

# DISASTER RECOVERY GUIDEBOOK

**MAUI**  
Nō Ka 'Ōi  
**STRONG**



## COOPERATIVE EXTENSION

UNIVERSITY OF HAWAII AT MĀNOA  
COLLEGE OF TROPICAL AGRICULTURE AND HUMAN RESOURCES



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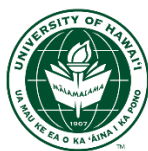
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# A NOTE FROM US

It's difficult to put into words the profoundly life-changing experience of surviving a wildfire.

After the flames are out, the road to recovery is about more than filing claims, calling agencies, clean-up, and what will feel like a never-ending to-do list. It's about the emotional healing of accepting what was lost, forgiving yourself for what you wish you would have done, and remembering to have faith again in the future ahead. The smiles will eventually outweigh the tears—you'll emerge stronger and be amazed by your resilience.

No two recovery journeys are the same, and each present unique circumstances. The University of Hawaii Cooperative Extension on Maui has adapted this guidebook which was created by Colorado State University Extension and incorporated some portions of a similar guidebook created by Texas A&M AgriLife Extension. A variety of subject matter experts have provided guidance on the road to recovery. We hope you find this guidebook useful as you embark on the journey ahead.



COOPERATIVE EXTENSION  
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## ACKNOWLEDGEMENTS

*This guidebook would not have been possible without contributions from the University of Hawai'i Cooperative Extension, experts at Colorado State University, and Texas A&M AgriLife Extension. Thank you to all who contributed.*

# CLEANING & DEBRIS MANAGEMENT

After confirming your insurance coverage, scheduling a time to meet with your adjuster, and recording any damages or losses, you may be ready to start the clean-up process. Whether damaged or destroyed, you'll want to be familiar with safe clean-up, disposal, and debris management practices. Your needs may vary depending on the extent of the damage and whether you hire contractors or do it yourself. The following pages include resources for the most common clean-up, disposal, and debris management issues that may arise.

## TIPS FOR SAFELY CLEANING FIRE ASH

*Resource adapted from Mesa County Sheriff's Office, Colorado State University Extension, and Texas A&M Agrilife.*

Ash can be deposited on indoor and outdoor surfaces during and after wildfires and contains trace amounts of cancer-causing chemicals. The ash from trees and vegetation is typically non-toxic; ash from constructions can be contaminated with mercury, asbestos, and lead, making it toxic. Fire ash can irritate skin, especially sensitive skin. Inhaled ash can induce nasal and throat irritation, as well as coughing. Asthma episodes can be triggered by airborne ash. As you begin the clean-up process, keep the following health and safety tips in mind

Keep children, pets, and livestock out of burn debris or ash sites.

Well-fitting N-95 or P-100 masks can help protect during cleanup by blocking more ash particle inhalation than dust or surgical masks.

When cleaning ash, wear gloves, long-sleeved shirts, and long pants to avoid skin contact. If you, a family member, or pet comes into contact with ash, wash it off as quickly as possible.

As much as possible, avoid stirring or shifting ash. Before lightly sweeping, mist indoor and outdoor hard surfaces to keep down dust. Follow up with wet mopping or a damp cloth.

On lightly dusted indoor and outdoor surfaces a damp cloth or wet mop may be all that is

needed.

If available, utilize HEPA filter vacuums instead of shop vacuums or other non-HEPA vacuums. HEPA filter vacuums will filter out minute particles rather than blowing them into the air.

Food, beverages, or medications that have been exposed to burn debris or ash should not be consumed.

If you have a vegetable garden or fruit trees, thoroughly wash the produce before eating.

Clean all utensils and dishware before use by washing them in a strong detergent solution and then soaking them in a bleach solution of one teaspoon of bleach per quart of water for 15 minutes.



# CLEANING RESOURCES

Check out the following resources for more information on safe and effective after wildfire clean-up in your home.



## **Cleaning Up After a Fire Disaster**

*Utah State University Extension*

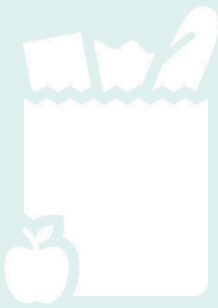
Visit <https://extension.usu.edu/preparedness/articles-and-research/cleaning-up-after-a-fire-disaster> for more information on cleaning smoke damage, fire retardant, soot, ash, both indoors and outdoors.



## **Cleaning Up and Removing Smoke Odor**

*American Red Cross*

Check out [bit.ly/cleaningsmokeodor](http://bit.ly/cleaningsmokeodor) for more detailed indoor clean-up advice and cleaning mixtures for removing smoke odor from clothes, walls, and surfaces.



## **Food Safety, Disaster Recovery Guide**

*Colorado Department of Public Health and Environment*

Visit [bit.ly/CDPHEfoodsafety](http://bit.ly/CDPHEfoodsafety) for more detailed information on preventing foodborne illness, food safety after power loss and food exposure to wildfire smoke.



## **Returning to Your Home Kitchen After Wildfire**

*CSU Extension*

This resource has more information on supplies and considerations for cleaning refrigerators and freezers. <https://extension.colostate.edu/docs/pubs/fire/kitchen-after-fire.pdf>

# DEBRIS AND DISPOSAL RESOURCES

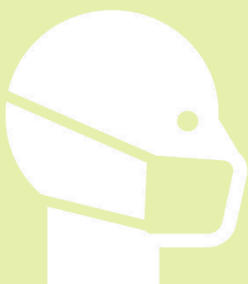
A good place to start is by checking with your local landfill for restrictions on disposing of fire debris, hazardous materials, carcasses, and other waste. Central Maui Landfill Refuse & Recycling Center can be contacted by calling (808) 270-6153 or visiting [mauicounty.gov](http://mauicounty.gov).



## **Debris Cleanup, Disaster Recovery Guide**

*Colorado Department of Public Health and Environment*  
Visit [bit.ly/CDPHEdebriscleanup](http://bit.ly/CDPHEdebriscleanup) for more information on the safe cleanup of debris, ash, hazardous materials, and emergency livestock disposal.

**Environmental Protection Agency** [epa.gov](http://epa.gov)



## **Asbestos and Natural Disasters Guide**

*The Mesothelioma Center*

Check out [asbestos.com/asbestos/natural-disasters](http://asbestos.com/asbestos/natural-disasters) for information about materials containing asbestos and how to minimize your exposure after a wildfire.



## **Animal Carcass Disposal**

*Colorado Department of Public Health and Environment*

This resource has more information on safe carcass disposal and staying in compliance with disposal regulations. Check it out at [bit.ly/CDPHEanimalcarcass](http://bit.ly/CDPHEanimalcarcass).

**Maui County Humane Enforcement Dept.**  
**(808) 877-3680 ext. 222.**



## **Livestock Mortality Composting Guide**

*Montana State University Extension*

Visit [bit.ly/livestockmortality](http://bit.ly/livestockmortality) for more information on disposal for large and small operations in semi-arid western regions.

# CONTROLLING MOLD

## **As soon as it is safe to return home begin cleaning up and drying**

- Mold testing is not usually needed.
- For extensive damage and mold growth, hire a reputable mold remediation firm that is licensed to repair water damage and remove mold.

## **Doing the clean-up Yourself**

After water damage:

- Cover damaged areas of the roof with a waterproof tarp to prevent more damage.
- Take an inventory of your home and belongings.
- Dry all wet materials as quickly as possible. If possible, use air conditioning or heat with fans and dehumidifiers. If you have no power but have access to a generator, run a dehumidifier indoors.

## **Remove wet carpets right away**

- Discard upholstered fabric furniture.

**Cut away wet wallboard and remove all damp insulation right away**—even if the wallboard looks dry.

- Use non-phosphate detergents to clean. Phosphate residue is mold food.
- Do all you can to speed the drying of subfloors, slabs, and wall framing before replacing insulation, wallboards, and floors.
- Before replacing insulation, use a moisture meter to make sure the moisture content of the studs and sheathing is no more than 14 percent by weight.
- Remove wet insulation from the attic if it is saturated from blowing rain.

## **Protect yourself**

- Wear long sleeves, long pants, sturdy shoes, gloves, and a mask or respirator (N-95 or better). If you are sensitive to mold, wear splash goggles.
- Isolate the work area and ventilate it to the outdoors. Seal off the contaminated area from the rest of the house.
- Remove and discard moldy materials.
- Clean small items in the washing machine.
- Clean all surfaces. Remove, do not just kill the mold. Dead spores can cause health problems.
- Use a disinfectant to kill any mold missed by the cleaning. Use a solution of 1 cup bleach to 1 gallon of water. Do not use it in the air system.
- Remain on mold alert. Continue looking for signs of moisture or new mold growth. If mold returns, repeat the cleaning.
- Do not rebuild or refurbish until all affected materials have dried completely.



## **CONTROLLING MOLD** *(continued)*

### **In hot, humid climates**

- Mold can grow even if you do not have water damage but lose power.
- Ventilate the house as much as possible.
- Minimize the amount of moisture that you add to the inside of the home through showers, cooking, laundry, and more.

### **Choosing a Mold Contractor**

- Check the phone listings for specialists in painting, restoration, carpet cleaning, furniture repair, and water damage.
- Make sure the business is licensed for mold remediation. Ask to see the licenses, including those of the people doing the work.
- Ask for and check references.

### **A Remediation Contract Should Specify**

- What is to be corrected, including a diagram that shows where the work will be done.
- How long it will take to complete the work.
- The materials required, such as lumber, sheetrock, flooring, carpet and padding, and paint.
- Who will provide the renovation materials.
- How the contaminated items will be handled.
- Who will remove the debris from the site.
- Warranties of work and guarantees on remediation.

# SALVAGING IMPORTANT PAPERS, BOOKS, AND PHOTOS

- Dry papers, books, and photos before mold sets in. For best results, dry them slowly.
- Before drying, wipe book covers with a solution of one part rubbing or denatured alcohol and one part water.
- Carefully remove framed items from their frames. If an object is stuck to the glass, do not remove it—take out the backing material and dry the object inside the frame, glass-side down.
- If papers or photos are muddy or dirty and are still wet, rinse them very gently in a bucket of cold, clean water before drying. Do not rinse books.
- When books are partially dry, set them on a flat surface with a slight weight to keep the pages from warping.
- Alternate drying and pressing the books until they are thoroughly dry. This helps prevent mildew.
- For valuable books that are nearly dry, consider pressing the pages with an electric iron set on low. Although this is a tedious process, it may be worth the effort. Separate the pages to prevent musty odors.

## **If the items are very damp:**

- Blot it gently with a clean, dry sponge, clean paper, or bath towels. Do not blot on hand-written ink or fragile surfaces. Do not use newspaper for blotting.
- Sprinkle papers, photos, books with cornstarch or talcum powder to absorb moisture. Leave the powder for several hours and then brush it off.
- To dry papers and photos, lay them flat on a surface covered with absorbent material. Separate the papers if possible.
- You might have to wait until they are partially dry before you can separate them. Place books on the top or bottom edge with the leaves separated. Do not stand books on the front edge.
- Dry items out of direct sunlight. Use an oscillating fan to increase air circulation but do not let it blow directly on the items

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## **When books are thoroughly dry:**

- - Close them and use C-clamps to help them retain their shape.
- -Wipe vinyl and leather book cover with a light coating of petroleum jelly or leather or vinyl dressing.
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## **If you do not have time to clean and dry your books and papers immediately:**

- -Put each book or paper in a sealed plastic bag in the freezer to prevent mildew.
- -Place wax paper between the layers of paper bundles or books so they can be separated easily when removed.
- Even if your papers appear to have dried successfully, they may disintegrate because of substances that were in the floodwater or rainwater. To be certain valuable or historic papers and photos are preserved, take them to a professional conservator

# CARING FOR ANIMALS AFTER WILDFIRE

Until you're able to safely bring back pets and livestock, UH CTAHR Cooperative Extension can help you arrange for places to keep them out of harm's way. When you're ready to bring them back, remember to handle them calmly and carefully. They will likely be stressed or confused and may react with unexpected behavior.

Keep the following tips in mind:

- When it is safe to do so, check pens, barns, and sheds for damage, and check pastures for debris. Move animals to safe areas.
- Check pets and livestock for injury and tend to minor injuries promptly. For animals with serious injuries or long-term behavioral issues, contact a veterinarian for help.
- Make sure your animals have plenty of fresh food and water. Cover their food, hay, and water to keep ash and other contaminants out.
- Smoke, while irritating to humans, can be harmful to animals. If you can see or feel the effects of smoke, take precautions to protect your pets and livestock from smoke exposure.
- Animals can become disoriented easily after a wildfire and get lost. Be sure that pets and livestock are wearing their identifiers (collars with IDs, microchips, tags, brands, etc.) with your name, address, and phone number.
- To look for lost and found pets, contact local animal shelters.
- For animals needing to be rescued or for help with carcass disposal, call Maui County Humane Enforcement Dept. (808) 877-3680 ext. 222.
- Document and report all livestock and poultry losses immediately to your county Farm Service Agency (FSA).
- After wildfire, be sure your livestock are pastured somewhere safe from post-fire flooding, if possible.

## **CARING FOR PETS**

- Check your pets for injuries and treat minor injuries with your home first-aid kit.
- Make sure your pets have ample food and water and are contained in a safe area.
- Your home may be a very different place after a disaster, whether you have taken shelter at home or elsewhere. Do not allow your pets to roam loose. Familiar landmarks and smells might be gone, and your pet will probably be disoriented. Pets can easily get lost.
- While you assess the damage, keep dogs on leashes and cats in carriers inside the house. If your house is damaged, they could escape and become lost.
- Be sure pets are wearing collars with tags that have your name, address, cell phone number (in case land phone lines
- Be patient with your pets after a disaster. Try to get them back into their normal routine as soon as possible, and do not be surprised if they have behavioral problems as a result of the stressful situation.
- As soon as possible after the disaster, have your pets examined by a veterinarian. Discuss with the veterinarian any behavioral problems that persist.
- To look for lost and found pets, call your local animal shelter. Also register at: [www.petfinder.com](http://www.petfinder.com).
- To report an animal needing rescue or for help with seriously injured animals, call your county's emergency management department.

## **CARING FOR LIVESTOCK**

- When it is safe to do so, check pens, barns, and sheds for damage and check pastures for debris. Move animals to safe areas.
- Make sure animals have plenty of feed and water. They might also need vitamins and electrolytes to help them recover from stress.
- To report an animal needing rescue or for help with carcass disposal, call your county's emergency management department or your county Extension office.
- For information or guidance on building a carcass composting pile, contact your county Extension office.

## **ANIMAL CARE RESOURCES**

### **Wildfire Smoke and Animals**

American Veterinary Medical Association

<https://www.avma.org/resources/pet-owners/emergencycare/wildfire-smoke-and-animals>

**Caring for Livestock After Disaster CSU Extension** [bit.ly/caringforlivestock](http://bit.ly/caringforlivestock)

### **Assessing and Caring for Cattle After Wildfires Texas A&M Extension**

<http://overton.tamu.edu/files/2011/04/assessing-and-caring-for-cattle-after-wildfires.pdf>

### **Checklist of Considerations for Post-Fire Management**

**Texas A&M Extension**

<https://texashelp.tamu.edu/wp-content/uploads/2016/02/checklist-of-considerations-for-post-wildfire-management.pdf>

## **LOCAL CONTACTS**

- **UH CTAHR Maui Livestock Agent – Dr. Kyle Caires**  
[kylecaires@yahoo.com](mailto:kylecaires@yahoo.com)

- **Maui Humane Society**  
(808) 877-3680  
[info@MauiHumaneSociety.org](mailto:info@MauiHumaneSociety.org)

**Kahului Animal Hospital**  
(808) 871-7387  
[kahuluianimalhospital.com](http://kahuluianimalhospital.com)

- **Makawao Veterinary Clinic**  
(808) 572-9003  
[makawaovet.com](http://makawaovet.com)

- **USDA, Farm Service Agency (FSA)-Maui**  
77 Hookele St., Suite 201, Kahului, HI  
(808) 871-5500 X2  
[fsa.usda.gov](http://fsa.usda.gov)

# LANDSCAPE RECOVERY

Following a destructive wildfire, landowners will need to assess the surrounding landscape and determine how best to affect restorative treatments. Immediate concern should be for the stabilization of soils to help prevent or mitigate flooding, erosion, mudslides, and other hazards. Hawaii's diverse topography, paired with burn severity of the area can make each landscape treatment plan vary. The following pages contain landscape recovery resources for soil erosion, seeding, trees, and key contacts. UH CTAHR Extension agents and foresters can also help provide recommendations.

## LANDSCAPE RECOVERY RESOURCES

### SOIL EROSION

Understanding Burn Severity Photo Guide  
Coalitions & Collaborations  
[bit.ly/burnseverity](http://bit.ly/burnseverity)

What Are Hydrophobic Soils?  
NRCS  
[bit.ly/hydrophobicsoils](http://bit.ly/hydrophobicsoils)

Erosion Control Techniques & Supplies  
NRCS  
[bit.ly/erosiontechniques](http://bit.ly/erosiontechniques)

### SEEDING

Grass Seed Mixes to Reduce Wildfire Hazard  
CSFS  
[bit.ly/grasseedmixes](http://bit.ly/grasseedmixes)

Native Grasses for Hawaii Landscapes Maui

Native Nursery [mauinativenursery.com](http://mauinativenursery.com)

Seeding After Wildfire  
NRCS  
<https://www.nrcs.usda.gov/resources/guides-and-instructions/after-the-fire-seeding>

Replanting in Burn Areas Tips for Success  
CSFS  
[bit.ly/replantingburnareas](http://bit.ly/replantingburnareas)

### TREES AND VEGETATION

Native Trees for Hawaii Landscapes Maui Native  
Nursery [mauinative](http://mauinative)nursery.com

Insects and Diseases Associated with Forest Fires  
USDA  
[invasivespeciesinfo.gov](http://invasivespeciesinfo.gov)

Post-Fire Restoration & Rehabilitation  
CSFS  
[csfs.colostate.edu/forest-management/](http://csfs.colostate.edu/forest-management/)

## LOCAL CONTACTS

**Maui County Department of Planning**  
(808) 270-7735  
mauicounty.gov

(808) 214-1744  
nrcs.usda.gov

**Maui Soil and Water Conservation Districts**



# POST-FIRE FLOODING

Wildfires have increased the risk of flooding in many areas of Hawaii in recent years. The dramatic changes in landscape and ground conditions after wildfires increases the risk of flooding during heavy rains. Burned landscape is unable to absorb rain as effectively as it did before the fire, resulting in runoff conditions like those found in parking lots. Flooding is most common during the summer and early fall, when thunderstorms develop during the rainy season. Rainfall over the burned area collects in streams causing flash floods carrying downed trees, boulders, gravel, and other debris. The resources on the following pages will help landowners downstream understand how to reduce risk and prepare for flooding.

## POST-FIRE FLOODING RESOURCES

### **Watershed Assessment and Vulnerability Evaluation (WAVE) Program**

Colorado Water Center | CSU Extension

[bit.ly/WAVEprogram](https://bit.ly/WAVEprogram)

### **Post-Wildfire Hazards: Mudslides and Debris Flow**

Colorado Geological Survey

[bit.ly/postwildfirehazards](https://bit.ly/postwildfirehazards)

### **Flood After Fire Infographic**

FEMA

[bit.ly/floodsfollowfires](https://bit.ly/floodsfollowfires)

### **Actions to Take Before a Flood Occurs After Wildfire New Mexico**

[bit.ly/actionsbeforeflood](https://bit.ly/actionsbeforeflood)

## LOCAL CONTACTS

### **NRCS Kahului Service Center**

(808) 871-5500

[nrcs.usda.gov](https://nrcs.usda.gov)

# STAY CONNECTED

Every loss and the emotions that come with it matter. It's okay to grieve life prior to the wildfire, mourn what has been lost, feel overwhelmed by the work ahead, and the multitude of other feelings you may experience. Like the wildflowers, you too will grow again in new ways, you may not have thought possible.

Throughout the development of this guidebook, one theme held constant. Amidst the heartbreak, we found ourselves captivated by the resilience of survivors and their land. Although it may feel like all is lost, your connections with family, friends, and the community, will prove to be the most valuable asset to your recovery.

Whether you've known UH CTAHR Cooperative Extension and our partners for a while or we've just connected, we hope to stay in touch along the way. Don't hesitate to contact us if we can be of further assistance or you're interested in getting involved in community recovery efforts.

You've got this.

**UH CTAHR COOPERATIVE EXTENSION-Maui**

(808) 244-3242

[kahului@hawaii.edu](mailto:kahului@hawaii.edu)

## GUIDEBOOK CONTRIBUTORS

The contributors listed below were able to bring a wide range of perspectives. They include, landowners that experienced post-fire impacts, extension agents that have assisted with recovery efforts, and subject-matter experts on emergency management, forestry, fire science, animal care, and communication. We hope you find this toolkit useful, and we welcome any feedback you may have so that we can continue to improve it.

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- Texas A&M Agrilife Extension Service

University of Hawaii, Colorado State University, Texas A&M AgriLife,  
U.S. Department of Agriculture cooperating Extension programs are available to all without discrimination.