

**CALIFORNIA POLYTECHNIC STATE UNIVERSITY
FOUNDATION**

HANTAVIRUS HAZARD ABATEMENT PROGRAM

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1. PURPOSE

This document will serve as the Hantavirus Hazard Abatement Program (HHAP) for California Polytechnic State University Foundation (Cal Poly Foundation) employees conducting rodent livetrapping activities. This program was developed as part of an agreement between Cal Poly Foundation and the California Division of Occupational Safety and Health, Department of Industrial Relations, State of California.

This document lists personnel potentially involved with rodent livetrapping activities, identifies locations of predicted rodent livetrapping activities, and presents a training program that will include the following: description, mode of transmission, and symptoms of the hantavirus; the need for employees to report any hantavirus symptoms experienced during the 45 days following potential exposure to their supervisor and a medical physician; mandatory protective equipment to be worn; and procedures to be followed while conducting rodent livetrapping tasks intended to reduce the chance of hantavirus infection.

2. INTRODUCTION

Cal Poly Foundation is currently contracted to the California Army National Guard (CA ARNG) to assist their natural resources staff with two projects, an Endangered Species Conservation Project and a Land Condition Trend Analysis (LCTA) program. The Endangered Species Conservation Project focuses primarily on the San Joaquin kit fox (*Vulpes velox macrotis*) at the Camp Roberts Training site and includes periodic monitoring of species that foxes may prey upon including nocturnal rodent species. The LCTA program includes annual vegetation monitoring and periodic monitoring of birds and rodents at both Camp Roberts and Camp San Luis Obispo.

CA ARNG requires livetrapping as the rodent monitoring techniques for both projects. Snap trapping is not permitted because of the presence of species of special concern and a desire to not impact rodent density.

The presence of hantavirus in the California Central Coast region was publicly confirmed in August 1993. Cal Poly Foundation and the CA ARNG suspended rodent livetrapping activities until measures to reduce the risk of hantavirus infection were developed and implemented. Rodent livetrapping resumed in October 1994.

The U.S. Army Environmental Hygiene Activity conducted a hantavirus survey at Camp Roberts in April 1995 and at Camp San Luis Obispo in June 1995. The presence of the deadly strain of hantavirus was confirmed at both installations.

In June 1995 the Division of Occupational Safety and Health, Department of Industrial Relations, State of California (CalOSHA) conducted a site visit of Camp Roberts to review work practices designed to reduce exposure to hantavirus. This site visit included a review of the protection measures implemented by Cal Poly Foundation personnel during LCTA rodent trapping for CA ARNG. As a result of this site visit, CalOSHA prepared an agreement between CalOSHA and Cal Poly Foundation requiring the preparation of the HHAP.

The Endangered Species Conservation Project and the LCTA program are the CA ARNG projects that Cal Poly Foundation is currently conducting that may put employees at a greater risk for hantavirus, specifically by livetrapping activities. It is possible that Cal Poly Foundation may provide additional rodent trapping services to CA ARNG or other customers in the future. The provisions of this HHAP will apply to any other rodent trapping projects; and the HHAP will be revised as needed to properly address the specific requirements.

3. PERSONNEL

The following personnel may be involved with rodent livetrapping activities:

A. Field Supervisor – The Field Supervisor is responsible for the following:

1. Ensure that the HHAP is properly implemented.
2. Train personnel to properly perform necessary field tasks in accordance with the HHAP and document the training.
3. Provide personnel with the mandatory protective equipment and ensure that it is used.
4. Formulate personnel work assignments to properly complete the necessary activities.
5. Conduct and supervise tasks associated with the necessary activities.

B. Wildlife Technicians – The Wildlife Technicians are responsible for the following:

1. Read and understand the HHAP.
2. Perform all tasks assigned by the field supervisor, such as: placing traps in the field, checking traps, handling rodents, removing traps from the field, cleaning traps.

C. Project Director – The Project Director is responsible for the following:

1. Ensure overall compliance with the HHAP.
2. Act as point of contact with outside organizations that may have an interest in the implementation of the HHAP.
3. Conduct field activities as needed.

D. Cal Poly Foundation Safety Officer and Cal Poly Environmental Safety Officer – The safety officers are responsible for providing technical and procedural oversight to the implementation of the HHAP.

E. Personnel from other organizations – Personnel from other organizations may observe or assist with field activities under the following conditions:

1. Participation in rodent livetrapping activities will require:
 - a. The organization has a comparable Hantavirus Hazard Abatement Program, and participating personnel conform to the Program.

- b. The Project Director, Field Supervisor, and both Safety Officers give approval.
2. Observation of rodent livetrapping activities will require:
- a. Observers will read the HHAP to inform them of the potential hazards associated with the activity and of the precautions that participants will be taking.
 - b. Observers will not touch any object that could be potentially contaminated with rodent tissues, fluids or excreta.
 - c. Observers will maintain a minimum distance of 10 feet from any captured rodent during the handling process.

Prior to any livetrapping activities, a memo will be issued stating the names and positions of personnel that will be participating in the activities.

4. LOCATIONS OF RODENT LIVETRAPPING ACTIVITIES

Currently, all rodent livetrapping activities are in support of CA ARNG projects and take place within the boundaries of Camp Roberts and Camp San Luis Obispo. The LCTA program includes some rodent livetrapping on the Big Sandy Wildlife Area that borders a portion of Camp Roberts on the east. This land was once part of Camp Roberts but is now owned by the State of California and is managed by the Department of Fish and Game. This area serves as an ungrazed control site for the LCTA program.

The Endangered Species Conservation Project conducts trapping at twelve permanent trapline locations on Camp Roberts. The LCTA program has 79 permanent trapline locations on Camp Roberts, 7 on the Big Sandy Wildlife Area and 30 at Camp San Luis Obispo. Camp Roberts and the Big Sandy Wildlife Area are located along U.S. Highway 101 in Monterey and San Luis Obispo counties. Camp San Luis Obispo is located in San Luis Obispo County along State Highway 1 between the cities of San Luis Obispo and Morro Bay. If so directed by the CA ARNG, Cal Poly Foundation will add, move or abandon trapping locations on Camp Roberts, Big Sandy Wildlife Area or Camp San Luis Obispo.

Cal Poly Foundation may become involved with livetrapping activities at other installations for CA ARNG or other customers. This HHAP will be revised to include any locations apart from Camp Roberts, Camp San Luis Obispo, or the Big Sandy Wildlife Area.

5. TRAINING PROGRAM

5.1 Purpose

This Training Program is intended to educate employees of the risks involved with livetrapping small mammals and to describe the practices to be followed, which will minimize exposure to hantavirus while accomplishing project tasks.

5.2 Introduction

Hantavirus is a recently discovered virus that can be deadly to humans. The predominant host of the virulent and potentially fatal strains of the hantavirus is the deer mouse (*Peromyscus maniculatus*). A hantavirus survey was conducted by the U.S. Army Environmental Hygiene Activity at Camp Roberts in April 1995 and at Camp San Luis Obispo in June 1995. The Camp Roberts survey discovered a virulent strain of the virus in deer mice (*Peromyscus maniculatus*) and pinyon mice (*Peromyscus truei*) captured on post. The Camp San Luis Obispo survey discovered a virulent strain of the virus in one pinyon mouse captured on post. Other research conducted in California has demonstrated that dusky-footed wood rats (*Neotoma fuscipes*) and California voles (*Microtus californicus*) may also serve as hosts for the hantavirus.

All of these species are known to occur at Camp Roberts and Camp San Luis Obispo and will likely be encountered during rodent trapping activities. For this reason, it is very important that the employee read and understand the risks of contracting and precautions preventing hantavirus infection provided below.

Much of the information in this document was drawn from the Morbidity and Mortality Weekly Report (MMWR) Vol. 42, No. RR-11, dated July 30, 1993, titled: "Hantavirus Infection – Southwestern United States: Interim Recommendations for Risk Reduction" prepared by the U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention (CDC). It is suggested that readers review the MMWR before proceeding with this memo.

5.3 About the Hantavirus

5.3.1 Method of Transmission

The hantavirus is transmitted to humans from its rodent host when aerosols of saliva and excreta are inhaled directly from the rodent or when dried fecal matter is inhaled as dust. Humans may also be infected if contaminated material comes in contact with broken skin or the mucous membranes around the eyes (conjunctiva). Rodent bites can also transmit the virus.

5.3.2 Symptoms of Hantavirus Infection

Symptoms of hantavirus infection can include:

1. fever
2. nausea
3. persistent headache
4. muscle aches
5. fatigue
6. achiness
7. difficulty breathing
8. conjunctivitis (red eyes)

Hantavirus fatalities occur when lungs fill with fluid and the patient dies as a result of respiratory failure, currently called “Hantavirus Pulmonary Syndrome”. Fifty-one percent of the known cases of hantavirus infection have resulted in death. However, because symptoms resemble those associated with the common flu, it is likely that many non-fatal hantavirus cases have gone unreported.

Personnel should consult a physician if they notice any symptoms associated with hantavirus infection within 45 days of first possible rodent exposure. The physician should be informed of the possibility of exposure to hantavirus. The field supervisor should also be notified of any possible symptoms.

5.4 Pre-Exposure Activities

Prior to participating in any rodent livetrapping activities, all affected personnel shall accomplish the following:

1. Read and understand:
 - A. This HHAP and any other supporting documents
 - B. All reports listed in the reference section (6) of this document.
 - C. Any other information deemed pertinent, as instructed by the field supervisor.
2. Undergo a physical examination that includes a medical history, emphasis on the renal and pulmonary systems, and clearance for use of a negative pressure respirator. The project will pay for the cost of the physical exam.
3. Have a baseline blood serum sample taken. This would need to be done only once for each person involved with rodent-related activities. The serum sample will be kept for comparison purpose in the event a person became ill and hantavirus infection was suspected.

Blood sampling and storage will be done at General Hospital in San Luis Obispo. All work will under the direction of a public health physician. The project will pay for the costs of the blood collection.

5.5 Required Safety Materials

All personnel will properly use the following safety materials, including Personal Protective Equipment while involved in rodent livetrapping activities.

5.5.1 Personal Protective Equipment

Personal Protective Equipment will be worn by personnel while performing tasks that might involve an increased risk of exposure to hantavirus. Personal Protective Equipment includes:

1. Protective Gloves. Latex, vinyl, or nitrile are acceptable materials. Gloves must be worn while handling rodents and while handling contaminated or potentially contaminated traps. Gloves must be worn while cleaning traps and while handling disinfectants.
2. Protective Goggles. Goggles will be worn while handling rodents, while handling potentially contaminated traps and while cleaning traps. Goggles will also be worn while handling disinfectants.
3. Respirator. A Respirator fitted with a HEPA ('high efficiency particulate air') filter will be worn while handling rodents and contaminated or potentially contaminated traps.
4. Plastic Apron. An apron will be worn while handling rodents and while handling traps that may contain, do contain, recently contained, or potentially may have contained a rodent. An apron will be worn while cleaning traps.

5.5.2 Required Supplemental Safety Materials

1. Bite Disinfection Kit. Each team of persons handling rodents will have a bite disinfection kit consisting of a toothbrush (for scrubbing the wound), topical disinfectant, and water for rinsing.
2. Infectious Waste Bags. These bags will be used to transport potentially contaminated traps and to dispose of potentially contaminated material such as batting, bait, gloves, and aprons.
3. Disinfectant. An EPA approved disinfectant will be used to treat potentially contaminated material and to clean potentially contaminated traps.
4. Disinfectant Containers. Appropriate containers such as small and large sprayers and buckets will be used to properly apply disinfectants.

5.6 Activities With Potential Increased Exposure to Hantavirus

There are three primary activities that may put employees at a higher risk of exposure to the hantavirus:

1. Rodent livetrapping field activities:
 - A. Placing traps in the field.
 - B. Handling captured animals.
 - C. Collecting traps from the field.
2. Cleaning of traps following captures of rodents.
3. Cleaning of buildings or storage areas that show evidence of heavy rodent infestation.

Activities 1 and 2 will be performed routinely whenever rodent trapping is scheduled. Activity 3 will only be performed when necessary.

5.6.1 Livetrapping Field Activities.

Reference Box 5, page 9 of the MMWR.

1. Inventory and assemble equipment and materials required for livetrapping:
 - A. Personal Protective Equipment (Section 5.5.1)
 - B. Supplemental Safety Materials (Section 5.5.2)
 - C. Livetraps
 - D. Trap hoods (if used)
 - E. Batting
 - F. Bird seed
 - G. Bait mixture
 - H. Data sheets or notebooks
2. Remove appropriate number of clean traps from storage and load into vehicle. Batting and seed should be placed in traps before leaving the office if practical. Load trap hoods if they are being used. Personal Protective Equipment does not need to be worn while handling clean traps.

3. Drive to designated trapping location(s). Place traps and hoods in the field as instructed. Use of leather gloves is recommended while handling trapping hoods. Add batting or seed to traps if necessary. Open traps and bait with a small amount of bait mixture at the appropriate time of day.
4. The following morning before travelling to trap locations, gather materials listed above. Make sure there are plenty of gloves and aprons to accommodate all traplines plus extra replacements. Make sure the respirator fits properly. Bring additional clean traps.
5. Travel to trapline(s). Before picking up a closed trap, be sure that protective equipment is properly fitted.
6. Use caution when handling captured animals. Handle the animal as instructed by your supervisor or group leader. The prevailing wind should be on either side of you not in your face or to your back. If you get bitten, immediately scrub bite with disinfectant and scrub brush. Report bite to field supervisor as soon as practical.
7. All closed traps will be considered contaminated and should be removed from the trapline and replaced with clean traps. Personal Protective Equipment (gloves, respirators, goggles and aprons) must be worn when handling contaminated traps. Place contaminated traps in plastic garbage bags for transport back to the storage area.
8. Contaminated batting and bait should remain in the contaminated trap to be disinfected with the trap. Any batting, bait, or seed that falls from the trap into the handling bag should be left in the handling bag. The handling bag and all contents should be placed in an infectious waste bag after the animal is released.
9. Replace gloves as necessary. Used gloves should be placed in infectious waste bag.
10. When you are finished with a given trapline and the contaminated traps are securely stored and identified in the back of the vehicle, personal protective equipment may be removed. To remove protective equipment:
 - A. Spray gloves with disinfectant.
 - B. Remove apron; spray it with disinfectant and place in infectious waste receptacle.
 - C. Remove goggles and respirator.
 - D. Remove gloves and place in infectious waste receptacle.

11. Repeat Steps 4 through 10 above until all traplines have been visited each morning.
12. Return to the trap storage area. Contaminated material should be in the open bed of a pick-up truck or similar arrangement, not inside an enclosed vehicle with personnel.
13. Put on Personal Protective Equipment. Place contaminated traps in the area designated for storage of contaminated materials to await cleaning.
14. While still wearing Personal Protective Equipment, place the 'fieldwork' infectious waste bags containing batting, gloves, etc., into the temporary holding barrel at the designated storage area.
15. Remove personal protective equipment:
 - A. Spray gloves with disinfectant.
 - B. Remove apron; spray it with disinfectant and place in infectious waste receptacle.
 - C. Remove goggles and respirator.
 - D. Remove gloves and place in infectious waste receptacle.
16. Wash hands with soap and water.

5.6.2 Cleaning of Contaminated Traps

1. Inventory and assemble equipment and materials required for cleaning traps:
 - A. Personal Protective Equipment (Section 5.5.1). Nitrile gloves are recommended for cleaning traps.
 - B. Supplemental Safety Materials (Section 5.5.2).
 - C. Scrub brush (toilet brush).
 - D. Storage crates for clean traps.
 - E. Cleaning container of appropriate size.
 - F. Contaminated traps.
2. While wearing gloves, place bags containing contaminated traps into back of a pick up truck.

3. Spray gloves with disinfectant. Remove gloves and place in infectious waste bag.
4. Drive to the designated trap washing area.
5. Don the Personal Protective Equipment.
6. Place contaminated traps in an appropriate cleaning container filled with a proper concentration of disinfectant. Soak the traps for at least 15 minutes.
7. After traps have soaked in disinfectant solution for 15 minutes, unfold traps one at a time (while still in the disinfectant solution); remove baiting and place in an infectious waste bag. Scrub out any remaining bait, fecal matter, or debris from all surfaces of the trap with the scrub brush.
8. Rinse the traps with water.
9. Place traps on ground to air dry.
10. Consolidate all infectious waste into one or two bags and place in the back of pickup truck.
11. Remove Personal Protective Equipment:
 - A. Spray gloved hands with disinfectant.
 - B. Remove apron, spray it with disinfectant and place it in infectious waste receptacle.
 - C. Remove goggles and respirator. Clean them as instructed by the field supervisor.
 - D. Remove gloves and place gloves in infectious waste receptacle.
12. Fold traps and load into clean wooden trap cases.
13. Drive back to trap storage area and place clean traps in the clean trap storage area. Be sure the crate lids are in place to prevent mice from entering traps.
14. While wearing gloves and goggles, place the bags of infectious waste into the temporary holding container.
15. If necessary, clean the contaminated material storage area.
 - A. Wear the Personal Protective Equipment.

- B. DO NOT SWEEP OR VACUUM THE FLOOR. Carefully spray the area with a disinfectant. Allow the disinfectant to soak in for a few minutes.
 - C. Remove any large pieces of debris and place them in infectious waste bags.
 - D. Mop the area using a solution of water, detergent and disinfectant.
 - E. Allow area to dry.
16. Remove Personal Protective Equipment:
- A. Spray gloved hands with disinfectant.
 - B. Remove apron, spray it with disinfectant and place it in infectious waste receptacle.
 - C. Remove goggles and respirator. Clean them as instructed by the field supervisor.
 - D. Remove gloves and place gloves in infectious waste receptacle.

5.6.3 Cleaning of Heavily Infested Areas

Cleaning of heavily infested areas is not a scheduled activity, but it may be required during the course of work conducted by Cal Poly Foundation employees.

1. Inventory and assemble equipment and materials required for cleaning traps:
 - A. Personal Protective Equipment (Section 5.5.1). Nitrile gloves are recommended for cleaning tasks.
 - B. Full body overalls with shoe covers.
 - C. Supplemental Safety Materials (Section 5.5.2).
 - D. Mop and bucket.
 - E. Detergent.
2. Don the full body overalls and other Personal Protective Equipment.

3. DO NOT SWEEP OR VACUUM THE FLOOR. Carefully spray the area with a disinfectant. Allow the disinfectant to soak in for a few minutes.
4. Remove any large pieces of debris and place them in an infectious waste bag.
5. Mop the area using a solution of water, detergent and disinfectant. Allow to dry.
6. Remove Personal Protective Equipment:
 - A. Spray gloved hands with disinfectant.
 - B. Remove apron, spray it with disinfectant and place it in infectious waste receptacle.
 - C. Remove goggles and respirator. Clean them as instructed by the field supervisor.
 - D. Remove full body coveralls; spray with disinfectant and place in infectious waste receptacle. If coveralls are not disposable, they should be laundered with detergent and hot water.
 - E. Spray gloved hands again with disinfectant. Remove gloves by pulling the fingers of one glove with the other gloved hand until it is removed. Hold the empty glove in the gloved hand and peel the remaining glove off inside out and over the other glove. Place gloves in infectious waste receptacle.
7. Place all infectious waste bags in the temporary holding container.

6. REFERENCES

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