Do not load Zone”. Doing so could result in a catastrophic hitch failure which could result in the loss of the load and/or an accident involving a loose trailer.

iii) The reverse is also true whereby loading the majority of the weight forward on the trailer would put an enormous amount of pressure on the tow hitch itself, this could also result in a catastrophic failure.

iv) Proper loading procedure for any trailer states that the majority of the weight is to be loaded right above the wheels. Loading weight (even smaller amounts) forward or aft of the wheels will result in a degradation of the wheels on the corresponding side. If you put the weight on the front, the front tires will wear out first. If you put the weight on the back of the trailer, the rear tires will wear out first. It is the responsibility of all Staff members involved to know and discuss proper loading procedure.

v) Loading or transporting hazardous materials without prior authorization from a (SNRMC) is strictly prohibited and will be met with disciplinary action.

d) Trailer Attachment and Towing: It is the responsibility of the authorized driver to be able to safely attach/check/tow the trailer with general ease. All Authorized users must be aware of the procedures for attaching and testing the trailers safety features before driving.

i) Make sure to use the correct sized hitch draw bar ball as the coupler on the trailer. The draw bar must be secured to the vehicle hitch with a cross pin and a safety pin or locking device to keep the pin from vibrating loose from the hitch.

ii) Pintle hitch is required for all towing operations.

iii) Have a second person assist in backing up to the trailer to avoid damaging the rear bumper of the truck and make sure that the trailer hitch is higher than that of the towing hitch.

iv) The trailer coupler is lowered onto the Pintle hitch, ensure the lever securely closes around the hitch ball. Insert the locking pin through the locking lever to prevent it from popping open in the event of a sudden upward force on the trailer hitch. The locking pin is a required piece of equipment for operations. Operations are to shut down in the event of a lost locking pin, smooth wire is not an acceptable alternate.

v) The safety chains are then attached, crossing under the tongue. Crossing the chains will “catch” the trailer tongue and will help to avoid a runaway trailer situation if you have a hitch/coupler failure. Ensure that the chains do not drag on the ground. Safety chains are essential and nothing can be towed without them being present on the trailer and in functioning condition.

vi) The ANRP trailer is outfitted with an emergency breakaway device for the breaks. The breakaway cable must be securely attached to the towing vehicle to ensure that the brakes are activated should the trailer separate from the hitch. Any excess length in this cable should be wrapped around the trailer electrical cable to keep it from dragging on the ground. Under no circumstances will the breakaway cable be threaded through or around the safety chains.

vii) The trailer electronics must be attached to the 7 point electrical outlet located on the back of the towing vehicle. Once attached the breakaway box must be checked to assure electricity is reaching the trailer. There is a “TEST” button located on the trailers electronics box. The light will illuminate and the corresponding color chart will provide the information needed to assess the condition of the electronics. If ever a red light appears during this test the braking system must be repaired before loading.

viii) The tire pressure and electronics of the trailer are to be thoroughly tested before the trailer leaves the base yard for any operation (preferably before loading). The trailer tire pressure of the exterior and interior tires will be tested and should all be the same level (Between 70-75 PSI). The electronics are to be plugged in to the rear of the towing vehicle and tested via turning on the headlights. The headlights should turn the running lights of the trailer on and the brake and turn signals should both work on the tail lights of the trailer. The trailer does not have reverse lights, the reverse lights that illuminate are only on the towing vehicle, reverse with caution.

ix) Testing the brake lights and turn signals on the trailer is essential to proceeding with operations. If any of the signaling lights do not work and/or are damaged during the test, the system must be repaired before the operation can continue.

x) Testing the trailer lift is done by pushing the locking lever clockwise from its resting position. The locking arm will “snap” into its position, so take care when unlocking the lever during this test. After the lever is released, stand on the tongue of the trailer (Aft End) and it should slowly rise to the correct position. Once the trailer is in its upright position, walk to the front of the trailer and it will slowly go down to its original position. NOTE: Testing the trailer lift is only to be done when the trailer is EMPTY (No load) and on FLAT GROUND. Additionally no unloading is to be done utilizing the trailer lift. The trailer lift is for loading heavy equipment with wheels, such as another truck or bobcat. Utilizing the trailer lift to unload is unsafe and could result in injury/death or disciplinary action.

xi) All required tools and straps will stay inside the towing vehicle during towing operations unless being utilized on the trailer itself. Under NO circumstances should the trailer ever leave the baseyard with a load that has not been attached by the authorized driver. This means that the authorized driver is responsible overall for how things are attached to the trailer and subsequent towing operations. If a field tech attached the load to the trailer and it subsequently falls off without a check by the authorized driver, all damages fall on the authorized driver as the field tech was not properly vetted/trained to attach materials to the trailer.

e) Trailer Operations Completion and Parking

i) Upon completion of operations and return to the baseyard, the trailer will be unloaded and the tires pressure will retested. In the event of a substantial drop in pressure (Over 10lbs lost) the authorized driver will notify the SNRMC or the Support Operations Associate for immediate inspection/repair.

(1) A substantial drop in tire pressure could mean the tire is no longer road/tow worthy and may need replacement.

(2) However, a Towing operation of substantial weight will bleed an excessive amount of air out of the tires.

ii) The electronics will be retested upon unloading of the operational load after returning to the baseyard. This is make sure no failures occurred in transit back to base which would in turn stop any operation prior to its start due to the potential lack of knowledge of damage to the trailer.

iii) The trailer will be inspected for any damages. Any damages are to be reported to a supervisor or SNRMC the same day and may include:

(1) Dings or significant scrapes that do not hinder the capabilities of the trailer to function.

(2) Significant damages to the trailer that hinder function will shut down operations until an SNRMC approves the operation to continue.

(3) In the event of a catastrophic failure of the trailer, the operation will be cancelled unless other means of completion can be planned. Any continuation of operations shall not put any member of ANRP at a higher risk than the operation would allow. Example: unloading the trailer into other trucks on the highway/Mountain roads. Any additional risk to the operation has to be assessed and recorded by not only the Authorized user but the authorizing supervisor as well.

(4) Any significant damages or catastrophic failure of the trailer will be treated as a vehicle accident and an accident/incident report will be required. All details of the accident shall be recorded, and photos taken for documenting the incident. This report shall be submitted to the SNRMC/RCUH/PICHTR for evaluation. Failure to report damages may result in disciplinary action.

iv) The Trailer will be stored at the West Base office in a designated location deemed safe and out of the way of other current operations or deliveries to the base yard. The trailer is only to be parked on flat ground if it is being stored there. The trailer can and will move if it is disturbed and parked at an angle. The lack of consideration in regard to where the trailer is parked and detached from the towing vehicle could result in injury or death. Any questions on the parking spot should be directed to an SNRMC or his designee. It is the authorized driver's responsibility to ensure whether the parking position is safe and whether or not the trailer has a risk of rolling after it is detached from the towing vehicle. Upon site selection, the authorized driver will:

(1) Reverse the trailer into the spot.

(2) Put the towing vehicle in park and engage emergency/parking break before dismounting the vehicle. The trailers brakes only work when the electronics are attached to the towing vehicle and cannot be engaged after the driver dismounts the vehicle.

(3) Once the driver dismounts the towing vehicle, everyone involved with the parking procedures is free to approach the trailer to assist as per directed by the authorized driver.

(4) The trailer jack pin will be removed to drop the jack to the 3rd rung and cranked into a loadbearing position before the pintle hitch is opened.

(5) The chocks for the wheels of the trailer will be placed prior to the release of the trailer from the towing vehicle.

(6) Note: The trailer jack uses downward pressure to hold the trailer in place. If a large amount of weight were placed on the back of the trailer tongue when it is parked it would elevate the trailer jack and could result in the trailer rolling from where it was parked.

(7) Once the trailer is parked and the chocks are in place with the trailer jack set to the 3rd rung. The trailer is now secure and ready to be released to the next authorized driver.

(8) Use good judgement when determining if and where to detach the trailer during towing operations. Responsibility for this decision lies solely with the authorized driver of the vehicle. If any field team/member of ANRP notices a potential danger when using the trailer they shall notify all personnel in the immediate area as soon as possible. Safety during trailer operations is a team effort and all pertinent safety information will be relayed to the authorized driver for them to determine the next course of action during a trailer operation.

v) Any maintenance issues observed during any inspections (pre or post) shall be relayed to the SNRMC and his designee.

f) As of 04/30/2019 All Authorized Drivers are listed below.

i) Jobriath Rohrer (Senior Natural Resource Management Coordinator)
ii) Matthew Burt (Ungulate Management/Elepaio Stabilization Coordinator)
iii) Tyler Bogardus (Small Vertebrate Pest Stabilization Specialist)
iv) Jordan Taylor Marsh (Ecosystem Restoration Specialist)
v) George Woodrow Schneller (Support Operations Associate)
vi) Daniel Adamski (Rare Plant Program Manager)

g) Required Training videos: https://www.youtube.com/watch?v=wJFVMj-bVsY, https://www.youtube.com/watch?v=TM49x1qFugA

Standard Operating Procedures (SOP) for Pneumatic Air Guns

1. PURPOSE. The purpose of this SOP is to provide the procedures to ensure the safe operation of Pneumatic Air Guns (PAGs) while carrying out ANRP's essential Invasive Vertebrate Management program.

2. SCOPE. Pneumatic Air Guns (PAGs) are vital tools needed to accomplish the ANRP goal of controlling and eradicating invasive vertebrates. A pneumatic air gun (PAG) is defined as any gun that expels a projectile using compressed gas from a reservoir or gas pressurized mechanically via a pump or crank arm on the gun itself. Projectiles may include pellets, BBs, shot, bolts, arrows and slugs. Some PAGs are designed to use multiple types of projectiles. Use of a PAG is, under certain situations, the only viable and humane option to remove these species. However, the use of a PAG comes with heightened levels of responsibility, accountability, and liability. Policies and procedures to store, issue, use, and care for PAGs must be established, and enforced to ensure the highest level of safety for all personnel recruited through University of Hawaii and the Pacific International Center for High Technology Research (PICHTR). This Standard Operating Procedures for Pneumatic Air Guns provides the procedures to ensure the safe operation of the PAG while carrying out ANRP's Invasive Vertebrate Management Program. All approved employees permitted to use PAGs shall have a thorough understanding of this SOP. ANRP will have the right to (temporarily or permanently) suspend or revoke any individual's right to use a PAG at any time. Failure to comply with this SOP will result in disciplinary action to any employee. The RCUH, at any time, may suspend/terminate its authorization to allow PAG in job-related activities.

3. RESPONSIBILITIES

   a) Principal Investigator (PI) or Delegated Designee (ANRP Chief PAG Custodian)

      i) Be a Regular Status RCUH employee and approve all PAG use within ANRP programs.

      ii) Shall successfully complete the State of Hawaii Hunter's Safety Course. (Note: State and Federal statutes do not require State Hunter's Safety certification for air gun use. However, this is a requirement as part of the ANRP Invasive Vertebrate Management Program).

      iii) Maintain copies of employee's Hawai`i Hunter Safety certification, and current Hawai`i Driver's License or other photo identification.

      iv) Maintain PAG inventory records.

      v) Procure and provide projectiles for project use.

vi) Provide required secured storage and transport options for PAG and projectiles.

vii) Ensure the employee reads, understands and complies with this PAG SOP. The employee must sign the PAG SOP Acknowledgement form.

viii) Coordinate prior with the respective Provost Marshal's Office (PMO) at 655-7114/5555 (Schofield Barracks) or 438-8739 (Fort Shafter) before entry with PAG. Personnel will have a signed copy of the Exception to policy for Policy Memorandum USAG-Hl-68, Possession of Privately Owned PAG on U.S. Army Garrison, Hawaii (USAG-HI) Installations at all times while on US army installations.

ix) Obtain prior approval from Range Operations for PAG use on training ranges.

x) Ensure all other project SOP protocols are followed.

xi) Assume project responsibility for the use of PAGs and investigate any safety procedure violations or incidents.

xii) Revoke an approved employee's use of PAGs for all ANRP activities should any unsafe situation or incident warrant such action, or due to any violation of the policies and procedures of this PAG SOP.

b) ANRP Employee

i) Pass the State of Hawaii Hunter's Safety Course. (Note: State and Federal statutes do not require State Hunter's Safety certification for air gun use. However, this is a requirement as part of the ANRP Invasive Vertebrate Management Program).

ii) Complete a firearm safety class from the National Rifle Association (NRA) or equivalent prior to carrying or using a PAG on official duty. A refresher course will be required at least every five (5) years. (Note: State and Federal statutes do not require registration for air guns or firearms certification, such as the National Rifle Association (NRA) firearms training (handgun, rifle, and/or shotgun), for air gun use. By definition, PAGs are **not** firearms).

iii) Obtain Wilderness First Aid Certification.

iv) Read and understand this SOP and the Owner's Manual for each PAG. Sign the Pneumatic Air Gun SOP Acknowledgement Form.

v) Abide by this SOP and any other applicable ANRP SOPs.

vi) ANRP employees approved to use PAGs are responsible and accountable for their actions involving PAG-use under the ANRP Invasive Vertebrate Management program.

4. PROCEDURES

a) PAGs shall be used on Army-owned or managed lands only when approved in a USAG-HI-approved risk assessment for that area.

b) Written or email approval must be obtained from any landowner before transporting and using a PAG on their property.

c) Safety Program in PAG Operations

   i) PAGs will be kept in proper working order as described in the manufacturer's manual.

   ii) Employee and public safety will take precedence over operational priorities.

   iii) PAG operations will be conducted by staff who are certified in first aid/CPR. Each field PAG operation will require a field first aid kit, field communications (e.g., two-way radio or cell phone) that maintain communication with the project's base/office, a check-in/check-out process, a pre-PAG operation briefing, and applicable personal protective equipment (PPE).

   iv) Recommended PPE may include the use of eye protection and brightly-colored shirt, vest or hat. If a non-brightly colored backpack is worn over a shirt or vest, staff will tie orange flagging on the backpack to maintain visibility.

d) The use of PAGs by ANRP staff shall be limited to those positions identified and approved by the PI or Chief PAG Custodian to accomplish assigned job duties. Minimum requirements to be an authorized PAG user are:

   i) Passing State's Hunter Safety course, completing a firearms safety class from the National Rifle Association (NRA) or equivalent, obtaining Wilderness First-Aid certification, and acknowledging that s/he has read and understands this SOP and the manufacturer's manual. staff shall also demonstrate proficiency in using the PAG safely.

   ii) Any employee incident involving failure to follow this or any other applicable ANRP SOPs, or indications of decreased PAG proficiency or safety, will result in the immediate revocation of permission to participate in ANRP Invasive Vertebrate Management Program and may result in disciplinary action if the revocation involved policy or safety violation(s). The Custodian will also revoke the employee's PAG use if the employee is under indictment for, has waived indictment for or been convicted of a felony or crime of violence (as defined in Hawaii Revised Statutes 134-1) or is prohibited from owning, possessing or controlling any firearm or ammunition by any other reason specified in Hawaii Revised Statutes 134-7. (Note: By definition, PAGs are not firearms and therefore, are not subject to Federal or State statutes governing ownership or use of firearms. However, the ANRP will follow similar guidelines when authorizing an employee for PAG-use). The ANRP Manager may also revoke the employee's firearms use if the employee is disciplined for a work rule violation or work performance, placed on performance probation, or has an Annual Performance Evaluation rated at

"Unsatisfactory". The decision to revoke an employee's PAG use will be reported immediately to the RCUH Director of Human Resources and the Principal Investigator. Final determination of whether additional discipline or the duration of the revocation will depend on the facts and circumstances of each case.

iii) Any serious employee failure to comply with this SOP policy or procedures for the PAG's storage, check-in/check-out, maintenance, transportation and field use, and additional safety measures may jeopardize his/her employment with ANRP/RCUH/PICHTR.

e) Employees are authorized to use PAGs while on official duty for the ANRP Invasive Vertebrate Management Program conducting the following actions:

i) Approved predator or pest-control projects. Species to be controlled include but are not limited to rats, mongooses, feral dogs, feral cats, nuisance birds, rabbits, and other predators or detrimental species.

ii) Approved ungulate-control projects. Species to be controlled include but are not limited to pigs and goats.

iii) Scientific purposes under the conditions of an applicable University of Hawai'i, federal, State, or county permit or authorization.

iv) Personal protection from injury by dangerous animals (e.g., feral dogs, etc.)

f) Authorized PAG and Projectiles

i) Project-owned PAGs – All PAGs owned by the project are for staff use only. The PAG shall be kept in a safe operable condition through regular cleaning and maintenance based on the manufacturer's guidelines. If there is any doubt in the condition of a PAG, the PAG Custodian will have the PAG inspected by the manufacturer or an authorized service station. The purchase of project PAGs must have the approval of the project's sponsor and comply with RCUH procurement policies. The PI is responsible to ensure that all project-owned PAGs are inventoried.

ii) Personally-owned PAGs –All PAGs owned by an employee must be kept in a safe, operable condition through regular maintenance based on the manufacturer's guidelines. No modified or PAG that have been tampered with are allowed to be used. Approved ANRP employees may bring their PAG to the ANRP workplace only when preparing for the immediate deployment to the field operation or returning from a field operation requiring use. The workplace is defined as the office, baseyard, and/or field camping sites, and in an ANRP vehicle being used to transport staff from the baseyard to a work site requiring the PAG, and back.

iii) Project-Purchased Projectiles - Only project-purchased projectiles will be used in PAG operations. Use of personal projectiles is prohibited. Only projectile of the correct caliber and design for the PAG will be used. Never reuse projectiles.

iv) Checkout and Check-in - The Chief PAG Custodian or ANRP Manager shall issue the appropriate projectiles to the employee. After the operation, ANRP staff will return all unused projectiles to the Chief PAG Custodian or ANRP Manager.

v) Fill/Charge PAG with compressor – Follow the manufacturer's instructions on how to properly and safely fill the PAG. Fill the PAG with compressed air or nitrogen **ONLY**. Do not exceed the maximum fill pressure as stated in the manufacturer's manual.

(1) Make sure the PAG is **Unloaded, On Safe and Pointed in a Safe Direction.**

(2) Locate and remove the Fill Nipple Cover. (If filling the PAG from 0 psi, then it will be necessary to cock the PAG to remove the force of the Hammer against the firing Valve. Otherwise, the air will pass through the firing Valve, out the barrel and the PAG will not pressurize).

(3) Remove the Cover from the PAG. Stow for replacement later.

(4) Lay the PAG so the on-board gauge is facing up.

(5) Attach the quick disconnect fitting from your filling equipment to the fill nipple on the PAG.

(6) Fill the PAG slowly to eliminate heat buildup and chance for overfilling. If the PAG is overfilled, past 3000 psi (206 bar) open the bleed valve (follow the owner's manual directions for each different PAG). You will hear a loud rush of air (and maybe see some water vapor) escape from the bleed valve. You may now safely remove the pump hose's probe adapter from the rifle's receptor port.

(7) Replace the Fill Nipple Cover in the reverse order of removal

g) Restrictions of Use

i) No Discharging of PAG toward populated areas or known hiking trails. No PAG will be discharged in the direction of populated areas within the range of the PAG. This includes but is not limited to residential neighborhoods, publicly traveled roads, schools, hospitals, areas where members of the public may be hiking, campsites, base camps, temporary living quarters, etc., or in the direction of flying aircraft.

ii) No Personal Use of Project-Owned PAG. RCUH or University of Hawai‘i project-owned PAGs shall not be used for personal use.

iii) Internal/Official Use Only – No Interagency Loans of PAGs.

iv) Under the Influence. No employee shall carry or use a PAG while consuming or while under the influence of alcohol or controlled substances. Employees will

inform their PI and project leaders if they are taking medication that may impair their use of a PAG. These medications may be either prescription or over-the-counter medication with warning labels that caution against driving or the use of heavy equipment. The employee will be temporarily reassigned to job duties that do not require the use of a PAG while taking this medication.

h) Storage and Transport: The following applies to project-owned and personally owned PAG, projectiles, and accessories.

   i) Storage – Industry-Standard Gun Safe. PAGs, accessories, and projectiles must be stored in an industry-standard gun safe when not in use. The safekeeping of keys or combinations to the gun safe(s) will be the responsibility of the Chief PAG Custodian and ANRP Manager. When storage space becomes an issue, ANRP will purchase another gun safe. When possible, projectiles shall be stored in a separate safe from any PAG.

   ii) In field areas or other remote base camps where a gun safe is not available, the field supervisor or individual in charge is responsible to ensure that all PAGs, accessories, and projectiles are stored in a locked hard case.

   iii) PAGs will be stored with at least at least 1,000 psi of high-pressure air to keep the valves closed against dirt.

i) Transport – Empty and Enclosed in Gun Case. PAGs are to be unloaded, including any projectiles in the chamber, cylinder, or magazine if inserted in the PAG, while in transport to and from the field and carried in a commercially manufactured lockable hard gun case that completely encloses the PAG. They shall be placed in the vehicle trunk or under/behind the seat, or covered and out of view. All safety precautions and procedures will be followed, including:

   i) Prior to leaving the ANRP baseyard the Chief PAG Custodian will inspect the ANRP and personal-owned PAGs to ensure they are clean and in working order. If the personal PAG has not been maintained and does not appear functional, the Chief PAG Custodian will disallow its use until the weapon is cleaned and in proper working order. The Chief PAG Custodian or Manager will issue the projectiles for the approved PAG at that time.

   ii) Projectiles being transported must be stored out of view, in a separate location from the firearm and not within any occupant's reach.

   iii) Staff with a PAG being driven in an ANRP, federal, state, and PICHTR vehicle to an initial field meeting location may not take their PAG out of their vehicle until instructed by the field operations leader. The meeting area is normally a location where all those participating in the ANRP-managed operation initially meet; this location may also be the start of the operation. On some occasions, the meeting area may be used to consolidate vehicles prior to driving to the project area to lessen the number of vehicles on the road or traversing private or government

lands. For those occasions, the PAG may be transferred from one vehicle to another's safe/secured site.

iv) Only after a briefing with the Operation Leader on the upcoming field operation will the ANRP staff be allowed to remove their approved PAG from the vehicle to start the operation.

v) When in an area where the PAGs will be used, the PAGs will be removed from their case. They will be loaded only when they will be used immediately or imminently.

vi) At the end of the ANRP-managed operation and upon returning to the field meeting or project area and parked vehicles; each person (ANRP staff) **will check to ensure their PAG is unloaded**, secured in its case and the Operation Supervisor will conduct an operations debriefing/closeout.

vii) ANRP employees will return to the ANRP baseyard by the most direct practical route.

viii) All ANRP-projectiles must be returned by the user upon return from the field to the Chief PAG Custodian or Manager.

ix) No PAG shall be left unattended upon return to the ANRP baseyard and shall not be accessible to unauthorized users.

x) If the gun safe cannot be opened, the Manager or the designee will keep the projectiles in his/her possession on site until it can be returned to the gun safe. In such situations, the projectiles must be securely stored in a temporary location at the baseyard.

xi) When flying in US DOI OAS-approved helicopters, the PAG shall be unloaded, in its case and, if possible, transported in an external load.

xii) If external loads are not part of the helicopter operation, the PAG and projectiles will be transported within the back seat area or in an approved cargo pod of the MD500 helicopter or rear cargo compartment for Bell or Eurocopter helicopters.

xiii) Pilot must be notified ahead of time and give permission for the PAG and projectile to be transported internally. Helicopter flight plans shall also state the hazardous material being transported.

j) Reporting of Shooting Accidents (Personnel Injuries or Property Damage) – Immediate Reporting, Mandatory Substance-Abuse Test, Temporary Disqualification, and Investigation:

i) Any property damage or injury to a person caused by a PAG shall be reported immediately to the employee's supervisor and as soon as possible to the PI and, as applicable, county police department.

ii) An immediate investigation will be conducted by the Principal Investigator or designee.

iii) All shooting accidents will require the employee to undergo an immediate substance-abuse test (pursuant to RCUH Policy 3.930B Addendum: Controlled Substance Prevention) and be temporarily disqualified from using PAG until an investigation is completed.

k) Lost/Stolen/Malfunctioning PAGs and Manufacturer Recalls or Alerts:

i) Project-owned PAG or specialized accessories that are lost or stolen must be reported immediately to the PI.

ii) Project-owned or personal PAGs that are malfunctioning or that have been declared unsafe through a manufacturer recall or alert will be immediately suspended from use until they have been properly repaired by the gun manufacturer.

l) Non-Compliance by Project Management:

i) Compliance with this SOP and the importance of the safety of RCUH employees cannot be overemphasized.

ii) A Project's failure to comply with any provision of this SOP will result in an immediate suspension (i.e., "stand-down") of all use of PAGs in the program. This suspension of PAGs use may be temporary or permanent.

m) Additional Safety Measures

i) ANRP approved staff are required to maintain their personal PAG in a safe operable condition; if in doubt, they are responsible for having their PAG checked by an authorized service center.

ii) Know how to use the PAG safely. Know the basic parts, how to safely open and close the action, and how to remove a projectile from the chamber and/or magazine.

(1) If a projectile becomes jammed in the barrel, depressurize the PAG, open the breech cover and use a coated metal rod designed for cleaning rifles to clear the barrel. Push it through from the muzzle to the breech.

iii) Carry only one caliber of ANRP-issued projectile to avoid mixing different types.

iv) Employees are responsible for matching the projectile with the PAG and know the maximum range of the projectile.

v) During an ANRP operation:

(1) Know your target! Never rush a shot and at NO TIME take a shot without positively identifying the target and the background.

(2) Wear eye and ear protection as appropriate.

(3) Never fire at surfaces that can cause a bullet, shot, or slug to ricochet, such as water or hard flat surfaces.

(4) If you notice an ANRP employee using a PAG and showing signs of fatigue and or using a PAG in an unsafe manner, stop the operation and have that person unload their PAG and place it back in the case.

(5) Maintain radio or verbal communications at all times.

(6) Wear brightly-colored safety vest, shirt or cap at all times during the operation. Tie orange flagging on your backpack if a pack is worn over your shirt or vest.

(7) Carry the PAG in a safe and secure manner with an empty chamber when not in use.

(8) Always point the muzzle in a safe direction regardless of whether the PAG is loaded or not.

(9) Never take a skyline shot.

vi) If the PAG malfunctions or exhibits reduced performance contact the manufacturer to address the issues.

5. APPENDICES

a) Projectile Inventory Form
b) Pneumatic Air Gun Field Checklist

Annual Site Inspections

The Principal Investigator and/or designated representative will annually inspect the ANRP PAG and projectile inventories. They will notify the ANRP Manager and Chief PAG Custodian prior to the inspection. The annual inspection will include:

1. Inventory each type of projectile
2. Inspection of the PAG

Reviews and Updates

This SOP will be reviewed and updated at a minimum, annually (based on approval date), by the Manager and PAG Custodian. The SOP may be reviewed anytime if additional procedures or safety updates will improve the document; an electronic update will be sent to the PI and Safety Coordinator for their review and approval. A new signature page will be completed for final approval.

Submitted by/Date: _____

Clifford Smith, DoD Projects Manager
Pacific Cooperative Studies Unit

Approved by/Date: _____

David Duffy, Principal Investigator
Pacific Cooperative Studies Unit

Previous version's approval date: original

ARMY NATURAL RESOURCES PROGRAM ON OAHU

PNEUMATIC AIR GUN SOP ACKNOWLEDGEMENT - Employee

DATE: _____

TO: Dr. Clifford W. Smith, PCSU DoD Projects Manager

_____, ANRP: Chief PAG Custodian

FROM: ANRP Employee _____

I acknowledge reading and understanding the ANRP SOP for Pneumatic Air Guns (PAG). I further acknowledge that I will abide by the policies and procedures of this SOP.

I will submit the required certifications for that PAG, a copy of my photo identification, and present my PAG for inspection by the Chief PAG Custodian prior to each use.

I also acknowledge that my PAG and accessories (scope, case, strap, etc.) are in operable condition for the ANRP Invasive Vertebrate Management.

If I fail to follow this SOP or any other ANRP SOP, I acknowledge that my use of PAGs for the ANRP Invasive Vertebrate Management will be revoked and disciplinary action may be taken.

_____ _____

Signature Date

Standard Operating Procedures (SOP) for Equipment Tag-Out Procedures

1. PURPOSE: This procedure establishes the minimum requirements for the tag-out of project tools and equipment.

2. SCOPE: Tag-out procedures shall be used to identify faulty tools and equipment, and prevent them from being used until they are repaired and in proper working order. Damaged and unsafe items shall clearly be tagged out before staff perform any servicing or maintenance activities.

3. RESPONSIBILITIES:

   a) Natural Resource Management (NRM) Supervisors: Review tag-out procedures with NRM Staff during safety briefings to ensure understanding and compliance.

   b) NRM Staff: Execute tag-out procedures in accordance with this SOP.

   c) NRM Staff assigned to manage a particular set of gear: These staff should oversee any tagged-out items and follow up to ensure the items are either repaired by an appropriate person or safely disposed of.

   d) Failure to comply with this SOP may result in disciplinary action.

4. PROCEDURES: The following procedure sequence shall be followed by all staff.

   a) All equipment and supplies that do not meet safety standards shall be physically marked with a “do not operate/use” tag. Examples of such items include, but are not limited to, frayed ropes, malfunctioning chainsaws, and leaking backpack sprayers. The tag shall include the date, staff name, and description of damage or problem.

   b) The person(s) initiating tag-out on an item shall notify both his/her supervisor and the NRM staff assigned to oversee that type of gear. Notification shall include: name of staff who noted the damage; date of the tag-out; item number and description; a detailed description of the damage or problem observed with the item; and the current location of the item.

   c) Servicing and repair of a tag-out item shall be coordinated by the NRM staff assigned to manage that particular set of gear. Different staff are tasked with different gear responsibilities (for example, power-tool maintenance versus helicopter gear maintenance).

   d) Any item deemed unserviceable (cannot be repaired) or not worth repairing (cost of repairs is nearly equal to the replacement cost of a newer/better item of the same size,

type and quality), shall be destroyed and/or disposed of after approval by a Senior NRM Coordinator. If the item is on a hand-receipt, it shall be turned in to the appropriate hand-receipt holder to retire.

e) The tag will be removed from an item only after it is deemed safe to use.

f) Disciplinary action may be taken if a damaged item is not reported to the appropriate staff and/or marked with a “do not operate/use” tag. A written explanation of events may be required. Negligent action which leads to the damage and tag-out of an item will be investigated and disciplinary action may be taken.