

Safety Policy  
YOSEMITE NATIONAL PARK

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**HANTAVIRUS**  
**PROGRAM POLICY**

Approved by: (Signed) Chip Jenkins  
(For) David A. Mihalic, Superintendent

Date: July 12, 2002

Safety Policy  
YOSEMITE NATIONAL PARK

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## HANTAVIRUS PROGRAM

### I. PURPOSE

The purpose of this policy is to alert Yosemite National Park employees and supervisors of the presence of hantavirus carrier rodents in the park, and provide measures that will be taken by park personnel to protect themselves and others from contact with this potentially fatal virus.

Hantavirus, also known as Sin Nombre Virus, is a virus that can cause disease of the upper respiratory system. Rodents carriers, such as deer mice, shed the virus in their urine, droppings and saliva, and researchers believe the virus is normally transmitted to people when they breathe air contaminated with the virus and employees are at risk of contracting the virus when exposed to these droppings, urine or nesting materials.

**The presence of hantavirus infected deer mice within Yosemite National Park have been confirmed.** Testing in the Tuolumne Corridor by the California Department of Health Services was conducted while investigating a hantavirus illness of a July visitor to the Tuolumne Meadows area. This investigation revealed a 22% hantavirus infection rate in the deer mice caught.

The major components of this policy include methods to prevent human exposure to hantavirus by:

- reducing opportunities for rodents to find shelter and food in and around buildings,
- removing rodents from inside buildings,
- rodent-proofing buildings,
- preventing hantavirus infection while rodent-contaminated areas are being cleaned,
- protecting employees who may have occupational exposure to wild rodents or rodent contaminated areas.

### II. OBJECTIVES

The objective of this program is to ensure all affected Yosemite National Park (YNP) employees involved in spring openings of buildings that have been closed for the winter are provided the training, knowledge, procedures, and equipment

## Safety Policy

### YOSEMITE NATIONAL PARK

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necessary to protect themselves from potential exposure to hantavirus. In addition, employees who observe mouse droppings and nests in offices and residences are provided recommended procedures to be used when cleaning rodent infestation debris.

### **III. PROCESS/PROGRAM**

This directive is an essential component of the Park's overall health and safety program. It is policy that all supervisors and employees comply with the requirements outlined in this program.

Utilizing proper precautions, the possibility of contracting hantavirus, either occupationally or while residing in the park, is remote. Proper precautions include keeping rodents out of buildings (rodent proofing) and disinfecting rodent droppings and carcasses before handling. **Dry sweeping and vacuuming (home type vacuum cleaner) of any amount of rodent feces should be avoided.** Park personnel who clean up rodent infestations must attend Hantavirus Program training provided by the Safety Office, and supervisors shall ensure that these employees are familiar with all protocols listed in this policy, including the use of respirators. Wherever the use of respiratory protection equipment is prescribed in this policy, supervisors will ensure employees are trained and qualified per the YNP Respiratory Protection Program **before** donning a respirator.

#### Hantavirus Transmission

The virus can be contracted when "carrier" rodent urine, droppings or nesting materials are stirred up, causing tiny particles or droplets containing the virus to become airborne. This process is known as aerosolization. Hantavirus "carrier rodents" include deer mice at Yosemite, cotton rats and rice rats in the Southeast, and the white-footed mouse in the Northeast. **Common house mice are not known to carry hantavirus.**

## Safety Policy

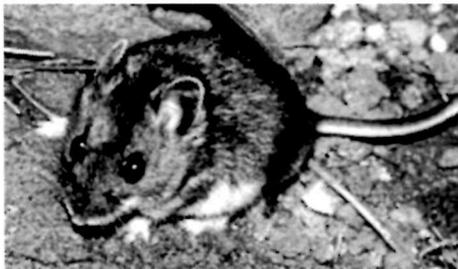
### YOSEMITE NATIONAL PARK

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**Common House Mouse** – gray fur on top and underbelly.



**Deer Mouse**- large ears, white underbelly, furry tail, white undertail.



Researchers suspect there may be several other ways rodents can pass hantavirus to humans:

- If you touch something that has been contaminated with rodent urine, droppings or saliva, and then touch your nose or mouth;
- If virus-infected rodent urine, droppings or saliva contaminates food you eat.
- If you are bitten by a rodent with the virus.

Transmission can occur in any place infected deer mice have infested, including barns, sheds or other outbuildings, warehouses, seasonal housing or structures that have been closed up during the winter season.

# Safety Policy

## YOSEMITE NATIONAL PARK

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### Symptoms of Exposure

A person who has contracted hantavirus will experience flu-like symptoms including fatigue, muscle aches (especially the large muscle groups—thighs, hips, back, sometimes shoulders), headaches, fever, and/or cough. These symptoms are universal.

There may also be dizziness, chills and/or abdominal problems, such as nausea, vomiting, diarrhea and abdominal pain. The affliction rapidly progresses to a severe respiratory disease known as Hantavirus Pulmonary Syndrome (HPS). About half of all HPS patients experience these symptoms

The incubation time varies from 1 to 5 weeks with fever lasting from 3 to 5 days.

Four to 10 days after the initial phase of illness, the late symptoms of HPS appear. These include *coughing* and *shortness of breath*, with the sensation of, as one survivor put it, a "tight band around my chest and a pillow over my face," as the lungs fill with fluid.

**"If you exhibit late phase symptoms and have been in contact with rodents or their excreta, contact your physician immediately."**

### Common Signs of Rodent Infestation

**1. Rodent Droppings:** Droppings are a reliable indicator you have a rodent problem. You may find droppings in places where you store your food or your pet/animal food, such as in cupboards and drawers, or in bins. Because mice like to run in places that offer them some protection from predators, droppings can also be found in cupboards or under the sink, along walls, or on top of wall studs or beams. Mice will leave droppings near their nests as well. Storage rooms, sheds, barns, or cabins loaded with boxes, bags, old furniture, and other objects make an ideal home for rodents, so you may also find droppings there.

Workplaces can also make good rodent homes. Warehouses, restaurants, and similar occupancies are obvious places to look for infestations because food may be plentiful there. However, rodents can also infest office buildings. Once again, look for droppings in protected places, such as closets, storage rooms, or inside boxes.

**2. Rodent Nests:** Rodents tend to build their nests from materials that are soft, fuzzy, or warm. Common rodent nest materials are shredded paper, bunches

## Safety Policy

### YOSEMITE NATIONAL PARK

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of dry grass or small twigs, fabric, and furniture stuffing. Rodents will nest close to food and water wherever safety from predators can be found. Inside buildings, places to inspect for infestation include:

- inside cabinets;
- under or inside dressers;
- in and among boxes;
- behind and inside machinery and appliances (kitchen appliances such as stoves or refrigerator casings or drip pans; water coolers; and electric motor cases or computer cases);
- inside upholstered furniture;
- inside double walls or the space between floors of structures.

3. **Food Boxes:** Containers or food that appear to be nibbled indicate infestation. Look for droppings nearby. Rodents will chew through plastic, so plastic bags do not make safe food storage containers.
4. **Feeding Stations:** These are semi-hidden spots where rodents eat food they have collected. At these stations, rodents may leave larger-than-normal amounts of droppings/urine, plus remnants of a variety of foods (such as nutshells), bits of plastic or paper, and cockroach carcasses.
5. **Gnawing:** To get to food, rodents will gnaw on almost anything that is softer than the enamel of their teeth. This includes such things as wood, paperboard, cloth sacks, and materials even harder than these described. Because rodents' teeth grow continuously, they must gnaw to keep them short. This may help to explain why chair legs or similar surfaces show gnawed spots or tooth marks in rodent-infested places.
6. **Odd, Stale Smell:** In closed-up rooms infested by rodents, you will commonly smell an unusual, musky odor.

## Safety Policy

### YOSEMITE NATIONAL PARK

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- 7. Mouse sighting:** Lack of mouse sightings are not a reliable indicator, since rodents are normally active at night, and generally avoid humans. If you have rodents, unless the infestation is large, you may never see one.

#### Prevention of Rodent Infestation

The most significant and effective method to prevent exposure to hantavirus is to eliminate or minimize contact with rodents. Making homes and workplaces unattractive to mice will lessen employee risk of exposure to the virus.

**Appendix A** lists steps that should be taken to rodent-proof buildings and living areas.

#### Elimination of Rodent Infestation

Special precautions must be taken when conducting rodent elimination work or when cleaning homes or buildings with rodent infestations in areas where HPS has been reported.

**Appendix B** outlines procedures for cleaning minor infestations in homes or offices.

**Appendix C** outlines procedures used by park employees cleaning major infestations of homes or offices.

#### Spring Opening and Winter Closing of Cabins, Barns, and Outbuildings

The Centers for Disease Control and Prevention (CDC) has identified certain seasonal opening activities that may increase employees' risk of exposure to hantavirus. These activities include opening/cleaning cabins, sheds and outbuildings which have been closed during the winter where rodent proofing has not occurred—such as barns, garages or storage facilities for farm and construction equipment. Employees of YNP who are involved in these activities may have a higher risk of exposure to hantavirus due to the increased number of buildings they have to open.

**Appendix D** provides procedures that must be followed when rodent infestation is observed and employees are engaged in seasonal opening operations.

**Appendix E** is reserved for procedures to be used by backcountry rangers and other YNP employees when entering or cleaning ranger cabins and other backcountry facilities that exhibit signs of infestation.

Safety Policy  
YOSEMITE NATIONAL PARK

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## **IV. ROLES AND RESPONSIBILITIES**

### The Superintendent

The Superintendent of Yosemite National Park is responsible for the overall implementation of this policy and for providing necessary program funds.

### Management

**Division Chiefs** are responsible for ensuring all supervisors within their divisions are aware of this policy, have all necessary resources, and implement the YNP Hantavirus Program.

**Branch Chiefs** are responsible for identifying specific positions and employees who may be required to clean up rodent infestations or open up seasonal facilities which may contain infestations. Branch Chiefs are also responsible for ensuring potentially exposed employees have received training as required in this program, as well as any other pertinent program such as Respiratory Protection and Hazard Communication, before beginning clean-up activities, and that employees have been provided required personal protective equipment.

**First-Line Supervisors** will ensure all employees who may be exposed to hantavirus are familiar with this program. First-line supervisors will also ensure employees **do not enter** a seasonally-closed building which has not been inspected, that the building be disinfected if necessary and placarded with a green "safe to enter" placard by Buildings and Grounds personnel or other authorized and trained employees. First-line supervisors will also ensure employees engaged in cleaning activities use personal protective equipment as directed by this policy.

### Safety and Occupational Health Manager

The **Safety and Occupational Health Manager** is responsible for developing and maintaining the YNP Hantavirus Program, for prescribing adequate personal protective measures and equipment for employees engaged in building disinfecting and clearing operations, and for providing training to employees, including general employee awareness training.

# Safety Policy

## YOSEMITE NATIONAL PARK

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### Maintenance Division Chief

The **Maintenance Division Chief** is responsible for developing a written rodent-proofing program which includes identification of seasonally closed buildings in the park, strategies for rodent-proofing and mileposts for goal achievement, with the objective of prioritizing the rodent-proofing of all seasonally closed buildings, where technologically feasible. In addition, rodent-proofing other buildings will occur on an as-needed basis.

Ensure that Building and Grounds supervisors and employees receive training on rodent-proofing techniques and are provided necessary resources and equipment to rodent-proof buildings.

### Building and Grounds Supervisors

The **Building and Grounds Branch Chief and Supervisors** have the responsibility of implementing the YNP Hantavirus Program according to this policy. Specific duties include:

1. Ensuring employees are trained per the requirements of this policy.
2. Ensuring only trained and medically-qualified personnel are assigned tasks requiring the use of respirators.
3. Ensuring employees use respirators and all other prescribed equipment when required and ensuring employees are properly trained in the use of such equipment.
4. Purchasing the necessary equipment for employees to perform activities addressed in this policy.

### Employees

**Park employees** working at YNP facilities are responsible for following the procedures of this policy in accordance with instructions and the training they have received.

Safety Policy  
YOSEMITE NATIONAL PARK

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Employees must use the equipment provided by YNP to perform the task outlined in this policy.

## **V. PROGRAM EVALUATION**

YNP Safety and Occupational Health Staff will evaluate the efficacy of this program during health and safety audits and will review this policy annually.

Employees and supervisors are asked to provide comments or recommendations to improve program effectiveness and to identify any problems during implementation of this policy.

## **VI. LEGAL AUTHORITY**

### Occupational Safety and Health Administration (OSHA)

Title 29 of the Code Federal Regulations 1960 provides the authority for implementation of OSHA standards within the Federal sector.

### Executive Order (EO)

Presidential EO 12196 provides the authority for implementation of this standard within the Federal sector.

Safety Policy  
YOSEMITE NATIONAL PARK

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National Park Service

NPS, DO 50B Reference Manual, Section 11.

Pacific West Area Memorandum Dated 11/93

Other Agency

Centers for Disease Control and Prevention (CDC)

While not a statutory requirement, CDC provides updated information and guidance for hantavirus disease control, transmission and prevention.

US Public Health Service Report Dated 7/30/93

Safety Policy  
YOSEMITE NATIONAL PARK

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**Appendix A**

**Prevention of Rodent Infestation**

- A. **To eliminate rodents and reduce the availability of food** sources and nesting sites used by rodents inside homes, cabins, and other buildings:
1. Keep food (including pet food) and water covered and stored in rodent-proof metal or thick plastic containers with tight-fitting lids.
  2. Store garbage inside homes in rodent-proof metal or thick plastic containers with tight-fitting lids.
  3. Wash dishes and cooking utensils immediately after use and clean up any spilled food.
  4. Do not leave pet food in feeding dishes.
  5. Dispose of trash and clutter.
  6. Continuously use spring-loaded rodent traps in homes.
  7. If there is a persistent rodent problem in a building, arrange for an inspection by the Buildings and Grounds Supervisor or the Resource Management Branch. No insecticides or rodenticides may be used in park residences without obtaining prior approval from the Building and Grounds Supervisor and the Resource Management Branch.
- B. **To prevent rodents from entering homes**, cabins, and other buildings:
1. Use steel wool or 1/4" hardware cloth (wire mesh) to seal, screen, or otherwise cover all openings into the home which have a diameter >1/4 inch.
  2. Place metal roof flashing as a rodent barrier around the base of wooden, earthen, or adobe dwellings up to a height of 12 inches and buried in the soil to a depth of 6 inches.
  3. Establish short-term, environmentally sensitive, pest control programs.
- C. **To reduce rodent shelter and food sources** within 100 feet of homes.
1. When possible, place woodpiles 100 feet or more from homes and elevate wood at least 12 inches off the ground.
  2. Store grains and animal feed in rodent-proof containers.
  3. Near buildings, remove food sources which might attract rodents or store food and water in rodent-proof containers.

Safety Policy  
YOSEMITE NATIONAL PARK

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4. Store hay on pallets to keep hay free of rodents. Elevate 12" if possible and use traps continuously.
5. Dispose of garbage and trash in rodent-proof containers that are elevated at least 12 inches off the ground.
6. Haul away trash and other items that may serve as rodent nesting sites.
7. Cut grass, brush, and dense shrubbery within at least 30 feet of residences. Do not use dense ground covers in landscaping.
8. Place spring-loaded rodent traps in likely areas of rodent shelter within 100 feet around buildings, and use continuously.
9. Eliminate water sources: standing water (barrels, buckets), leak faucets or pipes.

**Appendix B**

**Cleaning Minor Rodent Infestation  
in Homes and Offices**

- A. **To clean up infestations** in your home or office:
1. Put on disposable rubber gloves before cleaning up.
  2. Do not sweep or vacuum droppings, urine or nesting materials, as contaminated dust will become airborne.
  3. Using a spray bottle, thoroughly wet contaminated areas with detergent or disinfectant to deactivate the virus. Most general-purpose disinfectants and household detergents are effective. However, a bleach (sodium hypochlorite) solution prepared by mixing 1½ cups of household bleach with 1 gallon of water can be used in place of commercial disinfectant. When using the bleach solution, avoid spilling the mixture on clothing, carpeting or other items that may be damaged or discolored.
  4. Once the contaminated area is wet, collect contaminated materials with a damp towel, then mop or sponge the area with disinfectant. Spray dead rodents with disinfectant, then double-bag along with all cleaning materials and throw out in an appropriate trash receptacle.
  5. Disinfect gloves with disinfectant or soap *before taking them off*. After taking off the clean gloves, thoroughly wash hands with soap and warm water.

Safety Policy  
YOSEMITE NATIONAL PARK

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Appendix C

**Elimination of Major Rodent Infestation by Qualified Employees or Contractors in an Occupied Facility**

- A. All infested facilities should be reported to Building and Grounds.
- B. Employees will don personnel protective equipment (PPE) prior to work activities. This equipment will consist of disposable Tyvek suit, disposable P100 or equivalent respirator, disposable rubber gloves and protective goggles. **Before using any respirator**, employees must receive medical clearance from a physician or licensed health care professional (PLHCP) to wear a respirator, and must be trained and fit-tested per YNP Respiratory Protection Policy. Contact the Safety Office at 379-1064 for further information on the respiratory protection program.
- C. When first entering a rodent infested area for cleanup purposes, a disinfecting agent will be sprayed on dead rodents, rodent nests, droppings, foods or other items which have been contaminated by rodents (floors, countertops). A general-purpose household disinfectant, Quaternary Ammonia, or a 10% bleach (hypochlorite) solution (1½ cups of household bleach in 1 gallon of water) will be used. **Caution - Do not mix bleach and ammonia and do not vacuum or dry sweep surfaces before spraying with disinfectant.**
- D. After spraying disinfectant, ventilate the buildings by opening doors and windows for at least 30 minutes. Leave the building until the airing-out period is finished.
- E. Remove captured rodents from the traps. Place the carcasses in a plastic bag containing a sufficient amount of a general-purpose household disinfectant to thoroughly wet the carcasses. Double bag, seal and dispose of as ordinary waste. Re-bait and reset all sprung traps.
- F. Wipe all vertical or horizontal surfaces clean with disposable rags, mop floors and dispose of all cleaning materials in a plastic bag.
- G. Identify and seal, screen, or otherwise cover all openings into the home that have a diameter >1/4 inch. Then set rodent traps inside the house, using peanut butter as bait. Use only spring-loaded traps that kill rodents.

## Safety Policy

### YOSEMITE NATIONAL PARK

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- H. Leave several baited spring-loaded traps inside the structure as a further precaution against rodent re-infestation. Examine the traps regularly. Disinfect traps no longer in use by spraying with a general household disinfectant or hypochlorite solution.
- I. When cleaning operations are done for the day, spray gloved hands with disinfectant, remove the Tyvek suit by rolling it off the body, place it in the plastic trash bag and spray the entire contents with the remaining disinfectant or bleach solution. When using the bleach solution, avoid spilling the mixture on clothing or other items that may be damaged or discolored. Place the gloves and respirator in the bag, seal it, place it into a second plastic bag and seal again. Dispose of the bagged material in covered waste containers as ordinary waste.
- J. Wash hands thoroughly with soap and water before beginning other activities.

Safety Policy  
YOSEMITE NATIONAL PARK

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**Appendix D**  
**Guidance for Opening Seasonal Facilities**

- A. Employees participating in rodent infestation cleaning operations during seasonal openings must attend the Hantavirus Program training provided by the Safety Office. **Only trained employees wearing the proper PPE will enter red placarded buildings.**
- B. Employees will don personnel protective equipment (PPE) prior to work activities. This equipment will consist of disposable Tyvek suit, disposable P100 or equivalent respirator, disposable rubber gloves and protective goggles. **Before using any respirator**, employees must receive medical clearance from a physician or licensed health care professional (PLHCP) to wear a respirator, and must be trained and fit-tested per YNP Respiratory Protection Policy. Contact the Safety Office at 379-1064 for further information on the respiratory protection program.
- Note: When work is being performed in a location where a group of buildings are being opened, the Tyvek suit need not be removed. If moving from one building to the next via GOV, the employee will remove the Tyvek suit prior to getting into GOV to avoid possible contamination, and don a new suit at the new location.**
- C. When first entering a rodent-infested area for cleanup purposes, a disinfectant agent will be sprayed on dead rodents, rodent nests, droppings, foods or other items that have been contaminated by rodents (floors, countertops). A general-purpose household disinfectant, Quaternary Ammonia, or a 10% bleach (hypochlorite) solution (1½ cups of household bleach in 1 gallon of water) will be used. **Caution - Do not mix bleach and ammonia, and do not vacuum or dry sweep surfaces before spraying with disinfectant.**
- D. After spraying disinfectant, ventilate the buildings by opening doors and windows for at least 30 minutes. Leave the building until the airing-out period is finished.

## Safety Policy

### YOSEMITE NATIONAL PARK

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- F. Spray dead rodents, rodent nests, droppings, foods or other items that have been contaminated by rodents (floors, countertops) with a general purpose household disinfectant, Quaternary Ammonia, or a 10% bleach (hypochlorite) solution, 1½ cups of household bleach in 1 gallon of water. Wipe surfaces and place all waste in a plastic bag. When cleanup is complete, seal the bag, then place it into a second plastic bag and seal. Dispose of the bagged material in covered waste containers as ordinary waste.
- G. Spray area with spray bottle until wet to prevent dust when cleaning, then mop or wipe area. Disinfect countertops, cabinets, drawers, and other durable surfaces with disinfectant, let stand 15 minutes and then wipe up surface. You may then wash surfaces with a solution of detergent and water if necessary for cleaning purposes. Spray floors with disinfectant, let stand 15 minutes and wipe up. Re-mop floors with a detergent (**Caution: Never mix ammonia and bleach**). To avoid generating potentially infectious aerosols, do not vacuum or sweep dry surfaces before mopping. A second mopping or spraying of floors with a general-purpose household disinfectant is optional.
- H. Carpets and rugs can be effectively disinfected with household disinfectants if color-safe, by commercial-grade steam cleaning or by shampooing. Spray dirt floors and horizontal cross members of stables, barns and out-buildings with a disinfectant solution.
- I. Upholstered furniture should be steam cleaned or shampooed. If rodents have nested inside furniture and the nests are not accessible for decontamination, the furniture should be disposed of in a sanitary landfill.
- J. Vinyl-covered mattresses will be wiped down with a disinfecting agent prior to placement in cleared building. Because vinyl mattresses can be readily decontaminated, only vinyl-covered mattresses should be purchased when mattress replacement is required.
- K. When cleaning operations are completed for the day, spray gloved hands with disinfectant, remove the Tyvek suit by rolling it off the body, place it in the plastic trash bag and spray the entire contents with the remaining disinfectant or bleach solution. When using the bleach solution, avoid spilling the mixture on clothing or other items that may be damaged. Place the gloves and respirator in the bag, seal it, and place it into a second plastic bag and seal. Dispose of the bagged material in covered waste containers as ordinary waste.
- L. Wash hands thoroughly with soap and water before beginning other activities.

Safety Policy  
YOSEMITE NATIONAL PARK

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Winter Closure

- A. Procedures outlined in **Appendix A** should be followed to prevent rodent infestation during the winter.
- B. All floors and flat surfaces should be dusted with a light talcum powder to serve as a visual indicator of any rodent activities that may occur before the next spring opening.

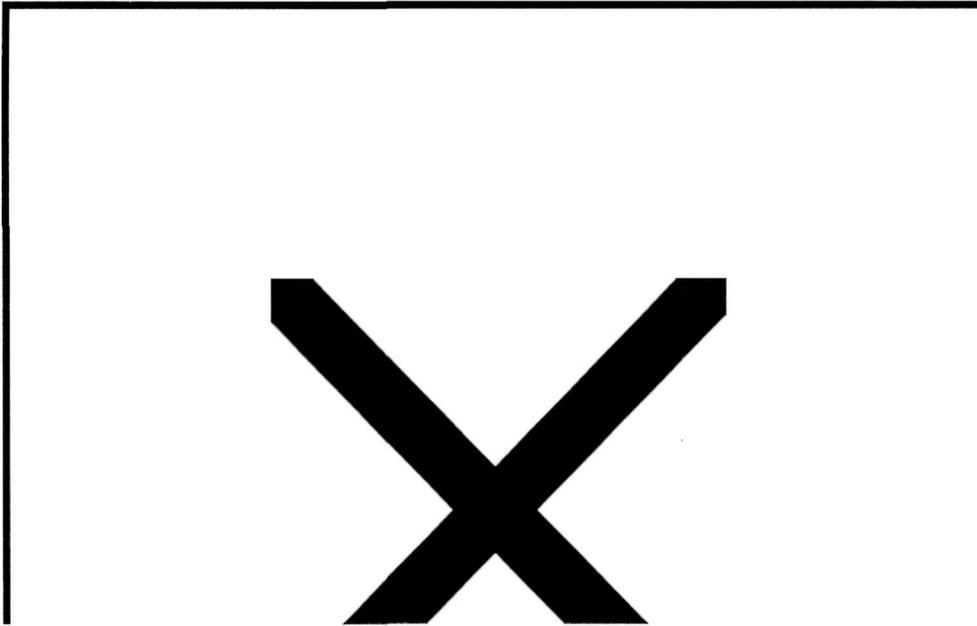
Safety Policy  
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**Appendix E**  
**Guidance for Backcountry Facilities**

Reserved

Hantavirus Placard, Front (Red Lettering)



**Potential Hantavirus Exposure**

**Do Not Enter**

**Authorized Entrants Only**

Hantavirus Placard, Back (Green Lettering)

**This facility  
has been  
inspected and cleared  
for all occupants**