

ALL-HAZARDS PREPAREDNESS FOR RURAL COMMUNITIES

www.prep4agthreats.org

A guide to help rural agriculture communities prepare for threats to their families, farms, animals and businesses



 the Center for
Food Security
& Public Health
IOWA STATE UNIVERSITY®

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prepare for threats to their families, farms,
animals and businesses



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ALL-HAZARDS PREPAREDNESS FOR RURAL COMMUNITIES

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Agriculture is an essential part of the U.S. economy accounting for over 45% of the nation's Gross Domestic Product.¹ Production of a wide variety of commodities including livestock, produce and grains are accomplished by an estimated 2.1 million farms - 34% of which are located in the North Central Region and 44% in the Southern U.S.²

Any incident involving agricultural communities, whether naturally occurring or man-made, accidental or intentional, will greatly impact the individuals, farms and businesses in these affected areas as well as impact local, state and national economies.

Rural communities need to prepare for these hazardous events, in efforts to prevent or minimize the impact on human and animal health as well as animal and crop production. Studies have indicated that despite recent hazardous events (e.g., the September 11, 2001 terrorist attack, impact of Hurricane Katrina in 2007) many people have still not taken steps to prepare for future situations. Additionally, a recent survey³ of individuals who considered themselves prepared for emergencies found on further assessment that they were less prepared than they perceived. This same survey also found that individuals in the Midwestern region of the U.S. to be less prepared compared to other regions of the country.

This All-Hazard booklet was developed as a resource for citizens of rural agricultural communities – individuals, farmers and producers, businesses – with the hope of raising awareness of the natural and man-made threats to these communities and their commodities. These threats can include natural disaster situations (e.g., floods, tornadoes); biological emergencies (e.g., pandemic flu, food safety recalls) and man-made or technological threats (e.g., bio- or agro-terrorism, agrochemical situations).

The booklet is divided into 4 sections: 1) general preparedness measures, 2) natural disasters hazards, 3) biological emergencies, 4) manmade or technological threats. Sections containing National and State contacts as well as sources for additional information are also provided. Each section contains an overview of the particular hazard and several informational handouts. The handouts are presented in a check list format to help guide individuals in rural communities in preparing for a particular hazard before it occurs, during the event, and recovering from the situation.

All materials found in this booklet as well as links to additional resources on preparedness and recovery can be found at www.Prepare4AgThreats.org. A CD containing various preparedness and recovery resources is also included as part of this booklet for individuals who may have limited internet capabilities and may not be able to access the website.

We hope this booklet will help you prepare for and minimize the impact of hazards and threats to your home, farm or business, as well as protect yourself, your family, your animals and your employees.

1. USDA NASS Farms, Land in Farms and Livestock Operations 2012 Summary (Feb 2013)
<http://usda01.library.cornell.edu/usda/current/FarmLandIn/FarmLandIn-02-19-2013.pdf>
2. U.S. Environmental Protection Agency. Ag 101.
Available at <http://www.epa.gov/oecaagct/ag101/index.html>.
3. Citizen Corps. CITIZEN PREPAREDNESS REVIEW, Community Resilience through Civic Responsibility and Self-Reliance.
Available at http://www.citizencorps.gov/pdf/citizen_prep_review_issue_5.pdf.

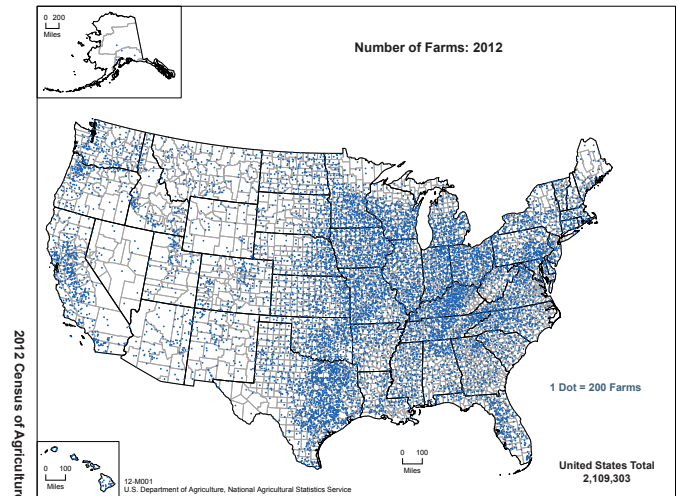


Figure 1. The number of farms in the United States (2012). A single dot equals 200 farms. Source U.S. Department of Agriculture, National Agricultural Statistic Service (USDA NASS)

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GENERAL PREPAREDNESS FOR ALL-HAZARDS

Rural communities are vulnerable to any number of hazardous or threatening situations. These can include incidents caused by natural disasters, biological emergencies or man-made or technological threats. The term “all-hazards” is used describe these possible situations that can impact you, your family, your home or farm, your business or your community. Table 1 shows some examples of these hazards.

The impact of any disaster or hazard on rural communities not only affects human life and property but can also cause devastating damage to the agricultural commodities – livestock, crops, and businesses – associated with these areas. Additionally, in many of these small communities, emergency or response resources may be limited. In the event of a disaster or emergency situation, individuals, businesses or communities may need to be self-sufficient for awhile until further assistance from local, state or federal agencies can be obtained.

Preparing for “all-hazards” requires knowing your risks and developing emergency plans to use during and after the situation. These efforts will help to minimize the impact and to protect yourself, your family, your home or farm and business as well as your pets and livestock.



Photo source: Lance Cheung/USDA Natural Resources Conservation Service

Table 1: Potential all-hazards for rural communities

Natural Disasters	<ul style="list-style-type: none"> Floods Severe Thunderstorms Tornadoes Excessive Heat Drought Severe Winter Storms
Biological Emergencies	<ul style="list-style-type: none"> Pandemic Influenza Foreign Animal Diseases Emerging and Zoonotic Diseases Emerging Crop Diseases and Pests Food Safety Recalls
Technological Threats	<ul style="list-style-type: none"> Bio- and Agro-terrorism Agrochemical Issues Power Outages



Regardless of the emergency situation or hazard anticipated, one of the best things you can do is to make a plan and prepare your family beforehand.

Create a Family Disaster Plan

- **Gather information.**
 - What disasters or hazards are most likely in your community? For your home?
 - How would you be warned?
 - How should you prepare for each?
- **Know the warning signals for your area.**
 - Learn the warning systems for your community.
 - Be sure you can hear or see the appropriate warning from your home.
- **Obtain insurance for your family and home.**
 - Check your homeowners insurance.
 - Get additional coverage for situations that may not be covered.
- **Stay alert for emergency broadcasts.**
 - Emergency Alert System broadcasts (radio, TV)
 - NOAA weather radio alerts
 - News sources – radio, television, internet
- **Choose a post-hazard meeting place for your family.**
 - A safe distance from your home for sudden emergencies (e.g., fire).
 - Outside your neighborhood in case you can't return home.
 - Learn where area evacuation shelters are located.
- **Make a family communication plan.**
 - Know how you will contact each other if you are at work, school or other location.
 - Have an out-of-state friend or relative serve as an emergency contact for everyone to call.
 - Keep a list of emergency phone numbers, including neighborhood contacts.
 - Give emergency numbers to all family members and post by every phone.
- **Make a family emergency supply kit.**
 - You may need to survive on your own temporarily until you can get assistance.
 - Prepare a kit with 3 or more days of supplies (food, water, clothing).
- **Share the above information with your family.**
 - Meet with all members of your household.
 - Discuss the types of hazards that could occur.
 - Discuss your family's plan.
 - Practice your plans.

- **Plan how you and your neighbors could work together during a disaster.**
 - Create a neighborhood communication plan.
 - Help neighbors with special needs, such as elderly or disabled persons.
 - Make plans for the care of children, if parents cannot get home.
 - Learn response plans for your children's schools or child care facilities.
- **Don't forget to include plans for your pets.**

Family Emergency Plan Situations

- **Shelter-in-place**
 - Take immediate shelter wherever you are – home, work, school or in between – rather than entering into a hazardous situation.
 - Used for situations such as severe storms, winter weather, biological emergencies.
 - Time will vary; few hours to several days.
- **Evacuation**
 - Leaving your current location and seeking shelter at a safer place.
 - For situations such as flood or chemical accidents.
 - Time will vary; days, weeks - it may be never for some situations (e.g., flood).

For More Information

Ready.gov

Federal Emergency Management Agency (FEMA)

<http://www.ready.gov/>

Information adapted from publications by the Federal Emergency Management Agency, the National Weather Service, the Centers for Disease Control and Prevention, and the American Red Cross.



FAMILY EMERGENCY CONTACT FORM

General Preparedness

Police	Insurance Agent
Fire	Homeowner's Insurance Policy Company: Policy Number:
Ambulance	Flood Insurance Policy Company: Policy Number:
County Emergency Management Office	Wind and/or Hail Insurance Policy Company: Policy Number:
Neighbors	Disaster Hotline
Out of State Contact	Cooperative Extension Service
American Red Cross	Veterinarian
Power Company	Animal Shelter or Pet Friendly Hotel
Gas Company	
Water Company	
County Public Health Department	
Poison Control Center	



In an emergency situation, such as a natural disaster, preparing items beforehand can help keep you and your family safe until you can get assistance.

Basic Kit

• Essential items needed for all situations – FOOD – WATER – CLOTHING.

- Canned food: 3-5 days worth – don't forget a non-electric can opener
- Water to last 3-5 days -- about 1 gallon of water per person per day
- Any medications needed by family members (e.g., heart or high blood pressure medication, insulin, contact lens supplies)
- A first aid kit and first aid manual.
- Extra clothing

• Other items to bring:

- A battery-powered radio
- Flashlight with extra batteries
- Cell phone with charger
- Mess kits or paper dining products (e.g., cups, plates, napkins)
- Personal hygiene supplies (e.g., soap, toothpaste, toilet paper, garbage bags, etc.)
- Hand sanitizer
- Sleeping bags or extra blankets
- Dust masks
- Duct tape
- Cash or traveler's checks

• Additional items for infants:

- Bottles, formula, drinking water
- Diapers, ointments
- Medications

• Special items for children:

- A favorite toy or blanket
- Colors and paper to help keep them busy while in the shelter

• Don't forget items for pets.

- See 'Pet Emergency Plan and Supply Kit' handout (next page).

• Place your kit in a central location.

- Let all of your family know where it is.
- Check the contents regularly to ensure fresh and complete supplies.

• Gather important family documents:

- Will, insurance policies, contracts, deeds, stocks, bonds
- Passports, social security cards
- Immunization records
- Bank account numbers
- Credit card account numbers and companies
- Inventory of valuable household goods
- Important telephone numbers
- Family records (birth, marriage, death certificates, social security numbers)
- Keep these documents in a waterproof, fireproof, portable container.

Seasonal Items

• Spring/Summer

- Mosquito protection: Insect repellent containing DEET or Picaridin, or long sleeved and long-legged clothing
- Sunscreen, wide brim hat

• Winter

- Extra blankets
- Hats, gloves, scarves
- Shovel, sand or cat litter

Emergency Kit for Your Car

• You may be away from home and in your car during an emergency situation.

• Keep these preparedness items in your car:

- High energy foods (e.g., peanut butter, crackers, granola bars, trail mix) and water
- Flares, booster cables, tools, maps
- First aid kit, blankets
- Flashlight and extra batteries
- Seasonal items: sunscreen, shovels

• Keep your gas tank full, in case of emergency.

For More Information

Ready.gov: Build A Kit

Federal Emergency Management Agency (FEMA)
<http://www.ready.gov/build-a-kit>

Information adapted from publications by the Federal Emergency Management Agency, the National Weather Service, the Centers for Disease Control and Prevention, and the American Red Cross.



PET EMERGENCY PLAN AND SUPPLY KIT

General Preparedness

Pets can also be affected by a number of hazard situations. While preparing your family emergency plan, don't forget to include plans for your pets.

Before a Disaster or Emergency

- **Make a preparedness kit for your pet.**
 - Leash and collar: clearly labeled with your pet's name, your name and a contact number
 - Transport carrier: clearly labeled with your name and a contact number
 - Food and water (5-7 day supply) – don't forget bowls and a non-electric can opener
 - Any medications for the pet
 - Copies of your pet's medical and vaccination records (e.g., rabies certificate)
 - Your veterinarian's name and phone number
 - Paper towels, newspapers, plastic trash bags, disinfectant (e.g., bleach) for waste clean-up
 - Toys or blankets the pet will find familiar
- **Provide for the special needs of unique pets.**
 - Birds/lizards: blanket to keep cage warm, spray bottle to hydrate feathers
 - Snakes: pillowcase to transport, heating pad for warmth, water bowl to soak
 - Pocket pets (hamsters/gerbils): cage/bedding material, water bottles
- **Store items in a sturdy container that can be easily carried.**
 - Covered trash container, duffle bag, plastic tote, bucket
- **Make sure pets are current on all vaccinations.**
- **Identification**
 - All pets should have some sort of identification (collar with tag, microchip).
 - Take a photo of the pet and keep it with the medical records.
 - Include any proof of ownership materials (e.g., registration information, proof of purchase, adoption records, microchip information).
- **Practice loading your pet into their cage, carrier, or trailer.**
- **Identify pet friendly locations in case of the need to evacuate.**
 - Board with friends/relatives in a safe area.
 - Check with your local animal shelter, boarding facility, or veterinary clinic.
 - Pet friendly hotels - www.petswelcome.com

During a Disaster or Emergency

- **If you are sheltering in place:**
 - Bring your pet indoors.
 - Place them inside a carrier or cage to help reduce their stress.
- **If you need to evacuate:**
 - Take your pets with you whenever possible.
 - Allow plenty of time to catch and "load" your pet.
 - Make sure your pet has identification securely fastened to them.
 - Call your prearranged animal evacuation site.
- **If you must leave your pets behind:**
 - NEVER leave pets tied up outside.
 - Leave them untied in an interior room with adequate air and no windows (e.g., bathroom).
 - Purchase a self-feeder in advance and leave enough food and water for 3-5 days.
 - Leave a faucet dripping as a water source; keep the sink drain open.
 - Leave a notice on your front door with the location and type of pets inside, their names and your contact phone number.

After the Disaster or Emergency

- **A pet's behavior may change before, during and even after a disaster.**
 - In the first few days after the disaster, leash your pets when they go outside.
 - Maintain close contact to help them readjust to the changed environment.

For More Information

Saving the Whole Family

American Veterinary Medical Association (AVMA)

https://ebusiness.avma.org/files/productdownloads/STWF_English.pdf

Information adapted from publications by the American Veterinary Medical Association (AVMA).



Protecting your farm involves a number of considerations – family members, co-workers or employees, buildings, equipment, livestock, and crops. Planning ahead for all-hazard situations can help to minimize the impact and speed the recovery process for you and your farm.

Before a Disaster or Emergency

- **Gather information.**
 - What disasters or hazards are most likely in your community? For your farm?
 - How would you be warned?
 - How should you prepare for each?
- **Know the warning signals for your area.**
 - Learn the warning systems for your community.
 - Are you able to hear or see the appropriate warning from your farm?
- **Stay alert for emergency broadcasts.**
 - Emergency Alert System broadcasts on radio or television
 - NOAA weather radio alerts
 - News sources – radio, television, internet
- **Put together an emergency supply kit for your family.**
 - See 'Family Emergency Supply Kit' handout
- **Draw a farm site map and indicate:**
 - Buildings and structures
 - Access routes (e.g., roads, lanes)
 - Barriers (fences, gates)
 - Locations of livestock
 - Locations of all hazardous substances
 - Electrical shutoff locations, etc.
- **Make a list of your farm inventory, include:**
 - Livestock (species, number of animals)
 - Crops (acres, type)
 - Machinery and equipment (make, model #)
 - Hazardous substances (e.g., pesticides, fertilizers, fuels, medicines, other chemicals)
- **Keep a list of emergency phone numbers.**
 - Your local and state veterinarian
 - County extension service
 - Local emergency management
 - Insurance agent
- **Make a list of suppliers or businesses providing services to your farm.**
 - Livestock or milk transport, feed delivery, fuel delivery, etc.

- **Contact your insurance agent.**
 - Review your insurance coverage.
 - Get additional coverage for “all-hazard” situations (e.g., flood, hail damage).
- **Stockpile supplies needed to protect the farm:**
 - Sandbags and plastic sheeting, in case of flood
 - Wire and rope to secure objects
 - Lumber and plywood to protect windows
 - Extra fuel for tractors and vehicles
 - Hand tools for preparation and recovery
 - Fire extinguishers in all barns and all vehicles
 - A safe supply of food to feed livestock
 - A gas powered generator
- **Identify areas (e.g., higher elevation) to relocate your assets, if needed.**
 - Livestock and horses
 - Equipment
 - Feed, grain, hay
 - Agrochemicals (pesticides, herbicides)
- **Remove or secure any loose equipment or materials, such as lumber or fuel tanks.**
- **Prepare farm employees.**
 - Keep them informed of the farm’s emergency plan; review it with them regularly.
 - Identify shelter-in-place or evacuation locations.
 - Establish a phone tree with contact information for all employees.

For More Information

Preparing the Farm and Farm Animals for Disasters

USDA National Agricultural Library

<http://emergencypreparedness.cce.cornell.edu/family/Documents/PDFs/Farmanimalprepare.pdf>

Information adapted from publications by the United States Department of Agriculture, National Agricultural Library.



FARM EMERGENCY CONTACT FORM

General Preparedness

Police	Local/Farm Veterinarian
Fire	State Veterinarian
Ambulance	Cooperative Extension Service
County Emergency Management Office	Livestock Shipper
Neighbors	Milk Hauler
Out of State Contact	Grain Hauler
American Red Cross	Fuel Supplier
Power Company	Homeowner's Insurance Policy Agent: Company: Policy Number:
Gas Company	Farm Insurance Policy Company: Policy Number:
Water Company	Flood Insurance Policy Company: Policy Number:
Disaster Hotline	Wind and/or Hail Insurance Policy Company: Policy Number:
County Public Health Department	
Poison Control Center	



Disaster situations can impact livestock and horses. Due to their size, and special shelter and transport requirements, planning ahead for emergency situations imperative.

Before a Disaster or Emergency

- **Determine the hazards and risks for your area and animals.**

- Are animal located outside or housed indoors?
- What is the risk of illness or injury to animals at these locations?

- **Maintain an inventory.**

- Keep a current list of all animals on your farm.
- Include their location and any records of vaccinations or testing.

- **Have identification for all animals.**

- Make sure animals have some form of permanent identification (e.g., ear tags, tattoos).
- Make sure you have records of ownership for all animals, in cases of loss or displacement.

- **Identify alternate water or power sources.**

- **Prepare an evacuation kit.**

- Handling equipment (e.g., halters, nose leads)
- Water, feed, and buckets
- Medications
- Tools and supplies needed for sanitation
- Cell phone, flashlights, portable radios, and batteries
- Basic first aid kit
- Safety and emergency items for your vehicles and trailers
- Gas powered generators

- **Make evacuation arrangements.**

- Locate and prearrange evacuation sites.
- Determine routes to these locations and have alternate routes planned as well.
- Make arrangements for trucks, trailers, or other transport vehicles for livestock as well as experienced handlers and drivers.
- Condition animals to being loaded and transported.
- Plan how handling equipment and veterinary care will be obtained at the evacuation site.
- Arrange for feed and water delivery for the evacuation site.

- **Establish escape routes to safe locations**

(e.g., higher elevation).

- Keep animals from unsafe locations (e.g., barns in flood situations, under trees in severe thunderstorms).

- **Establish a safe environment for animals.**

- Assess the stability and safety of barns and other structures.
- Remove dead trees or other debris in fields or animal holding locations.
- Remove or secure any loose equipment or materials, such as lumber, feed troughs.
- Make sure wiring for heat lamps or other electrical machinery is safe and away from flammable debris.

For More Information

Caring for Livestock Before Disaster

Colorado State University Extension

<http://extension.colostate.edu/docs/pubs/livestk/01814.pdf>

Caring for Livestock During Disaster

Colorado State University Extension

<http://extension.colostate.edu/docs/pubs/livestk/01815.pdf>

Caring for Livestock After Disaster

Colorado State University Extension

<http://extension.colostate.edu/docs/pubs/livestk/01816.pdf>

Information adapted from publications by the United States Department of Agriculture, National Agricultural Library, and Colorado State University Extension



LIVESTOCK DAILY FEED AND WATER REQUIREMENTS

General Preparedness

ANIMALS	WATER / DAY	FEED / DAY
DAIRY COWS		
IN PRODUCTION	9 GALLONS SUMMER	20 POUNDS HAY
	7 GALLONS WINTER	
DRY COWS	9 GALLONS SUMMER	20 POUNDS HAY
	7 GALLONS WINTER	
WEANING COWS	6 GALLONS SUMMER	8-12 POUNDS HAY
	3 GALLONS WINTER	
PREGNANT	7 GALLONS SUMMER	10-15 POUNDS LEGUME HAY
	6 GALLONS WINTER	
COW WITH CALF	9 GALLONS SUMMER	12-18 POUNDS LEGUME HAY
	8 GALLONS WINTER	
CALF (400 POUNDS)	6 GALLONS SUMMER	8-12 POUNDS LEGUME HAY
	4 GALLONS WINTER	
SWINE		
BROOD SOW WITH LITTER	4 GALLONS SUMMER	8 POUNDS GRAIN
	3 GALLONS WINTER	
BROOD SOW (PREGNANT)	1-2 GALLONS SUMMER	2 POUNDS GRAIN
	1 GALLON WINTER	
150 POUND GILT OR BOAR	1 GALLON	3 POUNDS GRAIN
SHEEP		
EWE WITH LAMB	1 GALLON	5 POUNDS HAY
EWE, DRY	3 QUARTS	3 POUNDS HAY
WEANING LAMB	2 QUARTS	3 POUNDS HAY
POULTRY		
LAYERS	5 GALLONS/ 100 BIRDS	17 POUNDS/ 100 BIRDS
BROILERS	5 GALLONS/ 100 BIRDS	10 POUNDS/ 100 BIRDS
TURKEYS	12 GALLONS/ 100 BIRDS	40 POUNDS/ 100 BIRDS
HORSES		
ALL BREEDS	5 GALLONS/ 1000 POUNDS	20 POUNDS HAY/ 1000 POUNDS

Source: Preparing the Farm and Farm Animals for Disaster. <http://www.nal.usda.gov/awic/pubs/IACUC/dis.htm#prep>



The impact of all-hazard situations on your business can involve a number of factors – your property, employees, customers, suppliers. Planning ahead for these situations can help to minimize the impact and speed the recovery of your business.

Before a Disaster or Emergency

- **Determine the hazards and risks for your area and business.**
- **Establish a team to develop the business all-hazards preparedness/continuity plan.**
 - Document all processes that make your business run -- from answering the phones, to tracking finances, to distributing your product or service.
 - Determine what processes and equipment are critical to keeping your business open.
 - Obtain building and site maps.
- **Plan for continuity.**
 - Store extra supplies offsite.
 - Make a plan for a temporary location if your company is forced to relocate.
 - Have a plan for alternate communication with customers, suppliers during recovery.
 - Determine leadership roles and responsibilities.
 - Develop plan to maintain payroll.
- **Maintain an inventory of all equipment used by your business.**
 - Keep a maintenance schedule for all equipment, as well as manufacturer and service contact information.
- **Develop a backup schedule for computer files.**
 - Keep a backup of all tax, accounting, payroll and production records, customer and supplier data off-site.
 - Keep copies of all paper and computer files in an accessible but off-site location.
- **Contact your insurance agent.**
 - Review your insurance coverage.
 - Get additional coverage for “all-hazard” situations (e.g., flood, hail damage).
 - Keep copies of critical documents, such as finance records, receipts of major purchases.
- **Prepare your employees.**
 - Inform your employees of the business emergency plan; review it with them regularly.
 - Ensure employees know the exit locations for the building
 - Identify an internal shelter in the event that authorities tell you to “shelter-in-place.”
 - Document each employee’s function and emergency contact information.

- **Develop a post-disaster communication strategy.**
 - Create a phone tree and designate individuals who will initiate the communication process.
 - Designate a contact person to communicate with customers and vendors.
- **Make plans regarding customers.**
 - Determine the likelihood of customers being present at your business during a disaster situation.
 - Have an emergency plan for customers; review it with employees regularly.
 - Label exit locations for the building.
- **Make plans for suppliers.**
 - Maintain a contact list of all your suppliers.
 - Find out how they plan to supply you in the event of a disaster situation.
 - Maintain a list of alternate suppliers.
- **Review your emergency preparedness plan annually.**
- **Coordinate with other businesses in your building or location.**

For More Information

Ready.gov: Business

Federal Emergency Management Agency (FEMA)

<http://www.ready.gov/business>

Emergency Preparedness for Small Businesses

U.S. Small Business Administration

<http://www.sba.gov/content/disaster-preparedness>

Information adapted from publications by the the Federal Emergency Management Agency and the National Safety Council.



BUSINESS EMERGENCY PLAN BASICS

General Preparedness

<p>Executive Summary</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Purpose of the Plan/Mission Statement <input type="checkbox"/> Authorities and Responsibilities of Key Personnel <input type="checkbox"/> Types of Emergencies that Could Occur (Capabilities and Vulnerabilities) <input type="checkbox"/> Managing Response Operations <input type="checkbox"/> Schedule and Budget
<p>Emergency Management Elements</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Direction and Control <input type="checkbox"/> Communications <input type="checkbox"/> Life Safety <input type="checkbox"/> Property Protection <input type="checkbox"/> Community Outreach <input type="checkbox"/> Recovery and Restoration <input type="checkbox"/> Administration and Logistics
<p>Emergency Response Procedures</p> <p>Determine actions necessary to:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Assess the situation. <input type="checkbox"/> Protect employees, customers, visitors, equipment, vital records and other assets, particularly during the first 3 days. <input type="checkbox"/> Get the business back up and running. <p>In an emergency, all personnel should know their role and where they should go.</p>	<p>Specific procedures might be needed for any number of situations such as bomb threats or tornadoes, and for such functions as:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Warning Employees and Customers <input type="checkbox"/> Communicating with Personnel and Community Responders <input type="checkbox"/> Conducting an Evacuation and Accounting for All Persons <input type="checkbox"/> Managing Response Activities <input type="checkbox"/> Shutting Down Operations <input type="checkbox"/> Protecting Vital Records <input type="checkbox"/> Restoring Operations <p>Some facilities are required to develop:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Emergency Escape Procedures and Routes <input type="checkbox"/> Procedures for Employees Who Perform or Shut Down Critical Operations Before an Evacuation <input type="checkbox"/> Procedures to Account for All Employees, Visitors, and Contractors <p>After an Evacuation</p> <ul style="list-style-type: none"> <input type="checkbox"/> Rescue and Medical Duties for Assigned Employees <input type="checkbox"/> Procedures for Reporting Emergencies <input type="checkbox"/> Names of Persons or Departments to Contact for Information About the Plan
<p>Support Documents</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Emergency Call Lists <input type="checkbox"/> Building and Site Maps <input type="checkbox"/> Resource Lists

NATURAL DISASTERS IN RURAL COMMUNITIES

Natural disasters are a common occurrence throughout the United States. From 2000-2010, the U.S. experienced 560 federally declared natural disasters; the majority due to severe storms (Figure 2). Natural disasters impact every state in the U.S. resulting in hundreds of deaths and destruction of homes, farms, and businesses.

Natural disasters can include any number of weather related events and are often determined by geographical location. Those common to the Midwest include severe thunderstorms, tornadoes and flooding in the spring, extreme temperatures and drought in the summer, and severe winter storms and blizzards in the winter. Less common are the impacts of earthquakes, however many states and rural communities in the Midwest are located within the New Madrid seismic zone.

Fortunately, most natural disaster events are predictable, allowing communities and individuals the opportunity to prepare prior to the event. Preparedness efforts before a natural disaster can help to minimize the impact on you and your family, protect and preserve your home, farm and business. Additionally, preparedness planning for pets and livestock is important to protect their well-being.

This section covers preparedness and recovery actions you can take for natural disaster situations to protect yourself, your family, your home or farm, animals, crops and business.

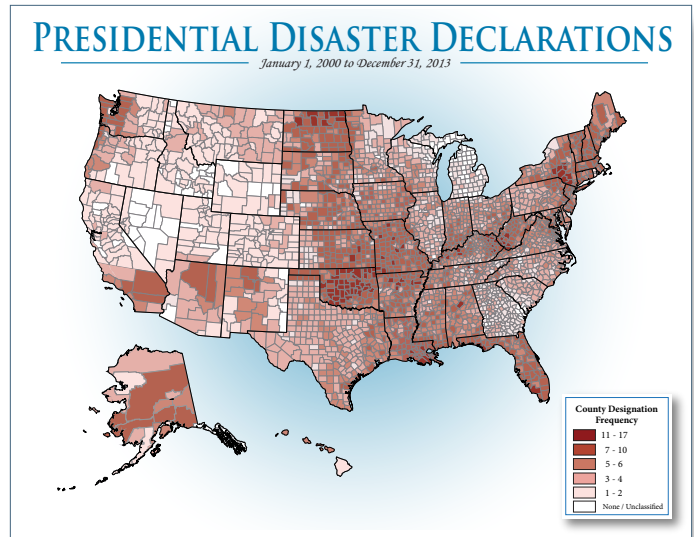


Figure 2. Presidential disaster declarations in the United States and Territories by county from 200-2013. Source: Federal Emergency Management Agency.

Find what declared disasters or emergencies
have been made for your state....
<http://www.fema.gov/disasters>

FLOODS

Floods are one of the leading causes of death from natural disasters in the United States. On average, more than 300,000 people are driven from their homes by floods, 200 flood-related fatalities occur, and \$6 billion in total flood damages are sustained each year. Over half of flood-related fatalities are vehicle related and associated with persons trying to drive through floodwaters or flash floods. In 2008, unprecedented and extensive flooding severely impacted the Midwest resulting in over 5 million acres of lost or reduced yield crop production, thousands of head livestock losses and subsequent disposal issues, as well as disruption in agriculture processing and business.¹

In the Midwest, floods can occur as a result of spring snowmelt, severe thunderstorms, prolonged rains, inadequate drainage or failure of levees and dams. While the greatest risk for floods are in low-lying areas, near water or downstream from a dam, flooding situations can occur in most locations.

Flood situations are variable. The impact can be local affecting a neighborhood or community, or very large, affecting entire river basins and multiple states. Some floods develop slowly – allowing time to prepare and evacuate. Others (e.g., flash floods) can develop quickly, even within a few minutes and without any visible signs of rain.

Regardless of the type or cause, the impact from flood situations can be devastating to individuals, homes, farms, and businesses resulting in injury and death, damage to property and displacement, often permanently, from homes. Floods can also severely impact agricultural crop production due to submersion of standing plants or erosion of top soil layers. Pets and livestock can become displaced, injured, or even drown in flood situations.

While flood situations cannot be entirely prevented, various measures can be taken to prepare for such situations in efforts to prevent or minimize illness, injury and loss due to flood situations. The following factsheets will help you prepare your family, home and farm, animals and business in efforts to minimize the impact and speed the recovery from flood situations.

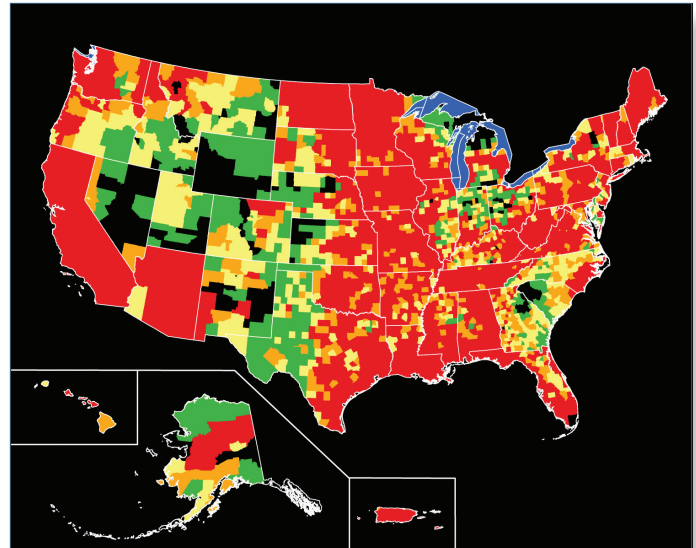


Figure 3. Presidential disaster declarations related to flooding in the United States (1965-2003). Green represent one declaration; yellow represent two declarations; orange represent three declarations; red represent four or more
Source: U.S. Geological Survey

See what significant flood events
have occurred for your state. . . .
<https://www.fema.gov/significant-flood-events>

1. Congressional Research Service (CRS) Report for Congress. Midwest floods of 2008: potential impact on agriculture. July 16, 2008. <http://www.policyarchive.org/handle/10207/bitstreams/20059.pdf>



Floods are one of the most common, and most costly, natural disasters. Preparing now for flood situations can minimize injury to yourself and your family and speed the recovery process.

Before a Flood

- **Be prepared for the possible disruption of services for extended periods of time, including electric, phone and local food and water sources.**
- **Prepare an emergency kit:**
 - Food, water and necessities for all members of the family to last 3 to 5 days
 - Any medications needed for family members
 - First aid kit, battery powered radio, flashlight with extra batteries
 - Sleeping bags or blankets, and extra clothing
 - Important family documents (e.g., insurance policies, emergency contact numbers)
 - Water-purifying supplies (e.g., chlorine tablets, or unscented, household chlorine bleach)
- **Family communication and evacuation plan.**
 - Know how you will contact each other if you are in separate locations or establish a location to meet.
 - Have an out-of-state relative or friend serve as the family contact person.
 - Learn the evacuation routes and locations of emergency shelters in your area.

During a Flood

- **Gather your emergency supplies.**
- **Stay informed.**
 - Listen to the radio or television for situation developments, evacuation instructions and routes, and road closures.
- **Never ignore an evacuation order for the safety of you and your family.**
- **If you have time,**
 - Disconnect electrical appliances to prevent electrical shock when power is restored.
 - Turn off the gas, electricity and water as the main switches or valves.
 - Do not touch electrical equipment if you are wet or standing in water.
- **Follow evacuation routes; expect heavy traffic.**
- **Avoid floodwaters.**
 - Water may be contaminated by oil, gasoline or raw sewage, harmful bacteria or electrically charged from underground or downed power lines.

- **Do not walk through moving water.**
 - If water is above your ankles, turn around and go another way; as little as 6 inches of water can sweep you off your feet.
- **Do not drive in flooded areas.**
 - Most flood-associated deaths are related to vehicle incidents.
 - As little as six inches of water will cause loss of control and possible stalling. A foot of water will float most vehicles. Two feet of rushing water can carry away most vehicles.
 - If flood waters rise around your car, abandon the car and move to higher ground.

After a Flood

- **Only return home after officials have declared the area safe.**
- **Cleanup safely.**
 - Wear protective clothing, (rubber gloves, boots).
 - Do not use water that could be contaminated to wash dishes, brush teeth, prepare food, wash hands, or make ice.
 - Use caution with gas powered equipment – dangerous carbon monoxide can be generated.
 - Be aware of hazards that may cause injury to you or others cleaning up, (e.g., chain saws, pressure washers, electrical or chemical hazards, heat exposure).
- **Prevent and treat injuries.**
 - Exposure to floodwaters in cold weather can lead to hypothermia.
 - Extreme heat can lead to heat stress or exhaustion.
 - Take precautions to minimize insect exposures.
- **Prevent illness.**
 - Wash hand frequently – especially after contacting flood water or contaminated items.
 - Use clean, boiled or disinfected water; if no water is available, alcohol-based hand sanitizers may be used.
- **Food and water safety.**
 - Throw away any food that may have come in contact with flood water.
 - Throw away perishable foods that have been unrefrigerated for 2 or more hours.
 - When in doubt, throw it out!
- **Use safe water (e.g., bottled, boiled or treated) for drinking, cooking and personal hygiene.**
 - Wells may be contaminated following floods.
 - Boil or treat water for drinking and cooking until authorities tell you that your water supply is safe.

Information adapted from publications by the National Weather Service, the Centers for Disease Control and Prevention, the American Red Cross and the Federal Emergency Management Agency.



FLOODS AND YOUR HOME

Natural Disasters

Protecting your home during flood situations can involve a variety of actions, from inspecting and maintaining the property to installing protective devices or materials.

Before A Flood

- **Determine the risk of flooding for your area**
 - The U.S. Geological Survey (USGS)
<http://water.usgs.gov/pubs/>
 - The National Weather Service
<http://www.weather.gov/>
- **Identify potential hazards on your property.**
 - Know how to turn off electrical power, gas and water supplies.
 - Secure unstable materials that are outside your home (e.g. patio furniture, fuel tanks).
 - Protect your well by using heavy plastic and duct tape to seal the well cap and top of the well casing.
- **Protect your home.**
 - Build with or install flood-resistant materials.
 - Buy and install sump pumps with backup power (e.g., battery-operated).
 - Install backflow valves or plugs to prevent flood water from entering.
 - Place furnace, water heater, washer, dryer on cement blocks above projected flood elevation.
- **Stockpile emergency building materials.**
 - Plywood, plastic sheeting, lumber, nails, hammer, saw, pry bar, sandbags, shovel.
- **Safeguard your possessions.**
 - Create a room-by-room inventory of your possessions, include receipts and photos.
 - Gather copies of critical documents, such as finance records, insurance policies.
 - Keep these lists in a secure place (e.g. safe deposit box, waterproof container).
- **Flood insurance.**
 - Obtain flood insurance
 - Most standard home owner insurance policies do not cover floods.
 - The National Flood Insurance program is available in most areas. For more information www.floodsmart.gov

During a Flood

- **Stay informed.**
 - Listen to the radio or television for situation developments and evacuation instructions.
 - Do not ignore evacuation orders.
 - Follow designated evacuation routes.
- **If you must evacuate,**
 - Ensure your family's safety first.
 - Gather your emergency supply kit; take only essential items with you.
 - Shut off electrical power and natural gas or propane tanks to avoid fire, electrocution, or explosions.

After a Flood

- **Return home only when officials have declared the area safe.**
- **Before entering - Assess the situation.**
 - Assess the impact and areas of damage to your home.
 - Identify sharp objects, dangerous materials, downed power lines, damaged gas lines, or other hazards (e.g., chemical spills).
 - If you smell natural or propane gas, or hear a hissing noise, leave immediately and call the fire department.
 - If power lines are down outside your home or buildings, do not step in any standing water.
- **Approach entrances carefully.**
 - Parts of your home or building structures may be collapsed or damaged.
 - Check if porch roofs and overhangs have all their supports.
- **Keep power off until an electrician has inspected your system for safety.**
- **Account for your inventory.**
 - Compare the list with the one prepared prior to the incident.
 - Take photographs of all damage for insurance or emergency assistance purposes.
- **Contact your insurance company or the National Flood Insurance program to file your claim.**
 - Your adjuster will need evidence of the damage to your home and possessions to prepare your claim.
 - Keep accurate records listing all clean-up and repair bills, flood-related living expenses and actual losses (furniture, appliances, clothing, etc).



- **Clean and disinfect items.**

- Walls, hard-surfaced floors, and many other household surfaces should be cleaned with soap and water and disinfected with a solution of 1 cup of bleach to five gallons of water.
- Thoroughly disinfect surfaces that may come in contact with food, such as counter tops, pantry shelves, refrigerators, etc.
- Areas where small children play should also be carefully cleaned.
- Wash all linens and clothing in hot water, or dry clean; For items that cannot be washed or dry cleaned, (mattresses, upholstered furniture), air dry in the sun, then spray thoroughly with disinfectant.
- Steam clean all carpeting. If there has been a backflow of sewage into the house, wear rubber boots and waterproof gloves during cleanup.
- Remove and discard contaminated household materials that cannot be disinfected, such as wallcoverings, cloth, rugs, and drywall.

- **Prevent carbon monoxide poisoning.**

- Alternative sources of fuel or electricity for heating, cooling, or cooking can cause carbon monoxide to build up in a home, garage, or camper.
- Never run a gas-powered equipment (generator, pressure washer, engines) inside, even if the doors or windows are open.
- Avoid running gas-powered equipment near open windows, doors, or vents where exhaust can enter indoor enclosed areas.

- **Clean up safely.**

- Be aware of hazards that may cause injury to you or others cleaning up - these can include chain saw or pressure washer injuries, electrical or chemical hazards, heat exposure.
- Have an electrician check the house's electrical system before turning the power on again.
- If the house has been closed up for several days. Enter briefly to open doors and windows to let the house air out for awhile (at least 30 minutes) before you stay for any length of time.
- Presume your home has been contaminated with mold.
- Use fans and dehumidifiers to remove excess moisture. Fans should be placed so air blows outwards rather than inwards.
- Have your home heating, ventilating, and air-conditioning (HVAC) system checked and cleaned by a maintenance or service professional who is experienced in mold clean-up before you turn it on.

- **Prevent mold growth.**

- Remove any items that have been wet for more than 48 hours, that cannot be thoroughly cleaned and dried.
- Porous items include carpeting, carpet padding, upholstery, wallpaper, drywall, floor and ceiling tiles, insulation material, some clothing, leather, paper, wood, and food --can remain a source of mold growth and should be removed from the home.
- When in doubt, take it out!

- **Well and pump inspection.**

- There is a danger of electrical shock from any electrical device that has been flooded.
- Do not turn on the pump and electrical system until equipment has dried and been checked by a qualified electrician, or well professional.
- Swiftly moving flood water can carry large debris that can damage the hardware, construction or casing of wells and pumps.
- Flood water could have also entered the well and contaminated it.
- Well water should be sampled and tested for contamination prior to use for drinking, cooking or cleaning.
- Call you state laboratory certification officer or contact the Safe Drinking Water hotline (1-800-426-4791) <http://www.epa.gov/safewater/hotline/index.html>

- **Septic systems.**

- Septic systems should not be used immediately after floods; drain fields will not work until water in the soil absorption field is lower than the water level around the house.
- Floodwater may have also broken septic lines. Have your septic tank professionally inspected and serviced; septic tanks may contain dangerous gases.

Information adapted from publications by the Centers for Disease Control and Prevention, the American Red Cross, the Federal Emergency Management Agency, the Environmental Protection Agency, and University of Wisconsin Extension.



FLOODS AND YOUR PETS

Natural Disasters

Floods can impact animal health as well as human health. Make plans for your pets in the event you will need to evacuate your home or farm.

Before a Flood

- **Create an emergency supply kit for your pet:**
 - Leash, collar
 - Transport carrier
 - Food and water (5-7 day supply)
 - Any medications
 - Vaccination history, rabies certificate
 - Waste disposal supplies
 - A blanket
 - Favorite toy
 - Your veterinarian's contact information
 - Special supplies for pets such as birds, pocket pets or reptiles (e.g., heat lamps)
- **Make sure pets are current on all vaccinations.**
- **Develop an evacuation plan for your pets.**
 - For public health reasons, evacuation shelters will not be able to accept pets.
 - Identify pet friendly locations in case of the need to evacuate. www.petswelcome.com
 - Check with boarding facilities, pet-friendly hotels, veterinary clinics, or relatives or family friends outside the impacted area.
- **Identification.**
 - All pets should have some sort of identification (collar with tag, microchip).
 - Take a photo of the pet and keep it with the medical records.
 - Include any proof of ownership materials (e.g., registration, proof of purchase, adoption records, microchip information).

During a Flood

- **Bring your pets inside immediately.**
- **AVOID leaving pets behind.**
 - If there is no other alternative, leave them loose inside your home with food and plenty of water.
 - NEVER leave your pet chained outside or enclosed in a way they cannot escape danger.
 - Place a notice on the outside of your home with the location and type of pets inside, their names, your contact phone number and the name and number of your veterinarian.

After a Flood

- **Be aware that a pet's behavior may change before, during and even after a disaster.**
- **Familiar scents and landmarks may be altered and your pet may become confused and lost.**
 - In the first few days after the disaster, leash your pets when they go outside.
 - Always maintain close contact.
 - Reintroduce food in small servings, gradually working up to full portions, especially if animals have been without food for a prolonged period of time.
- **Pets can be poisoned by exposure to harmful chemicals, products, or foods.**
 - If you suspect that your pet has been poisoned, call the Animal Poison Control Center toll-free 1-888-426-4435 (calls answered 24 hours a day, every day).

Information adapted from publications by the Centers for Disease Control and Prevention and the American Veterinary Medical Association.



Protecting your farm during flood situations can involve a variety of actions, from inspecting and maintaining the property to installing protective devices or materials.

Before a Flood

- **Determine the risk of flooding for your area.**
 - The U.S. Geological Survey (USGS)
<http://water.usgs.gov/pubs/>
 - The National Weather Service
<http://www.weather.gov/>
- **Identify potential hazards on your property.**
 - Know how to turn off electrical power, gas and water supplies
 - Secure structurally unstable materials (e.g. lumber, logs, equipment, fuel tanks).
 - Keep surface water out of your well by sealing the well cap and top of the well casing with heavy plastic and duct tape.
- **Prepare your buildings.**
 - Build with or install flood-resistant materials.
 - Raise electrical components (e.g., switches, sockets, circuit breakers) above the projected flood elevation.
- **Stockpile emergency building materials.**
 - Plywood, plastic sheeting, lumber, nails, hammer, saw, pry bar, sandbags, shovel
- **Make a list of your farm inventory, include:**
 - Livestock (species, number of animals)
 - Crops (acres, type)
 - Machinery and equipment (make, model #)
 - Hazardous substances (e.g., pesticides, fertilizers, fuels, medicines, other chemicals)
- **Identify areas of higher ground to relocate valuable or hazardous materials.**
- **Obtain flood insurance.**
 - The National Flood Insurance Program is available in most areas. For more information www.floodsmart.gov

During a Flood

- **Stay informed.**
 - Listen to the radio or television for situation developments and evacuation instructions.
 - Do not ignore evacuation orders.
- **If you must evacuate,**
 - Ensure your family's safety first.
 - Follow designated evacuation routes.

- **If you have time,**
 - Turn off all utilities at the main power switch and close the main gas valve.
 - Leave building doors and window open at least 2 inches to equalize pressure and help prevent buildings from shifting.
 - If possible, move motors and portable electric equipment to a dry location.

After a Flood

- **Return home after officials have declared the area safe.**
- **Before entering - Assess the situation.**
 - Survey damage to the outside and inside of your home and buildings, equipment, livestock and crops.
 - Identify areas of contaminated water.
 - Identify sharp objects, downed power lines, or other hazards (e.g., chemical spills).
 - If you smell natural or propane gas, or hear a hissing noise, leave immediately and call the fire department.
 - If power lines are down outside your home or buildings, do not step in any standing water.
- **Approach entrances carefully.**
 - Building structures may be collapsed or damaged.
- **Stay safe during cleanup.**
 - Wear protective clothing, including rubber gloves and rubber boots.
 - Use caution with gas powered equipment – dangerous carbon monoxide can be generated.
- **Account for your inventory.**
 - Compare with the list prepared prior to the incident.
 - Note any livestock losses.
 - Check machinery and equipment for damage.
 - Take photographs of all damage for insurance or emergency assistance purposes.
 - Report any hazardous materials (e.g., fuels, agricultural chemicals) spills or leaks to emergency response personnel.
- **Flooded farm machinery.**
 - Floodwater may permanently damage machinery; mud and silt may be deposited.
 - Thorough cleaning, drying and lubrication of parts is necessary.
 - Work with your mechanic to properly recondition equipment before use.

Information adapted from publications by the University of Wisconsin and South Dakota State University Cooperative Extension Service.



FLOODS AND YOUR LIVESTOCK

Natural Disasters

Floods can impact animal health as well as human health. Make plans for your livestock and horses in the event you will need to evacuate your farm.

Before a Flood

- **Maintain an inventory.**
 - Keep a current list of all animals on your farm.
 - Include their location and any records of vaccinations, testing and ownership.
- **Have identification for all animals.**
 - Make sure animals have some form of permanent identification (e.g., ear tags, tattoos).
 - Ensure animals are properly vaccinated before exposure to floodwaters.
- **Prepare an evacuation kit.**
 - Handling equipment (e.g., halters, nose leads)
 - Water, feed, and buckets
 - Medications
 - Tools and supplies needed for manure cleanup
 - Safety and emergency items for your vehicles and trailers
 - Gas powered generators
- **Make evacuation arrangements.**
 - Determine possible evacuation areas – higher elevation, alternate production facilities (e.g., temporary milking parlors).
 - Determine several routes to these locations.
 - Identify alternate water or power sources.
 - Locate and prearrange feed and water delivery, needed equipment (e.g., milking) and services (e.g., milk pickup).
 - Have well maintained backup generators for livestock production operations.
 - Make transport arrangements (e.g., trucks, trailers) with experienced handlers and drivers.
 - Condition animals to being loaded and transported.
- **Ensure a safe environment.**
 - Assess the stability and safety of barns and other structures.
 - Remove dead trees or objects from fields or livestock areas that may serve as potential debris during a flood situation.

During a Flood

- **Be aware animal behavior may change before, during and even after a disaster.**
 - If you must evacuate, ensure your family's safety first
 - If there is time - move or evacuate livestock and horses to higher ground.

- **AVOID leaving animals behind.**
 - If there is no other alternative, keep gates or buildings open so they can escape high water.
 - Provide access to safe free-choice food source, clean water and the safest living areas possible.
 - Do not rely on automatic watering systems, because power may be lost.
 - Establish escape routes to safe locations (higher elevation).
 - Place your contact number and the name and number of your veterinarian on the building.

After a Flood

- **Assess your animals and building structures.**
 - Survey damage to your barns and other structures; assess the stability and safety.
 - Examine your animals closely; contact your veterinarian if you observe injuries or signs of illness.
- **Return animals only after the threat has passed and the safety of buildings or the area has been assessed.**
 - Release animals in a safe and enclosed area until familiarity of the surroundings can occur.
- **Provide non-contaminated feed or water.**
 - Provide clean, uncontaminated water.
 - Do not feed flood damaged or moldy feed or hay.
 - Do not use any feed or forage that may have been contaminated by chemical or pesticides.
- **Animal disposal.**
 - Record any animal deaths.
 - Check with your state or local authorities for proper disposal methods for animal carcasses.
- **Prevent illness.**
 - Keep animals away from flood waters which may contain harmful bacteria or chemicals.
 - Monitor animals daily for signs of illness.

Information adapted from publications by the American Veterinary Medical Association and the United States Department of Agriculture National Agricultural Library.



Flooded fields can lead to loss of top soil as well as damage to crops. While little can be done prior to flood situations, prompt action after the flood may help minimize the impact to your crops.

Before a Flood

- **Open all drainage ditches.**
- **Remove any debris from fields and pastures that could injure plants or damage machinery.**

After a Flood

- **Assess your crops.**
 - Determine how much of your crops are water logged (only roots flooded) and fully submerged (entire plants under water).
 - Corn can typically last 12 hours completely submerged if the temperature is above 70 degrees, but up to four days if the weather is cooler.
 - Soybeans can typically last 48 to 96 hours completely submerged. Cooler temperatures allow for a longer survival time.
- **Factors affecting the extent of crop damage include:**
 - Degree of submergence of plant
 - Weather conditions prior to the flood situation (e.g., temperature)
 - Plant growth stage and height – younger stages are more vulnerable
 - Mud disposition, which stresses plants and reduces photosynthesis
 - Some root death will occur – while new root growth will occur, it will be stunted and therefore subject to greater injury if a dry summer follows
- **Be prepared with a rotary hoe to break up the dense surface crusts that may form as soil dries to aid emergence of plants.**
- **Flooding can cause significant losses of soil nitrogen.**
 - If fertilizer had been recently applied to the soil surface, substantial nitrogen loss may occur in runoff.
 - If fertilizer was applied several months ago, loss can occur by denitrification or leaching.
 - Signs of nitrogen loss in plants include the lower leaves yellowing as well as inverted “V” yellowing pattern of leaf tips.
- **Contact your crop insurance agent to discuss coverage.**
 - The Farm Service Agency provides assistance for natural disaster losses, resulting from drought, flood, fire, freeze, tornadoes, pest infestation, and other calamities for both insured and uninsured producers.
 - For more information, www.fsa.usda.gov

- **Monitor for diseases.**
 - Flood conditions can increase disease incident in surviving plants.
 - Scout the fields often to determine if and when problems occur.
- **Do not use flood damaged or wet feeds until tested.**
 - Flood damaged grain always need to be destroyed due to the contaminates that can enter through the water.
 - Good grain on top of the flooded grain MUST be removed from the top or side, not through the damaged grain.
 - Rain damaged grain is likely to contain toxins, as warm wet conditions are ideal for mold growth. Soaked grain will spoil within a day or two at high moisture and summer temperatures.
 - Rain damaged grain can be saved by drying and cleaning. It must be tested for mycotoxins before use.
 - Wet seed grain probably will not be suitable for seed, as wetness causes the seed to germinate.
- **Do not feed heated, molded or sour feeds or moldy legume hays (alfalfa, clover) to any livestock.**
- **Replant considerations. Evaluating whether to replant will depend on:**
 - The existing plant stand
 - Distribution of the plant stand
 - Calendar date
 - Weed situation
 - Seed availability of earlier maturing hybrids
 - Cost to replant
 - Yield potential of the existing crop

Information adapted from publications by the USDA Farm Service Agency, and the University of Wisconsin, University of Minnesota, Iowa State University and Purdue University Cooperative Extension Service.



FLOODS AND YOUR BUSINESS

Natural Disasters

Floods are one of the most common, and most costly, of natural disasters. Preventative actions can help to protect your business, ensure the safety of your employees, minimize damage to your property, and speed the recovery process.

Before a Flood

- **Determine the risk of flooding for your area.**
 - The U.S. Geological Survey (USGS)
<http://water.usgs.gov/pubs/>
 - The National Weather Service
<http://www.weather.gov/>
- **Have a business emergency/continuity plan.**
 - Determine the processes and equipment needed to keep your business open -- from answering the phones, to tracking finances, to distributing your product or service.
 - Maintain an inventory of all equipment used by your business.
 - Keep copies of all paper and computer files in an accessible but off-site location.
- **Flood insurance.**
 - Most standard insurance policies do not cover flood damage and the resulting loss of income.
 - The National Flood Insurance program (www.floodsmart.gov) is available in most areas.
 - Consider obtaining business interruption insurance.
- **Plan for continuity.**
 - Store extra supplies offsite.
 - Make a plan for a temporary location if your company is forced to relocate.
 - Have a plan for alternate communication with employees, customers, suppliers during recovery.
 - Develop a plan to maintain payroll.
 - Obtain alternate power source.
- **Prepare your property.**
 - Have electrical equipment (furnace, water heater) and components (e.g., switches, sockets, circuit breakers) raised at least 12 inches above the projected flood elevation.
 - Move electronic equipment (computers), furniture, valuables and important documents to a safe place.
 - Buy and install sump pumps with backup power (e.g., battery-operated).
 - Anchor any fuel tanks or any other unsecured items outside your business.
- **Prepare your employees.**
 - Inform employees of the business emergency plan; review it with them regularly.
 - Ensure employees know the exit locations for the building.

- **Develop a post-disaster communication strategy.**
 - Create a phone tree and designate individuals who will initiate the communication process.
 - Designate a contact person to communicate with customers and vendors.
- **Make plans regarding customers.**
 - Determine the likelihood of customers being present if a flooding situation occurs.
 - Have an emergency plan for customers; review it with employees regularly.
 - Label exit locations for the building.
- **Make plans for suppliers.**
 - Maintain a contact list of your suppliers.
 - Make a plan for supplies in the event of a flood.

During a Flood

- **Stay informed.**
 - Listen to the radio or television for situation developments and evacuation instructions; Do not ignore evacuation orders.
- **If evacuation appears necessary,**
 - Ensure employee and customer safety.
 - If there is time, turn off all utilities at the main power switch and close the main gas valve.

After a Flood

- **Return to your business only after officials have declared the area safe.**
- **Before entering - Assess the situation.**
 - Survey the outside and inside of the building for contaminated water, structural damage, sharp objects, downed power lines, damaged gas lines, or other hazards (e.g., chemicals).
 - If power lines are down outside your business, do not step in any standing water. Keep the power off until an electrician has inspected your system for safety.
 - If you smell natural or propane gas or hear a hissing noise, leave immediately and call the fire department.
 - Approach entrances carefully. Parts of your building may be collapsed or become damaged.
- **Clean up safely.**
 - Wear protective clothing, (rubber gloves, boots).
 - Use caution with gas powered equipment – dangerous carbon monoxide can be generated.
 - Report any hazardous materials (e.g., fuels, chemicals) that have leaked to emergency response personnel.

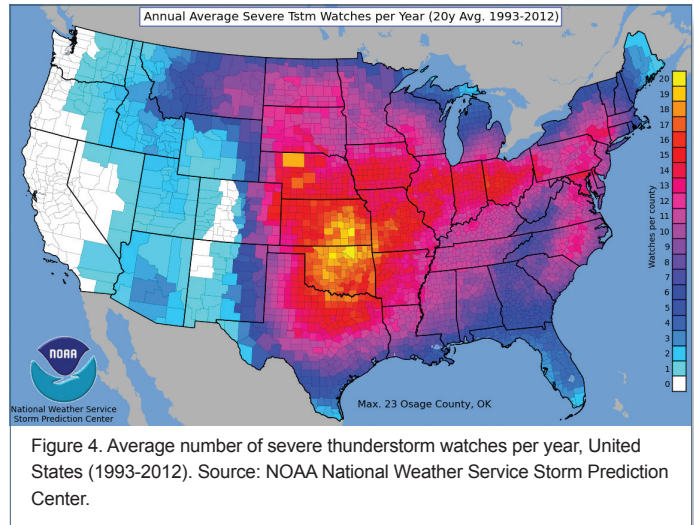
Information adapted from publications by the Federal Emergency Management Agency and the U.S. Small Business Administration.

SEVERE THUNDERSTORMS

Each year, an estimated 100,000 thunderstorms occur in the United States. Of those, about 10 percent are classified as severe thunderstorms - those that produce hail at least three-quarters of an inch in diameter, have winds of 58 miles per hour or higher, or produce a tornado. Figure 4 shows the 20-year average of severe thunderstorms watches issued per year in the United States between 1993-2012. As shown in this map, thunderstorms are common occurrences in the Midwest and Central United States.

All thunderstorms are dangerous and can be associated with a number of hazards. Heavy rains can lead to flash flooding events – one of the primary causes of death associated with thunderstorms. Lightning, which is produced by every thunderstorm, causes an average of 80 fatalities and 300 injuries each year. Lightning can also start building fires, damage electrical equipment, electrocute humans and livestock, and is the leading cause of farm fires. High winds generated by thunderstorm can cause damage to homes, overturn vehicles, uproot or damage trees, or blow down utility poles causing wide spread power outages. Hail causes billions of dollars in damage to crops and property each year and can injure people or animals left outdoors.

The following factsheets will help you prepare your family, home and farm, animals and business in efforts to minimize the impact from thunderstorm situations and help to speed the recovery process.



Monitor for severe thunderstorms in your area....
at the National Weather Service, Storm Prediction Center
<http://www.spc.noaa.gov>



SEVERE THUNDERSTORMS AND YOUR FAMILY

Natural Disasters

Severe thunderstorms can produce lightning, hail, high winds, even tornadoes or flash flooding, all of which can cause injury to you or your family. Know how to protect your family before, during and after severe storms.

Before a Severe Storm

- **Know the warning system for your community.**
 - Learn the thunderstorm warning system for your county or locality.
 - Monitor for severe thunderstorms in your area at NOAA's National Weather Service National Storm Prediction Center - <http://www.spc.noaa.gov>
- **Know the terminology.**
 - A **severe thunderstorm WATCH** means storms are likely in your area—Be ready to take necessary action.
 - A **severe thunderstorm WARNING** means storms have been reported by spotters or indicated by radar – Take immediate action to stay safe.
- **Know the safest location for shelter in your home, workplace and school.**
- **Prepare an emergency kit. You may experience power outages or need to shelter-in-place due to the storm.**
 - Food, water and necessities for all members of the family to last at least 24 hours
 - Any medications needed for family members
 - First aid kit
 - Battery powered radio
 - Flashlight with extra batteries
 - Sleeping bags or blankets, and extra clothing

During a Severe Storm

- **Stay informed.**
 - Listen to the radio or television about the situation.
- **If a WARNING is issued – Seek shelter immediately.**
- **If you are home,**
 - Remain indoors; stay off porches.
 - Stay away from windows and doors.
- **If you are outdoors,**
 - Seek shelter immediately – such as a nearby home or building.
 - If no shelter is available – take shelter in a hard top (not convertible) automobile, but avoid touching any metal.
 - If you are in the woods, go to a low area such as a ravine or valley under a thick growth of small trees; be alert for flash flooding.

- **Avoid** natural lightning rods: tall, isolated tree in an open area • hilltops in open fields • the beach or a boat on the water • isolated sheds/small structures in open areas • anything metal—tractors, motorcycles, golf carts or clubs, bicycles.

- **Lightning safety tips, if you are inside your home.**
 - Avoid contact with corded phones; cordless and cellular telephones are safe to use.
 - Avoid contact with electrical equipment or cords; if you plan to unplug any electronic equipment, do so well before the storm arrives.
 - Avoid contact with plumbing, it can conduct electricity – do not wash your hands, shower, wash dishes, or do laundry.
- **Lightning safety tips, if you are caught outdoors.**
 - Squat low to the ground on the balls of your feet.
 - Place your hands over your ears and your head between your knees.
 - Make yourself the smallest target possible and minimize your contact to the ground.
 - DO NOT lie flat on the ground.
 - Rubber-soled shoes and rubber tires provide NO protection from lightning.

After a Severe Storm

- **Stay away from storm-damaged areas.**
- **Clean up safely.**
 - Wear sturdy shoes or boots, long sleeves, and gloves.
 - Stay away from downed power lines and report them immediately.
 - Be aware of hazards that may cause injury to you or others cleaning up (e.g., chain saws, electrical or chemical hazards).
 - Use caution with gas powered equipment – dangerous carbon monoxide can be generated; use in well ventilated areas.
- **If someone has been injured by lightning,**
 - Call 911 or your local Emergency Medical Services.
 - Check the person for burns or other injuries; being struck by lightning can also cause nervous system damage, broken bones, loss of hearing or eyesight.
 - If breathing has stopped, begin rescue breathing.
 - If the heart has stopped beating, a trained person should give CPR.

Information adapted from publications by the Federal Emergency Management Agency, the National Weather Service and the American Red Cross.



Damage to your home from severe thunderstorms can occur from lightning, hail, high winds, even tornadoes or flash flooding. Prepare your home before the storm, to minimize the impact.

Before a Severe Storm

- **Pick a safe place in your home to gather during a thunderstorm.**
 - This should be a place where there are no windows, skylights, or glass doors, which could be broken by strong winds or hail and cause damage or injury.
- **Identify potential hazards on your property.**
 - Know how to turn off electrical power, gas and water supplies.
 - Secure unstable materials that are outside your home (e.g., patio furniture, fuel tanks).
 - Remove dead or rotting trees and branches that could fall and cause injury or damage.
- **Prepare your home.**
 - Shutter windows and secure outside doors.
 - Keep your roof clean and free of debris regularly and check for loose shingles or leaks on a regular basis.
 - Make sure there is proper drainage around your home to help reduce the possibility of flooding.
 - Consider having a lightning protection system installed.
 - Install surge protectors to protect electronic equipment.
- **Safeguard your possessions.**
 - Create a room-by-room inventory of your possessions, include receipts and photos.
 - Keep these lists in a secure place (e.g., safe deposit box).
 - Review your insurance coverage.

During a Severe Storm

- **Stay informed.**
 - Listen to the radio or television about the situation.
- **If a WARNING is issued – Seek shelter immediately.**
- **Avoid hazards in your home.**
 - Avoid corded telephones and metal; telephone lines and metal pipes can conduct electricity.
 - Unplug appliances and other electrical items such as computers and turn off air conditioners. Power surges from lightning can cause serious damage to equipment.
 - Draw blinds and shades over windows to prevent glass (if high winds break the windows) from shattering into your home.

After a Severe Storm

- **Assess the situation.**
 - Check the area for downed power lines; if found, notify your electric company immediately.
 - Check for power outages.
- **Cleanup safely.**
 - During cleanup, wear sturdy shoes or boots, long sleeves, and gloves to protect your body from injury.
 - Stay away from downed power lines and report them immediately.
 - Be aware of hazards that may cause injury to you or others cleaning up (e.g., chain saws, electrical or chemical hazards).
 - Clear broken tree branches away, but use caution, downed or damaged power lines can send electrical currents through tree branches and metal fences.

Information adapted from publications by the Federal Emergency Management Agency, the National Weather Service and the American Red Cross.



SEVERE THUNDERSTORMS AND YOUR PETS

Natural Disasters

High winds, thunder and lightning during severe storms often produce anxiety, fear and a need to escape for some pets. Take preparedness measures to protect and care for your pet during severe storms.

Before a Severe Storm

- **Identification.**
 - Major storms can destroy fences allowing frightened pets to run away.
 - Make sure your pet has some form of identification (collar, microchip) that will let people contact you if your pet becomes separated from you.
 - Take a photo of the pet and keep it with its medical records.
- **Create a safe haven.**
 - Try to create a safe place for your pets.
 - Practice loading your pet into their cage or carrier.
 - Know their favorite hiding locations.
 - Some pets will feel more comfortable in a small crate or under a bed.
- **Try to desensitize your pet.**
 - Over a period of time, expose your pet to an intensity level of noise that doesn't frighten the animal.
 - Pair the noise with something pleasant, like a treat or a fun game.

During a Severe Storm

- **Pet behavior.**
 - A pet's behavior may change before, during and after the storm.
 - Consult your veterinarian. Medication may be available which can help reduce your pet's anxiety levels for short time periods.
 - Distract your pet. Encourage them to engage in any activity that captures their attention and distracts them from being fearful.
- **Pet safety.**
 - Bring pets indoor well in advance of a storm.
 - NEVER leave pets tied up outside.
 - If they are frightened, reassure them and remain calm.
 - Pets should be provided the same cover as humans during severe weather.
 - Keep pets away from windows.
 - Do not give your pet a bath during a storm.

After a Severe Storm

- **Pet behavior.**
 - Be aware that a pet's behavior may change before, during and after a disaster.
 - In the first few hours after the storm, leash your pets when they go outside until they readjust to the situation.
- **Pet safety.**
 - Keep your pet away from storm damaged areas.
- **Lost pets.**
 - If pets cannot be found after a disaster, contact the local animal control office.
 - Bring along a picture of your pet, if possible.

Information adapted from publications by the American Veterinary Medical Association and the Humane Society of the United States.



The destructive forces of thunderstorms and lightning can be particularly dangerous and costly on the farm. High winds can damage buildings, overturn vehicles, uproot or damage trees. Lightning is the leading cause of farm fires and hail can injure animals left outdoors and damage crops. Preparing ahead can help minimize damage and speed your recovery.

Before a Severe Storm

- **Check weather reports before planning work activities.**
 - Have a way of receiving weather information while you work, especially at remote locations.
 - Monitor for severe thunderstorms in your area at NOAA's National Weather Service National Storm Prediction Center - <http://www.spc.noaa.gov>
- **Develop a communication plan with your family and employees or co-workers.**
 - Know how to contact each other in the event of severe weather, especially if you are in separate locations.
 - Establish shelter locations on your property.
- **Identify potential hazards on your property.**
 - Secure structurally unstable materials (e.g., lumber, logs, equipment, fuel tanks) and loose equipment and materials (e.g., buckets, tools, etc.) which can become dangerous projectiles in high winds.
 - Fix loose siding, roofing, fence posts, etc., as these can become dangerous projectiles in high winds.
 - Know how to turn off electrical power, gas and water supplies for buildings on the farm.
 - Remove or fence off single trees in pastures to prevent animals from congregating under them.
 - Ground wire fences; current can travel up to two miles through a wire fence, which could be harmful to both livestock and humans.
- **Stockpile emergency materials**
 - Plywood, lumber, nails, hammer, saw, pry bar
 - Wire and rope to secure objects
 - Fire extinguishers at all barns and in all vehicles
 - A gas-powered generator in case of power failure
- **Make a list of your farm inventory, include:**
 - Livestock (species, number of animals)
 - Crops (acres, type).
 - Machinery and equipment (make, model #).
 - Hazardous substances (e.g., pesticides, fertilizers, fuels, medicines, other chemicals).
- **Review your insurance coverage.**

During a Severe Storm

- **Stay informed.**
 - Listen to the radio or television for situation developments.
- **If there is time, turn off electrical power to machines, barns, and other structures that may become damaged.**
- **If a WARNING is issued – Seek shelter immediately!**
 - **Avoid** natural lightning rods • tall, isolated tree in an open area • hilltops in open fields.
 - In the woods, go to a low area (ravine or valley) under a thick growth of small trees; be alert for flash flooding.
 - If you have no shelter, make yourself the smallest target by squatting low to the ground on the balls of your feet, minimizing contact with the ground, and placing your hands on your knees with your head between them.
 - In a tractor or other vehicle, stay put. Vehicles often provide better protection than lying exposed in open fields, but avoid touching any metal.

After a Severe Storm

- **Assess the situation.**
 - Survey damage to your home, buildings, equipment, livestock and crops.
 - Report any downed power lines.
- **Account for your inventory.**
 - Account for all livestock, fuels, chemicals, machinery and equipment; use the inventory list previously prepared.
 - Note any livestock losses.
 - Check machinery and equipment for damage.
 - Take photographs of all damage for insurance or emergency assistance purposes.
 - Report any hazardous materials (e.g., fuels, agricultural chemicals) spills or leaks to emergency response personnel.
- **Cleanup safely.**
 - Wear sturdy shoes or boots, long sleeves, and gloves to protect your body from injury.
 - Stay away from downed power lines and report them.
 - Be aware of hazards that may cause injury to you or others cleaning up (e.g., chain saws, electrical or chemical hazards).
 - Use caution when clearing broken tree branches; downed or damaged power lines can send electrical current through them.
 - Use caution with gas powered equipment – dangerous carbon monoxide can be generated; use in well ventilated areas.

Information adapted from publications by the National Weather Service, the Federal Emergency Management Agency, and the Cornell University Cooperative Extension Service.



SEVERE THUNDERSTORMS AND YOUR LIVESTOCK

Natural Disasters

Livestock can become injured or die during thunderstorm situations. Debris displaced by high winds, or hail - especially large sized pellets - can cause injury to animals left outdoors. Lightning can kill animals when they are near a fence or tree that receives a lightning discharge. Protect your livestock during thunderstorms by following the following guidelines.

Before a Severe Storm

- **Maintain an inventory.**
 - Keep a current list of all animals on your farm; include their location and any records of ownership.
- **Have identification for all animals.**
 - Make sure animals have some form of permanent identification (e.g., ear tags, tattoos).
- **Prepare an emergency kit.**
 - Severe storms can lead to power outages, animal escape or injury, have the following items on hand: Handling equipment (e.g., halters, nose leads) • water, feed, and buckets • medications • tools and supplies needed for manure cleanup • safety and emergency items for your vehicles and trailers.
 - Have well maintained backup generators or alternate power sources for livestock production operations.
- **Ensure a safe environment.**
 - Assess the stability and safety of barns and other structures.
 - Remove dead trees or objects from fields or livestock areas that may serve as potential flying debris.
 - Fence off or remove single trees in pastures to prevent animals from congregating under them; ground any trees left in pastures.
 - Ground wire fences. Current can travel up to two miles through a wire fence, which could be harmful to both livestock and humans.

During a Severe Storm

- **Be aware animal behavior may change before, during and even after a disaster.**
- **Livestock safety.**
 - If possible, bring animal into a barn or shelter well in advance of a storm.
 - Make sure they have plenty of food and water.
 - Keep them away from areas with windows.
 - NEVER leave animals tied up or restrained outside.

After a Severe Storm

- **Assess your animals and building structures.**
 - Survey damage to your barns and other structures; assess the stability and safety.
 - Examine your animals closely; contact your veterinarian if you observe injuries.
- **Cleanup safely.**
 - Gather and dispose of trash, limbs, wire, and damaged equipment that could harm livestock.
- **Provide non-contaminated feed or water.**
 - Provide clean, uncontaminated water.
 - Do not feed flood damaged or moldy feed or hay.
 - Do not use any feed or forage that may have been contaminated by chemical or pesticides.
- **Animal disposal.**
 - Record any animal deaths.
 - Dispose of dead carcasses.
 - Check with your state or local authorities for proper disposal methods for animal carcasses.

Information adapted from publications by the American Veterinary Medical Association, the United States Department of Agriculture National Agricultural Library.



Thunderstorms can cause crop damage by a variety of means. High winds can break and damage plants. Hail can cause leaf damage reducing yield or destroying plants. Flooded fields can lead to loss of top soil as well as damage to crops. All of these hazards can have significant economic impacts. While little can be done prior to the storm situation, prompt action after may help minimize the impact to your crops.

Before a Severe Storm

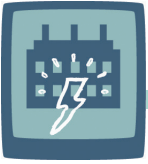
- **Open all drainage ditches.**
- **Remove any debris from fields and pastures that could damage plants, if airborne.**

After a Severe Storm

- **Assess your crops.**
 - Survey the damage to your crops from wind, hail or flooding.
 - Determine how much of your crops are water logged (only roots flooded) and how much are fully submerged (entire plants under water).
 - Evaluate injured plants to determine whether the growing potential is still viable; this is best done 3-5 days after the storm to allow time for plant recovery – if it occurs.
 - Factors affecting the extent of crop damage include:
 - . Degree of submergence of plant
 - . Weather conditions prior to the situation (e.g., temperature)
 - . Plant growth stage and height – younger stages are more vulnerable
 - . Significant loss of soil nitrogen
 - . Mud deposited on plants can stress plants and reduce photosynthesis
 - Yield losses due to hail damage may include:
 - . Stand reduction due to plant death
 - . Leaf area reduction due to hail damage to leaves
 - . Severe bruising of leaf tissue
- **Replant considerations.**
 - Contact your crop insurance agent prior to destroying or replanting crops to discuss coverage.
 - The USDA Farm Service Agency has a number of disaster assistance programs to aid farmers in recovering from severe weather damage to crops. www.fsa.usda.gov/
- **Evaluating whether to replant will depend on:**
 - The existing plant stand
 - Distribution of the plant stand
 - Calendar date
 - Weed situation
 - Seed availability of earlier maturing hybrids
 - Cost to replant
 - Yield potential of the existing crop

- **Monitor for diseases.**
 - Flood conditions can increase disease incidence in surviving plants; scout the fields often to determine if and when problems occur.
- **Do not feed heated, molded or sour feeds or moldy legume hays (alfalfa, clover) to any livestock.**
 - Rain damaged grain is likely to contain toxins as warm wet conditions are ideal for mold growth.
- **Do not use flood damaged or wet feeds until tested.**
 - It may be possible to dry and clean rain damaged grain, but it must be tested for mycotoxins before use.
 - Soaked grain will spoil within a day or two at high moisture and summer temperatures.
 - Flood damaged grain should always be destroyed due to the potential contaminants that can enter through the water.
 - Wet seed grain will probably not be suitable for planting, as wetness causes the seed to germinate.

Information adapted from publications by the USDA Farm Service Agency and the University of Minnesota and Purdue University Cooperative Extension Service.



SEVERE THUNDERSTORMS AND YOUR BUSINESS

Natural Disasters

Severe thunderstorms can occur at any time – leading to property damage, power outages, or even employee injury. Preventive actions can help to protect your business, ensure the safety of your employees, minimize damage to your property and speed the recovery process.

Before the Storm

- **Monitor for severe thunderstorms in your area.**
 - NOAA's National Weather Service
<http://www.spc.noaa.gov/products/wwa/>
- **Know the warning system for your community.**
 - Learn the thunderstorm warning system for your county or locality.
- **Know the terminology.**
 - A **severe thunderstorm WATCH** means storms are likely in your area—be ready to take necessary action.
 - A **severe thunderstorm WARNING** means storms have been reported by spotters or indicated by radar – Take immediate action to stay safe.
- **Establish shelter locations on your property.**
 - Choose a place where there are no windows, skylights, or glass doors.
 - Have enough room for all employees, any customers or suppliers who may be at your business during the hazardous situation.
 - Stock the shelter with emergency supplies such as flashlights, battery powered radio, and a first aid kit.
- **Prepare your employees.**
 - Inform your employees of the business emergency plan; review it with them regularly.
 - Ensure employees know the location of the sheltering area.
- **Make plans regarding customers.**
 - Determine the likelihood of customers being present if a severe storm situation.
 - Have an emergency plan for customers; review it with employees regularly.
 - Label shelter locations for the building.
- **Have a business emergency/continuity plan.**
 - Be prepared for power outages.
 - Determine any essential equipment or processes that rely on electrical power.
 - Have emergency power (e.g., backup generators) available.
 - Maintain an inventory of all equipment and assets for your business in the event of structural damage.
 - Install surge protectors to protect electronic equipment.

- **Identify potential hazards on your property.**
 - Secure unstable materials that are outside your business (e.g., lumber, equipment, fuel tanks).
 - Remove dead or rotting trees and branches that could fall and cause injury or damage.
 - Check the roof for signs of deterioration or leaks; make sure all drains and gutters are clear.

During A Severe Thunderstorm

- **Stay informed.**
 - Listen to the radio or television about the situation.
- **If a WARNING is issued – Seek shelter immediately.**
- **Lightning safety tips.**
 - Avoid contact with corded phones; cordless and cellular telephones are safe to use.
 - Avoid contact with electrical equipment; if you plan to unplug any electronic equipment, do so before the storm arrives.

After a Severe Thunderstorm

- **Assess the situation.**
 - Survey the outside and inside of the building for structural damage, sharp objects, downed power lines, damaged gas lines, or other hazards (e.g., chemicals).
- **Contact your insurance agent to report any losses and obtain advice about restoration needs.**
- **Clean up safely.**
 - Wear sturdy shoes or boots, long sleeves, and gloves for protection.
 - Use caution with gas powered equipment – dangerous carbon monoxide can be generated.
 - Report any hazardous materials (e.g., fuels, agricultural chemicals) that have leaked to emergency response personnel.
- **If someone has been injured by lightning,**
 - Call 911 or your local Emergency Medical Services.
 - Check the person for burns or other injuries; being struck by lightning can also cause nervous system damage, broken bones, loss of hearing or eyesight.
 - If breathing has stopped, begin rescue breathing
 - If the heart has stopped beating, a trained person should give CPR

Information adapted from publications by the Federal Emergency Management Agency and the U.S. Small Business Administration.

TORNADOES

Tornadoes – defined as a violently rotating column of air extending from a thunderstorm to the ground – are often formed when warm and cold air masses clash. They are capable of tremendous destruction, creating damage paths in excess of one mile wide and 50 miles long. Tornadoes speed can vary from nearly stationary to up to 70 mph; however, the wind speed from these formations can exceed 250 mph. Tornadoes are classified using the Enhanced Fujita Scale (Table 1). Most tornadoes (~88%) are considered weak (EF0 or EF1) and about 95% of all U.S. tornadoes are below EF3 intensity.

In the United States, on average, 1000 tornadoes are reported nationwide each year, resulting in 70 deaths and over 1,500 injuries. They occur most frequently east of the Rocky Mountains during the spring and summer months. Figure 5 shows the 20-year average number of tornado watches issued per year in the United States between 1993-2012. Tornado Alley is a nickname given to an area in the southern plains of the central U.S. that consistently experiences a high frequency of tornadoes each year.

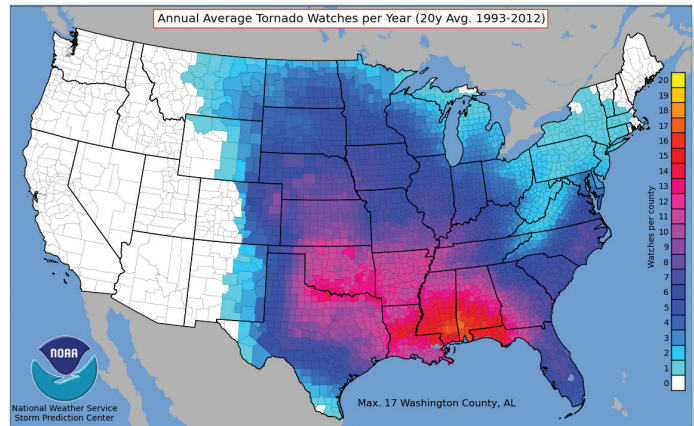


Figure 5. Average number of tornado watches per year, United States, 1993-2012. Source: NOAA National Weather Service Storm Prediction Center. <http://www.spc.noaa.gov/wcm/#watchfreq>

Tornadoes can cause rapid destruction of homes and property, as well as injury and death to humans and animals. The following factsheets will help you prepare your family, home and farm, animals and business in efforts to minimize the impact from tornadoes and help to speed the recovery process.

Table 1. Enhanced Fujita Tornado Intensity Scale (F-Scale)

Category	Description and Potential Damage
EF0	Gale tornado (40-72 mph); light damage. Some damage to chimneys; break branches off trees; push over shallow-rooted trees; damage to sign boards.
EF1	Moderate tornado (73-112 mph); moderate damage. The lower limit is the beginning of hurricane wind speed; peel surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads.
EF2	Significant tornado (113-157 mph); considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light-object missiles generated.
EF3	Severe tornado (158-206 mph); severe damage. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off ground and thrown.
EF4	Devastating tornado (207-260 mph); devastating damage. Well-constructed houses leveled; structure with weak foundation blown off some distance; cars thrown and large missiles generated.
EF5	Incredible tornado (261-318 mph); incredible damage. Strong frame houses lifted off foundations and carried considerable distance to disintegrate; automobile sized missiles fly through the air in excess of 100 yards; trees debarked.

Monitor for tornadoes in your area....
At NOAA's National Weather Service Active Watch and Warnings
<http://www.nws.noaa.gov/view/largemap.php>



TORNADOES AND YOUR FAMILY

Natural Disasters

Tornadoes are unpredictable and can cause major damage and destruction in seconds. The extremely high winds, flying debris as well as the wreckage left behind can cause personal injury or possibly death. Although nothing can be done to prevent tornadoes, there are actions you can take to protect yourself and your family from the impact of a tornado.

Before a Tornado

- **Know the warning signals.**
 - Learn about the tornado warning system for your county or locality.
 - Know how to distinguish the siren's warning for a tornado watch and a tornado warning.
- **Know the terminology.**
 - A **tornado WATCH** is issued when weather conditions favor the formation of tornadoes, for example, during a severe thunderstorm -- Be prepared to take shelter immediately if conditions worsen.
 - A **tornado WARNING** is issued when a tornado funnel is sighted or indicated by weather radar -- You should take shelter immediately!
- **Monitor for tornadoes in your area.**
 - NOAA's National Weather Service
<http://www.spc.noaa.gov/products/wwa/>
- **Identify an emergency shelter location in your home.**
 - The safest place is the interior part of a basement or storm cellar.
 - If there is no basement, use an inside room on the lowest floor (e.g., center hallway, bathroom, closet).
 - Avoid windows, skylights, or glass doors, which could be broken by strong winds or hail and cause damage or injury.
- **Have a family emergency plan. Discuss with your family:**
 - The best place to seek shelter from a tornado – in your home and other locations (e.g., outdoors, school, work, car).
 - How to protect themselves from flying/falling debris.
 - Possible disruption of services for extended periods of time (e.g., electric, phone and local food and water sources).
- **Prepare an emergency kit.**
 - This should include: 3-5 day supply of water (one gallon per person per day) and non-perishable food; don't forget a can opener for canned goods • One change of clothing and sturdy footwear per person • One blanket or sleeping bag per person • A first-aid kit, including prescription medicines • Battery-powered NOAA Weather Radio • Flashlight and plenty of extra batteries • A credit card or cash • Special items for infant, elderly, or disabled family members

During a Tornado

- **Stay informed.**
 - Listen to the radio or television about the situation.
- **Gather your emergency supplies.**
- **If a WARNING is issued – Seek shelter immediately.**
- **At home.**
 - Go to your emergency shelter location – the interior part of a basement or inner room on the lowest floor.
 - For added protection, get under something sturdy, such as a heavy table or workbench.
 - If possible, cover your body with a blanket, sleeping bag, or mattress, and protect your head with anything available --even your hands.
 - Avoid taking shelter where there are heavy objects, such as pianos or refrigerators, on the area of floor directly above you; they could fall through the floor if the tornado strikes your house.
- **Mobile homes.**
 - **DO NOT STAY IN A MOBILE HOME DURING A TORNADO!**
 - Mobile homes, even if tied down, offer little protection - go to a nearby building, preferably one with a basement.
 - If there is no nearby shelter, lie flat in the nearest ditch, ravine, or culvert and shield your head with your hands.
- **On the road.**
 - **DO NOT TRY TO OUTFRAN A TORNADO IN YOUR CAR!**
 - The least desirable place to be during a tornado is in a motor vehicle; cars, buses, and trucks are easily tossed by tornado winds.
 - If you see a tornado, stop your vehicle and get out - lie flat in the nearest ditch, ravine, or culvert and shield your head with your hands.
 - Do not get under your vehicle.
 - Do not get under an overpass or bridge; you are safer in a low, flat location.
- **Outdoors.**
 - If you are caught outside during a tornado and there is no adequate shelter immediately available:
 - Lie flat in the nearest ditch, ravine, or culvert and shield your head with your hands.
 - Avoid areas with many trees.
 - Do not get under any vehicle, no matter what its size.



After a Tornado

- **Stay safe.**
 - Stay away from tornado damaged areas.
 - Tornadoes often damage power lines, gas lines or electrical systems, so there is a risk of fire, electrocution or explosion.
- **Cleanup safely.**
 - Wear sturdy shoes or boots, long sleeves, and gloves to avoid injury.
 - Stay away from downed power lines and report them immediately.
 - Be aware of hazards that may cause injury to you or others cleaning up (e.g., chain saws, chemicals, exposed nails, broken glass).
 - Use caution with gas powered equipment – dangerous carbon monoxide can be generated; use in well ventilated areas.
 - Seek prompt medical attention if you suspect carbon monoxide poisoning – feeling dizzy, light-headed, or nauseated.
- **Seek medical attention for injuries as soon as possible.**
 - Injury may result from the direct impact of a tornado or it may occur afterward when people walk among debris and enter damaged buildings.
- **Protect your mental health.**
 - Effects may be immediate or delayed.
 - Maintain as much of a normal routine as possible.
 - Seek assistance if symptoms are prolonged (e.g., few weeks).

Information adapted from publications by the Federal Emergency Management Agency, the Centers for Disease Control and Prevention, The National Weather Service and the American Red Cross.



TORNADOES AND YOUR HOME

Natural Disasters

Tornado damage to homes is devastating. While it is impossible to make a home tornado-proof, there are many steps you can take to protect your home.

Before a Tornado

- **Determine the risk of tornadoes in your area.**
 - A map of high risk areas in the United States is available at www.fema.gov/areyouready/tornadoes.shtm
 - The National Weather Service <http://www.weather.gov/>
- **Identify potential hazards on your property.**
 - When inspecting your home, pay particular attention to the windows, doors, roof, gables and connections (roof-to-wall, wall-to-foundation). Weaknesses in these elements of your home make it more vulnerable to significant damage.
 - Secure unstable materials that are outside your home (e.g., patio furniture, fuel tanks).
 - Remove dead or rotting trees and branches that could fall and cause injury or damage during a tornado.
 - Keep trees and shrubbery trimmed. Cut weak branches and trees that could fall on your house.
- **Protect your home.**
 - Place furniture so that chairs and beds are away from windows, mirrors, and picture frames.
 - Place heavy or large items on lower shelves.
 - Secure large appliances, especially your water heater, with flexible cable, or metal strapping.
 - Secure top-heavy, free-standing furniture (e.g., bookcases, china cabinets) that could topple to the wall, by using “L” brackets, corner brackets, or aluminum molding.
- **Safeguard your possessions.**
 - Create a room-by-room inventory of your possessions, include receipts and photos.
 - Gather copies of critical documents, such as finance records, insurance policies.
 - Keep these in a secure place (e.g., safe deposit box, waterproof container).

During a Tornado

- **Stay informed.**
 - After moving to a safe location in your house, listen to the radio for further alerts and updates.
 - If there is time, move any large objects that could be a potential danger, out of the room.
 - Do not open windows. You won't save the house, as once thought, and may actually make things worse by giving wind and rain a chance to get inside.

After a Tornado

- **Continue to monitor your battery-powered radio or television for emergency information.**
- **Assess the situation.**
 - Survey damage to the outside and inside of your home.
 - Identify sharp objects, dangerous materials, downed power lines, damaged gas lines, or other hazards (e.g., chemical spills).
 - Be aware of possible structural, electrical, or gas-leak hazards in your home – if you suspect any damage, shut off electrical power, natural gas, and propane tanks to avoid fire, electrocution, or explosions.
- **Account for your inventory.**
 - Compare the list with the one prepared prior to the incident.
 - Take photographs of all damage for insurance or emergency assistance purposes.
 - Report any property damage to your insurance agent or company representative immediately after a natural disaster and make temporary repairs to prevent further damage.
- **Cleanup safely.**
 - Wear sturdy shoes or boots, long sleeves, and gloves when handling or walking on or near debris.
 - Be aware of hazards that may cause injury to you or others cleaning up - these can include chain saw injuries, electrical or chemical hazards.
 - Do not touch downed power lines or objects in contact with downed lines. Report electrical hazards to the police and the utility company.
 - Use caution with gas powered equipment – dangerous carbon monoxide can be generated; use in well ventilated areas.

Information adapted from publications by the Federal Emergency Management Agency, the Centers for Disease Control and Prevention, and the American Red Cross.



Tornado situations will often produce anxiety, fear and a need to escape for some pets. Debris displaced by high winds, can cause injury to animals left outdoors. Take preparedness measures to protect and care for your pet during tornadoes.

Before a Tornado

- **Create an emergency supply kit for your pet, should you need to evacuate your home due to heavy destruction.**
 - A 3-5 day supply of food and water for your pet, bowls and a non-electric can opener.
 - Sanitation items, such as a litter box or puppy pads, and disposal equipment.
 - Crates to provide the pet with a secure and safe hiding spot; make sure that the crate is clearly labeled.
 - Leash and collar should you need to transport your pet, carrier for cats.
 - Any medications for pets and all medical records for them as well.
- **Identification.**
 - All pets should have some sort of identification (collar with tag, microchip).
 - Take a photo of your pet and keep it with the medical records.
- **Prepare to seek shelter.**
 - Practice getting the entire family, including pets, to the tornado safe area during calm weather.
 - Train your dog to go to the area on command or to come to you on command regardless of distractions.
 - Learn how to quickly and safely secure your cat.
 - Know the hiding places of your pet and how to quickly and safely gather your pet.

During a Tornado

- **Pet safety.**
 - Bring pets indoor well in advance of a storm.
 - NEVER leave pets tied up outside.
 - If they are frightened, reassure them and remain calm.
 - Pets should be provided the same cover as humans during severe weather.
- **Put all pets in cages or carriers and in the safe room when a tornado warning is issued.**
 - Animals can sense bad weather and will look for a place to hide if they sense it is near.
- **NEVER leave your pet chained outside or enclosed in a manner in which they cannot escape danger.**

After a Tornado

- **Pet behavior.**
 - Be aware that a pet's behavior may change before, during and after a disaster.
 - In the first few hours after the storm, leash your pets when they go outside until they readjust to the situation.
 - Familiar scents and landmarks may be altered and your pet may become confused and lost.
- **Pet safety.**
 - Keep your pet away from storm damaged areas.
 - Power lines could be down and dangerous objects will be littered about everywhere.
- **Lost pets.**
 - If pets cannot be found after a disaster, contact the local animal control office.
 - Bring along a picture of your pet, if possible.

Information adapted from publications by the American Veterinary Medical Association and the Humane Society of the United States.



TORNADOES AND YOUR FARM

Natural Disasters

Tornadoes strike quickly, with little or no warning. High winds can damage buildings, overturn vehicles, uproot or damage trees. Preparing before a tornado can help to preserve life, minimize damage and speed your recovery.

Before a Tornado

- **Determine the risk of tornadoes in your area.**
 - A map of high risk areas is available at www.fema.gov/areyouready/tornadoes.shtm.
- **Know the terminology.**
 - A **tornado WATCH** is issued when weather conditions favor the formation of tornadoes, for example, during a severe thunderstorm -- be prepared to take shelter immediately if conditions worsen.
 - A **tornado WARNING** is issued when a tornado funnel is sighted or indicated by weather radar -- You should take shelter immediately!
- **Check weather reports before planning work activities.**
 - Have a way of receiving weather information while you work, especially at remote locations.
 - Monitor for tornadoes in your area at the National Weather Service Active Watch and Warnings. <http://www.weather.gov/>
- **Create an emergency plan of action.**
 - Know your area's warning signals for tornado watches and warnings. As soon as you hear the signal, take cover.
 - Carry a first aid kit, flashlight, and battery operated radio on all farm equipment.
 - Carry a cellular phone or portable radio to contact family or farm employees.
- **Develop a communication plan with your family and employees or co-workers.**
 - Know how to contact each other in the event of severe weather, especially if you are in separate locations.
 - Establish shelter locations on your property.
- **Identify potential hazards on your property.**
 - Secure structurally unstable materials (e.g. lumber, logs, equipment, fuel tanks), and loose equipment and materials (e.g., buckets, tools, etc.) which can become dangerous if airborne.
 - Fix loose siding, roofing, fence posts, etc., as these can become dangerous projectiles in high winds.
 - Know how to turn off electrical power, gas and water supplies for building on the farm.

- **Stockpile emergency materials.**
 - Plywood, lumber, nails, hammer, saw, pry bar
 - Wire and rope to secure objects
 - Fire extinguishers at all barns and in all vehicles
 - A safe supply of food to feed livestock
 - A gas-powered generator in case of power failure
- **Make a list of your farm inventory, include:**
 - Livestock (species, number of animals)
 - Crops (acres, type)
 - Machinery and equipment (make, model #)
 - Hazardous substances (e.g., pesticides, fertilizers, fuels, medicines, other chemicals)
- **Review your insurance coverage.**

During a Tornado

- **Stay informed.**
 - Listen to the radio or television for situation developments.
- **If a WARNING is issued – Seek shelter immediately!**
- **Never try to outrun a tornado.**
 - Get off of farm machinery and get as far away from it as possible.
- **If possible, get inside a sturdy building.**
 - The safest place is an inside room on the lowest floor.
 - Avoid windows, or glass doors, which can be broken by strong winds or hail and cause damage or injury.
 - Avoid long span buildings as these are often supported solely by the outside walls and can be dangerous during severe weather situations.
 - For added protection, get under something sturdy, such as a heavy table or workbench.
 - If possible, cover your body with a blanket or sleeping bag; protect your head with anything available--even your hands.
- **If no adequate shelter immediately available,**
 - Lie flat in the nearest ditch or other low lying area.
 - Cover your head and neck with your arms.
 - Stay away from trees.
 - Do not get under any vehicle, no matter what its size.



After a Tornado

- **Continue to monitor your battery-powered radio or television for emergency information.**
- **Assess the situation.**
 - Survey damage to your home, buildings, equipment, livestock and crops.
 - Identify sharp objects, dangerous materials, downed power lines, damaged gas lines, or other hazards (e.g., chemical spills).
 - Check for power outages.
- **Clean up safely.**
 - Wear sturdy shoes or boots, long sleeves, and gloves.
 - Be aware of hazards that may cause injury to you or others cleaning up - these can include chain saw injuries, electrical or chemical hazards.
 - Use caution with gas powered equipment – dangerous carbon monoxide can be generated; use in well ventilated areas.
- **Account for your inventory.**
 - Account for all livestock, fuels, chemicals, machinery and equipment; use the inventory list prepared prior to the incident.
 - Note any livestock losses.
 - Check machinery and equipment for damage.
 - Take photographs of all damage for insurance or emergency assistance purposes.
 - Report any hazardous materials (e.g., fuels, agricultural chemicals) spills or leaks to emergency response personnel.

- **Care for the livestock.**
 - Make sure that livestock have food and water.
 - Remove any debris that may cause injury.
 - Dispose of dead carcasses.
- **Farm disaster assistance.**
 - Disaster assistance for farms may be available from the USDA's Farm Service Agency <http://www.fsa.usda.gov/>.

Information adapted from publications by the Federal Emergency Management Agency, the Centers for Disease Control and Prevention, the National Weather Service and the University of Wisconsin Extension Service.



TORNADOES AND YOUR LIVESTOCK

Natural Disasters

Livestock can become injured, displaced or die during tornado situations. Protecting your livestock from tornadoes involves the following measures.

Before a Tornado

- **Maintain an inventory.**
 - Keep a current list of all animals on your farm; include their location and any records of ownership.
- **Have identification for all animals.**
 - Make sure animals have some form of permanent identification (e.g., ear tags, tattoos).
- **Have an emergency plan.**
 - Tornadoes can cause structural damage and power outages.
 - Have well maintained backup generators or alternate power sources for livestock production operations.
 - In the event of animal escape, have handling equipment (e.g., halters, nose leads) and safety and emergency items for your vehicles and trailers.
- **Ensure a safe environment.**
 - Assess the stability and safety of barns and other structures.
 - Remove loose objects from fields or livestock areas that may become potential flying debris.

During a Tornado

- **Be aware animal behavior may change before, during and even after a disaster.**
- **Livestock sense tornadoes in advance.**
 - If your family or house is at risk, ignore livestock.
 - If your personal security isn't threatened, you may only have time to open routes of escape for your livestock.
- **Livestock safety.**
 - If possible, bring animals into a barn or shelter well in advance of a storm.
 - Make sure they have plenty of food and water.
 - Keep them away from areas with windows.
 - NEVER leave animals tied up or restrained outside.

After a Tornado

- **Assess your animals and building structures.**
 - Survey damage to your barns and other structures; assess the stability and safety.
 - Examine your animals closely; contact your veterinarian if you observe injuries.
- **Cleanup safely.**
 - Gather and dispose of trash, limbs, wire, and damaged equipment that could harm livestock.
- **Provide non-contaminated feed or water.**
 - Provide clean, uncontaminated water.
 - Do not use any feed or forage that may have been contaminated by chemical or pesticides.
- **Animal disposal.**
 - Record any animal deaths.
 - Dispose of dead carcasses.
 - Check with your state or local authorities for proper disposal methods for animal carcasses.

Information adapted from publications by the American Veterinary Medical Association, the Humane Society of the United States and the Colorado State University, University of Wisconsin and South Dakota State University Cooperative Extension Service.



When tornadoes strike, businesses can suffer. A large percentage of tornadoes occur between 3 and 6 p.m., when most people are at work. Be prepared to protect your employees, customers and property, and ensure business continuity.

Before a Tornado

- **Monitor for severe thunderstorms in your area.**
 - NOAA's National Weather Service
<http://www.spc.noaa.gov/products/wwa/>
- **Know the warning system for your community.**
 - Learn the thunderstorm warning system for your county or locality.
- **Know the terminology.**
 - A **tornado WATCH** is issued when weather conditions favor the formation of tornadoes, for example, during a severe thunderstorm -- be prepared to take shelter immediately if conditions worsen.
 - A **tornado WARNING** is issued when a tornado funnel is sighted or indicated by weather radar -- You should take shelter immediately!
- **Establish shelter locations on your property.**
 - The safest place is the interior part of a basement.
 - If there is no basement, use an inside room on the lowest floor (e.g., center hallway, closet).
 - Avoid windows, skylights, or glass doors, which could be broken by strong winds or hail.
 - There should be enough room for all employees, any customers or suppliers who may be at your business during the hazardous situation.
 - Stock the shelter with emergency supplies such as flashlights, battery powered radio, and a first aid kit.
- **Prepare and protect your employees**
 - Make sure everyone knows the location of storm shelter areas in the building; conduct annual emergency drills.
 - Encourage employees to develop an emergency preparedness plan for their family.
- **Make plans regarding customers.**
 - Determine the likelihood of customers being present if a severe storm situation.
 - Have an emergency plan for customers; review it with employees regularly.
 - Label shelter locations for the building.
- **Identify potential hazards on your property.**
 - Secure unstable materials that are outside your business (e.g., lumber, equipment, fuel tanks).
 - Remove dead or rotting trees and branches that could fall and cause injury or damage.

- **Protect your assets.**
 - Maintain an inventory of all equipment used by your business.
 - Develop a schedule for backing up all computer records.
 - Keep backups of all tax, accounting, payroll and production records, customer and supplier data off-site.
 - Keep copies of all paper and computer files in an accessible but off-site location.
- **Prepare for business continuity.**
 - Have a business emergency plan.
 - Document all processes that keep your business running.
 - Determine what processes and equipment is needed to keep your business open.
 - Store extra supplies offsite and make a plan for temporary relocation.
- **Obtain tornado insurance.**
 - Business insurance policies can cover damage to your business property and equipment.
 - Add extra coverage in case of business interruption following the disaster.
 - Extra expense coverage may pay for the costs of relocating or leasing equipment while repairs are underway.

During a Tornado

- **Stay informed.**
 - Listen to the radio or television about the situation.
- **If a WARNING is issued – Seek shelter immediately.**
- **Ensure employee and customer safety.**
 - Have personnel and customers go to the businesses' emergency shelter location immediately!
 - . Interior hallway areas
 - . Avoid glass walls and windows
 - . Avoid areas with wide-span roofs (e.g., warehouses)
 - Designate an employee to be the contact for employees and customers and to ensure they go to shelter locations.
 - Instruct individuals to sit facing the wall with their heads between their knees.
 - Keep exterior doors and windows closed and interior doors (offices to corridors) open to minimize pressures.
 - Do not use elevators for shelter; if the building loses power, you may become trapped.
 - If there is time, turn off all utilities at the main power switch and close the main gas valve.



TORNADOES AND YOUR BUSINESS

Natural Disasters

After a Tornado

- **Return to your business only after officials have declared the area safe.**
- **Assess employees and customers for injuries.**
 - If someone has been injured, call 911 or your local Emergency Medical Services.
- **Implement your business post-disaster communication strategy to contact employees, customers and vendors.**
- **Assess your property.**
 - Survey the inside and outside of the building for structural damage, sharp objects, downed power lines, damaged gas lines, or other hazards (e.g. chemicals).
 - If re-entering a building, use extreme caution, as moving through debris presents further hazards.
 - Check machinery and equipment for damage.
 - Take photographs of all damage for insurance or emergency assistance purposes.
 - Contact your insurance agent to report any losses and obtain advice about restoration needs.
- **Clean up safely.**
 - During cleanup, personnel should wear sturdy shoes or boots, long sleeves, and gloves to protect their body from injury.
 - A tetanus booster may be warranted.
 - Stay away from downed power lines and report them immediately.
 - Be aware of hazards that may cause injury while cleaning up (e.g., chain saws, electrical or chemical hazards).
 - Use caution with gas powered equipment – dangerous carbon monoxide can be generated.
 - Report any hazardous materials (e.g., fuel, chemicals) that have leaked to emergency response personnel.

Information adapted from publications by the Federal Emergency Management Agency and the U.S. Small Business Administration.

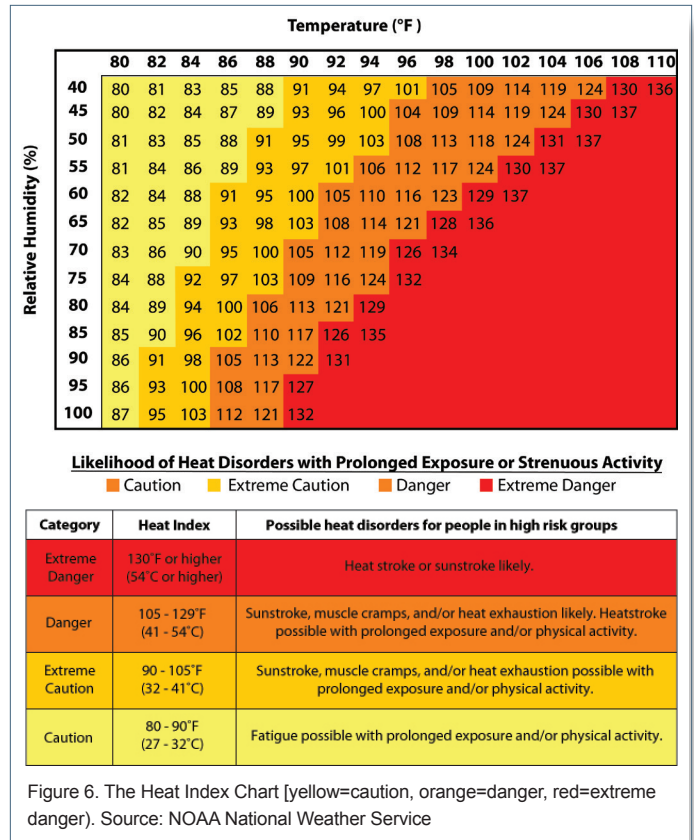
EXCESSIVE HEAT

Extreme heat conditions (e.g., heat waves) can occur in most regions of the U.S. High temperatures combined with humidity can be extremely hazardous and can result in heat-related illnesses and even death. Historically, from 1979-2003, excessive heat exposure caused 8,015 deaths in the United States. In recent years, excessive heat has caused more deaths than all other weather related events.¹

The Heat Index Chart² (Figure 6) is used to help monitor extreme heat conditions. The heat index is the temperature the body feels when the effects of temperature and humidity are combined. The chart also indicates the likelihood for heat disorders, especially with prolonged exposure or strenuous activity. Excessive heat advisories and warnings are issued based on heat index values. Heat advisories are initiated when the heat index is expected to exceed 105-110°F (on the table) for at least two consecutive days. [Note: The heat index values are determined for shady, light wind conditions. Exposure to full sunshine can increase the heat index by as much as 15°F. Conditions with strong, hot, dry winds can also increase the hazard.]

In extreme heat and high humidity situations, normal evaporation is slowed and the body must work extra hard to maintain a normal temperature. As a result, life threatening heat-related illnesses can occur, sometimes leading to death. Heat-related illnesses and deaths are preventable. Knowing who is at greatest risk and preventive actions to be taken can help to prevent these life-threatening situations. Most cases occur in individuals that have been overexposed to heat or have over-exercised for their age or physical condition. Young children, the elderly and individuals with chronic illnesses or obesity are at highest risk, but even young and healthy individuals can succumb to heat if they participate in strenuous physical activities during hot weather. Animals can also suffer heat-related illnesses, which can also be life threatening.

The following factsheets will help you prepare your family, home and farm, animals, and business in efforts to minimize the impact of extreme heat situations.



Monitor for heat advisories in your area
at the National Weather Service.
<http://www.weather.gov/>

References

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2. National Oceanic and Atmospheric Agency (NOAA), National Weather Service. Heat waves: a major summer killer. <http://www.nws.noaa.gov/os/heat/index.shtml>
3. Federal Emergency Management Agency (FEMA). Extreme Heat. <http://www.ready.gov/heat>
4. Centers for Disease Control and Prevention (CDC). Emergency Preparedness and Response: Extreme Heat. <http://www.bt.cdc.gov/disasters/extremeheat/>



EXCESSIVE HEAT AND YOUR FAMILY

Natural Disasters

High temperatures combined with humidity can be extremely hazardous, leading to life threatening illness. Heat-related illnesses are preventable, if you take the necessary precautions.

Before Excessive Heat Situations

- **Stay informed.**
 - Monitor for heat advisories in your area at the NOAA National Weather Service. <http://www.weather.gov/>
 - Listen to local news and weather channels for health and safety updates.
- **Know the terminology.**
 - **Excessive Heat Advisory:** An excessive heat event is occurring; prolonged exposure or strenuous activity might result in a heat-related illness.
 - **Excessive Heat Warning:** Life-threatening heat is occurring. Take precautions immediately!
- **Discuss heat precautions with your family.**
 - Limit or avoid activity during the day.
 - Keep hydrated.
 - Know the signs of heat-related illnesses.
- **Be aware of high risk individuals in your neighborhood.**
 - Young children, the elderly, people with illness or chronic disease, or that are overweight.

During Excessive Heat Situations

- **Monitor family members and others for heat-related illnesses.**
- **Stay inside and stay cool.**
 - Air-conditioning is the number one protective factor against heat-related illness and death.
 - If air conditioning is not available, spend time in public places that are air-conditioned (e.g., library, malls, and theaters).
- **Drink plenty of fluids.**
 - Drink 2-4 glasses of cool fluids (water, sports drinks) each hour.
 - Avoid drinks containing alcohol, caffeine, or large amounts of sugar – these actually cause you to lose more body fluid.
- **Eat small, but frequent meals.**
 - Avoid hot foods and heavy meals; they add heat to your body.
- **If you must be outdoors,**
 - Limit activities to morning and evening hours.
 - Avoid strenuous activities.
 - Wear lightweight, light-colored, loose-fitting clothing.
 - Wear a wide-brimmed hat, sunglasses and sunscreen that is SPF 15 or higher.
 - Take frequent breaks in the shade or in a cool environment.

- **Never leave children in a parked car.**
 - Each year children die from extreme heat after being left in parked vehicles.
 - Cars can heat up to dangerous temperatures very quickly – even within minutes.

Heat-Related Illnesses

- **Heat stroke is a life-threatening situation!**
 - Occurs when the body is unable to regulate its temperature and cool itself.
 - Signs: extremely high body temperature (above 103°)
 - red, hot, dry skin (no sweating)
 - rapid, strong pulse
 - throbbing headache
 - dizziness
 - nausea
 - confusion
 - unconsciousness
 - **If you see any of these signs, get medical assistance immediately!**
- **Heat exhaustion.**
 - A milder form of heat-related illness that can develop after several days of exposure to high temperatures and inadequate or unbalanced replacement of fluids.
 - **Signs:** cool, moist, pale or flushed skin • heavy sweating • headache • nausea • dizziness • weakness
 - Cool the victim by: providing cool, nonalcoholic beverages
 - rest in a cool or air-conditioned environment
 - cool shower, bath, or sponge bath
 - If the person vomits or begins to lose consciousness, **get medical assistance immediately!**
- **Heat cramps.**
 - Muscle pains or spasms (usually in the legs or abdomen) that occur in association with loss of fluids and electrolytes.
 - Often an early sign the body is having trouble with heat.
- **Sunburn.**
 - Damage to the skin that significantly slows the skin's ability to release heat.
 - Usually minor discomfort that heals in a week.
 - Severe sunburn may require medical attention.
- **Heat rash.**
 - Skin irritation caused by excessive sweating during hot, humid weather.
 - Red cluster of pimples or small blisters; usually on the neck, chest, or folds of the skin.
 - Most common in young children; can affect any age.
 - Usually does not require medical assistance.

Information adapted from publications by the Centers for Disease Control and Prevention, Federal Emergency Management Agency, National Weather Service and the American Red Cross.



Air conditioning is the number one protective factor against heat related illness and death. Ensure your home is ready to provide the necessary cool, protective environment you will need during extreme heat situations.

Before Excessive Heat Situations

- **Prepare your air conditioning system.**
 - Keep your air conditioner maintained properly; this will ensure it is able to work when you need it most.
 - Have your air conditioning system checked each year.
 - Check air-conditioning ducts for proper insulation.
 - Install window air conditioners snugly; insulate if necessary.
 - Keep your air conditioner in the shade. If your air conditioner is already in the sun, you can build a wood shade screen for it — but do not block the air flow.
- **Prepare your home.**
 - Weather-strip doors and windows to keep the cool air inside your home.
 - Install temporary window reflectors (e.g., aluminum foil-covered cardboard) to reflect heat back outside.
 - Cover windows that receive morning or afternoon sun with drapes, shades, awnings, or louvers; this can reduce the heat that enters a home by up to 80 percent.
 - Keep storm windows up all year.
- **Prepare for power outages.**
 - High summertime temperatures increase energy demand for cooling; overloaded energy systems can result in power outages.
 - For more information see the Power Outage handouts in this manual.

During Excessive Heat Situations

- **Reduce indoor heat.**
 - Close window coverings on the west side of the home to keep out the hot afternoon sun.
 - Cool only the rooms you use, but do not close all your vents - closing too many vents actually reduces operating efficiency.
 - Run the oven, dishwasher, washing machine and clothes dryer early in the morning or later in the evening to reduce adding heat during the hottest part of the day.
- **If you do not have an air conditioner,**
 - **Daytime:** Open at least two windows and place a fan in the window so it blows air out of the house; this will create airflow through the house
 - **Nighttime:** Turn the fan around to draw cooler air into the house.
- **Improve ventilation.**
 - Use a small electric fan to improve ventilation and comfort.
 - Use ceiling fans to circulate air.

After Excessive Heat Situations

- **Home improvements can make your home more prepared for extreme heat events.**
 - Use landscaping to provide shade for west-facing walls.
 - Consider replacing old windows. Storm or dual-glazed windows can reduce heat gain by as much as 50 percent.
 - Install additional insulation, which can help keep heat out in the summer as well as keep heat in during the winter months.
 - Use attic fans to help clear the hottest air from the home.

Information adapted from publications by the Centers for Disease Control and Prevention, Federal Emergency Management Agency, National Weather Service and the American Red Cross.



EXCESSIVE HEAT AND YOUR PETS

Natural Disasters

Extreme heat situations can be hazardous to your pets. Animals can overheat, suffer dehydration, and even die in hot weather. Heat-related illnesses can be prevented if proper measures are taken.

Before Excessive Heat Situations

- **Establish cool housing areas.**
 - Establish areas indoors or outdoors for extreme heat situations – cool basement, shade from a tree, doghouse or other shelter to protect from the heat.

During Excessive Heat Situations

- **Keep pets cool.**
 - Keep pets indoors as much as possible.
 - Use a hose or let your pet swim in a kiddie pool, lake or stream to cool off.
- **Cool water.**
 - Make sure your pet has access to cool, clean water.
 - Check the water bowl frequently throughout the day as pets will drink more during high temperatures.
- **Limit or restrict exercise.**
 - Exercise of any kind should be cut back and limited to the cooler, early morning or later evening hours.
 - Avoid midday heat.
- **Limit sun exposure.**
 - Dogs and cats can get sunburned just like people, especially their ears and noses.
- **Avoid burned pads on your pet's feet.**
 - Avoid walking your dog on hot surfaces, such as pavement, asphalt, or metal.
 - Walk your pet in the grass.
 - **Signs of burned pads:** limping or refusing to walk • licking or chewing at the feet • pads are darker in color • part of the pad is missing
 - If you notice a problem, flush the pad and foot with cool water or a cool compress; get the pet to a grassy area, or if possible carry him.
 - Contact your veterinarian to examine your pet for signs of deeper burns, blisters and possibly infection.
- **Never leave pets in a parked car.**
 - Each year pets die from extreme heat after being left in parked vehicles.
 - Cars can heat up to dangerous temperatures very quickly – even within minutes.

- **Monitor your pet for signs of heat-related illness.**
 - Watch your pet for signs of tiring and too much panting.
 - Brachycephalic breeds (i.e., short-nosed breeds, such as bulldogs and pugs), large heavy-coated breeds, and those dogs with heart or respiratory problems are more at risk for heat stroke.

Heat-Related Illnesses

- **If you see any of these signs, get veterinary attention immediately!**
- **Heat stroke is a life-threatening situation!**
 - Occurs when the body is unable to regulate its temperature and cool itself.
 - **Signs:** extremely high body temperature (above 104-110°F) • excessive panting • dark or bright red tongue and gums • sticky or dry tongue and gums • staggering, stupor, seizures • bloody diarrhea or vomiting • nausea • unconsciousness
 - Pets can go into a coma or die from heat stroke.
- **Heat stress.**
 - A milder form of heat-related illness that can develop after several days of exposure to high temperatures and inadequate or unbalanced replacement of fluids.
 - **Signs:** heavy panting • glazed eyes • rapid pulse • unsteadiness or staggering • vomiting • weakness
- **Sunburn.**
 - Animals with pink skin are at great risk of sunburn.
- **Actions to take:**
 - Contact your veterinarian immediately!
 - Move pet to a shaded/air conditioned area.
 - Apply ice packs or cold towels to your pet's head, neck, and chest.
 - Do not cool your pet too quickly.
 - Let your pet drink small amounts of cool water or lick ice cubes, but do not force ice or water to your pet.

Information adapted from publications by the American Society for the Prevention of Cruelty to Animals and the Humane Society of the United States.



Farm tasks generally require outdoor activities. Working in hot and humid conditions increases the risk of life-threatening heat-related illnesses. Take measures to protect yourself and others on your farm during extreme heat situations.

Before Excessive Heat Situations

- **Stay informed.**
 - Monitor for heat advisories in your area at the NOAA National Weather Service. <http://www.weather.gov/>
 - Listen to local news and weather channels during extreme heat conditions for health and safety updates.
- **Know the terminology.**
 - **Excessive Heat Advisory:** An excessive heat event is occurring; prolonged exposure or strenuous activity might result in a heat-related illness.
 - **Excessive Heat Warning:** Life-threatening heat is occurring. Take precautions immediately!
- **Discuss heat precautions with those that work on your farm.**
 - Limit or avoid activity during the day.
 - Keep hydrated; drinking at least every 15 minutes.
 - Train workers on how to minimize heat stress and to recognize the signs of heat illness.
- **Establish shade or cool areas on your farm.**
 - Designate areas for workers to go to cool off.
 - Set up awnings, canopies, if natural shade is not available.
 - Provide sources of water.
- **Prepare for power outages.**
 - High summertime temperatures increase energy demand for cooling; overloaded energy systems can result in power outages.
 - For more information see the Power Outage handouts in this manual.

During Excessive Heat Situations

- **If you (or farm workers) must be outdoors**
 - Limit activities to the morning and evening hours; avoid mid-day.
 - Avoid strenuous activities.
 - Take frequent breaks (10-20 minutes each hour), preferably in shade or an air conditioned area.
 - Drink 1-2 quarts of cool water every hour; avoid ice cold water as this can cause stomach cramps.
 - Wear lightweight, light-colored, loose-fitting clothing.
 - Wear a wide-brimmed hat, sunglasses and sunscreen that is SPF 15 or higher.

- **Encourage workers to ensure use a “buddy system” while working**
 - Ensure adequate water consumption.
 - Alternate work load between strenuous and light tasks.
 - Detect early signs of heat-related illnesses.

Heat-Related Illnesses

- **Heat stroke is a life-threatening situation!**
 - Occurs when the body is unable to regulate its temperature and cool itself.
 - **Signs:** extremely high body temperature (above 103°F) • red, hot, and dry skin (no sweating) • rapid, strong pulse • throbbing headache • dizziness • nausea • confusion • unconsciousness
 - **If you see any of these signs, get medical assistance immediately!**
- **Heat exhaustion.**
 - A milder form of heat-related illness that can develop after several days of exposure to high temperatures and inadequate or unbalanced replacement of fluids.
 - Signs: cool, moist, pale or flushed skin • heavy sweating • headache • nausea • dizziness • weakness
 - Cool the victim by providing cool, nonalcoholic beverages • rest in a cool or air-conditioned environment • cool shower, bath, or sponge bath • lightweight clothing
 - If the person vomits or begins to lose consciousness, get medical assistance immediately!
- **Heat cramps.**
 - Muscle pains or spasms (usually in the legs or abdomen) that occur in association with loss of fluids and electrolytes following strenuous activity.
 - Often an early sign that the body is having trouble with heat.
- **Sunburn.**
 - Damage to the skin that significantly slows the skin’s ability to release heat.
 - Usually minor discomfort that heals in a week.
 - Severe sunburn may require medical attention.
- **Heat rash.**
 - Skin irritation caused by excessive sweating during hot, humid weather.
 - Red cluster of pimples or small blisters.
 - Most common on the neck, upper chest, or folds of the skin (e.g., elbow creases).

Information adapted from publications by the Centers for Disease Control and Prevention, Federal Emergency Management Agency, and the American Red Cross.



EXCESSIVE HEAT AND YOUR LIVESTOCK

Natural Disasters

Extreme heat situations can be hazardous to your livestock, horses and poultry. Reduced production, heat-related illnesses, even death can occur. Protect your animals during extreme heat situations.

Before Excessive Heat Situations

- **Establish cool housing or shaded areas.**
 - Adequate shade is important and can be provided by trees, buildings or sunshades.
 - Ensure building roofs are high enough to allow for air movement.
- **Prepare access to water.**
 - Animals will require more water during extreme heat conditions – up to twice as much as normal.
 - Ensure animals always have access to cool, clean water.
 - Shade above ground water lines or tanks to keep water cool.
 - Additional watering tanks may be necessary; if possible provide these in advance so animals can become used to multiple water sources.
- **Improve ventilation.**
 - Install fans, open windows, front of stalls or roof ventilation to increase air movement in buildings.
 - Cut tall vegetation 150 ft back from perimeter of holding pens.
 - Consider building earth mounds to minimize bunching of animals.
 - Increase floor space per animal or reduce the number of animals in an area.
- **Prepare for power outages.**
 - High summertime temperatures increase energy demand for cooling; overloaded energy systems can result in power outages.
 - For more information, see the Power Outage handouts in this manual.

During Excessive Heat Situations

- **Provide cool, clean water.**
 - Check water delivery systems periodically for plugs or other problems.
 - Monitor the water temperature and keep it cool.
 - If possible, keep in a shaded area.
- **Keep animals cool.**
 - Spray with oscillating sprinklers; water can have a cooling effect for animals.
 - Run water on the ground to keep hooves cooled.
 - Run water across roofs of buildings where animals are housed to cool the area.

- **Control biting insects.**
 - Flies and other insects are more active in warm weather; animals may increase their activity trying to avoid these insects and risk overheating.
 - Reduce insect breeding areas by:
 - Removing weeds/brush
 - Removing standing pools of water or mud
 - Removing manure
- **Feed later in the day**
 - Do not feed animals during the hottest periods of the day.
 - Shift feeding toward the evening after peak day temperature.
 - Cover feed bunks to prevent spoilage from heating in the sun.
- **Avoid or limit handling of animals.**
 - Processing or working animals can elevate body temperature.
 - Avoid handling during mid-day.
 - If animal must be handled, work them early in the morning (prior to 8 AM – not after 10 AM) and if possible in a shaded facility or area.
 - Ship animals at night or early morning (e.g., arrival time before 7 AM).
 - Cool animals after exercise with sprays of water.

Heat-Related Illness

- **Monitor your animals frequently for heat-related illness.**
 - Signs of heat stress can be subtle initially, so watch animals closely.
 - Animals with darker fur (e.g., black haired beef cattle) may be more susceptible.
 - **Signs of heat stress:** increased respiration rate or panting
 - excessive salivation
 - elevation of head to make it easier to breathe
 - open mouth breathing
 - If your animals are showing signs of heat stress:
 - Contact your local veterinarian immediately!
 - Move animals to the shade immediately.
 - Offer plenty of cool, clean water.
 - Spray them with cool water, especially on the legs and feet, or stand them in water.
 - Increase air movement around them.
- **Sunburn.**
 - Animals can get sunburned just like people, especially their ears and noses.
 - Animals with pink skin are at greatest risk.

Information adapted from publications by the South Dakota State University, Ohio State University, University of Illinois and North Carolina State University Cooperative Extension Services.



During the summer, workers may perform more job tasks outdoors. This exposure to high temperatures and humidity can lead to life-threatening heat related illnesses. Heat-related illnesses are preventable. Protect your employees by following these suggestions.

Before Excessive Heat Situations

- **Stay informed.**
 - Monitor for heat advisories in your area at the NOAA National Weather Service. <http://www.weather.gov/>
 - Listen to local news and weather channels during extreme heat conditions for health and safety updates.
- **Know the terminology.**
 - **Excessive Heat Advisory:** An excessive heat event is occurring; prolonged exposure or strenuous activity might result in a heat-related illness.
 - **Excessive Heat Warning:** Life-threatening heat is occurring. Take precautions immediately!
- **Discuss heat precautions with your employees.**
 - Limit or avoid activity during the day.
 - Keep hydrated; drinking at least every 15 minutes.
 - Wear wide-brimmed hats for protection from the sun.
 - Wear sunscreen with SPF 15 or higher.
 - Dress in lightweight, loose-fitting, light-colored clothing.
 - Train employees to recognize the signs of heat illness.
- **Establish shade or cooling areas for your employees.**
 - Set up awnings or canopies, if natural shade is not available.
- **Prepare for power outages.**
 - High summertime temperatures increase energy demand for cooling; overloaded energy systems can result in power outages.
 - For more information see the Power Outage handouts in this manual.
- **Prepare your facilities.**
 - Maintain your air conditioning system to ensure it is able to work when you need it most.
 - Check air-conditioning ducts for proper insulation.
 - Window air conditioners should be installed snugly and insulated, if necessary.
 - Weather-strip doors and windows to keep cool air in.
 - Cover windows that receive morning or afternoon sun with drapes, shades, awnings, or louvers.
 - Use electric or ceiling fans to improve ventilation and comfort.

During Excessive Heat

- **If employees work outdoors,**
 - Schedule work during the morning and late-afternoon hours.
 - Avoid strenuous activities outdoors, especially mid-day.
 - Adjust work schedules to provide workers with breaks in the shade or an air-conditioned area.
 - Postpone nonessential tasks.
 - Make sure employees drink plenty of water, frequently.

Heat-Related Illnesses

- **Heat stroke is a life-threatening situation!**
 - Occurs when the body is unable to regulate its temperature and the body is unable to cool itself.
 - **Signs:** extremely high body temperature (above 103°F)
 - red, hot, and dry skin (no sweating)
 - rapid, strong pulse
 - throbbing headache
 - dizziness
 - nausea
 - confusion
 - unconsciousness
 - **If you see any of these signs, get medical assistance immediately!**
- **Heat exhaustion.**
 - A milder form of heat-related illness that can develop after several days of exposure to high temperatures and inadequate or unbalanced replacement of fluids.
 - **Signs:** cool, moist, pale or flushed skin
 - heavy sweating
 - headache
 - nausea
 - dizziness
 - weakness
 - Cool the victim by: providing cool, nonalcoholic beverages
 - rest in a cool or air-conditioned environment
 - cool shower, bath, or sponge bath
 - If the person vomits or begins to lose consciousness, **get medical assistance immediately!**
- **Heat cramps.**
 - Muscle pains or spasms (usually in the legs or abdomen) that occur in association with loss of fluids and electrolytes following strenuous activity.
 - Often an early sign the body is having trouble with heat.
- **Sunburn.**
 - Damage to the skin that significantly slows the skin's ability to release heat.
 - Usually minor discomfort that heals in a week.
 - Severe sunburn may require medical attention.
- **Heat rash.**
 - Skin irritation caused by excessive sweating during hot, humid weather.

Information adapted from publications by the Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, Federal Emergency Management Agency, and the American Red Cross.

DROUGHT

Droughts occur when areas receive less rainfall than expected over an extended period of time, usually several months or longer. All areas in the United States are at risk of drought.

A prolonged drought can have a serious impact on agricultural communities, affecting crops, livestock and families dependent on these commodities. The greatest impact from drought is of course the decrease in water supplies. Reduced water resources reduce crop and forage growth and can ultimately result in crop loss.

The impact of drought on livestock can be devastating, and can result in increased animal death. Limited water supplies occur during a time when the water needs are increased. Feed availability can become limited, impacting animal production. Plants can also concentrate toxins under drought conditions, making them lethal to livestock.

Drought conditions can increase the level of disease and insect infestations for plants and livestock. The dry conditions can also lead to wind erosion of top soil, or increase the risk for fire hazards, and given decreased water sources, can result in devastating losses.

Drought also impacts agricultural communities. Families may have water limitations or restrictions in efforts to conserve limited water resources. Businesses that are directly related to agricultural production or that provide goods and services to farms can face reduced business and the need for closure.

The U.S. Drought Monitor site (<http://droughtmonitor.unl.edu>) synthesizes data from multiple sources to map and monitor potential drought situations in the U.S. Maps and data on drought intensity and impact are updated weekly (see Figure 7). The National Integrated Drought Information System (www.drought.gov) is a multi-agency website with drought related information including early warnings, with previous drought comparisons, as well as plans for future droughts.

Planning ahead can help protect your family, livestock and crops. The following factsheets provide suggestions to minimize the impact and speed the recovery from drought situations.

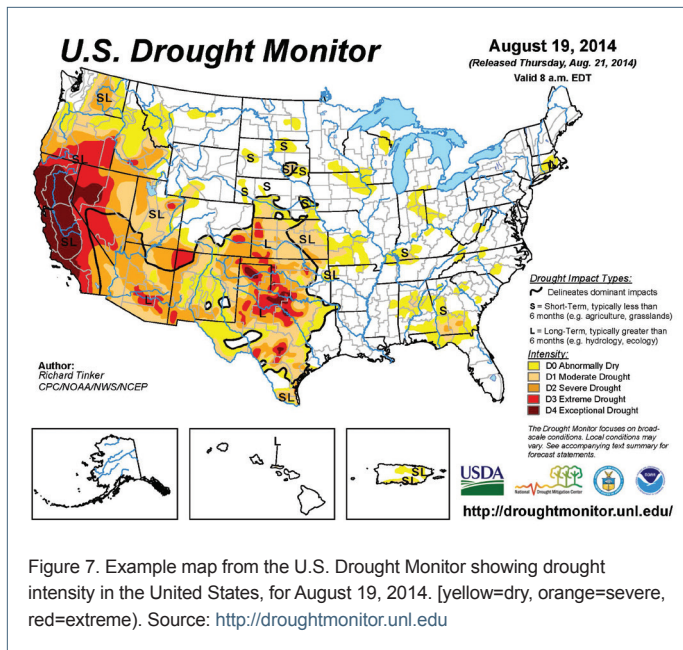


Figure 7. Example map from the U.S. Drought Monitor showing drought intensity in the United States, for August 19, 2014. [yellow=dry, orange=severe, red=extreme]. Source: <http://droughtmonitor.unl.edu>

Monitor potential drought conditions in your area
at the U.S. Drought Monitor website.
<http://droughtmonitor.unl.edu/>

References

1. University of Wisconsin Extension. The Disaster Handbook. <http://www.uwex.edu/ces/news/handbook.html>
2. U.S. Drought Monitor site. <http://droughtmonitor.unl.edu/>
3. The National Integrated Drought Information System. www.drought.gov
4. National Sustainable Agriculture Information Service (ATTRA). <http://www.attra.org/>



Each person uses 80-100 gallons of water per day. During periods of drought, it is important minimize water use to ensure enough is available for everyone. Here are some tips to help your household during periods of drought.

Before a Drought

- **General water conservation measures.**
 - Check your faucets, pipes and toilets for leaks; even a small faucet leak can waste as much as 20 gallons of water.
 - Do not pour water down the drain when there may be another use for it (e.g., watering plants or a garden).
 - When purchasing a new appliance, choose one that is more energy and water efficient.
- **Conserve water in the bathroom**
 - Turn off the water while you brush your teeth, wash your face, or shave, instead of leaving the faucet running.
 - Install aerators with flow restrictors on all household faucets.
 - Replace your shower heads with low-flow heads, which use less water.
 - Install a low-flow toilet to replace your existing model; this can cut your home water consumption by 20 percent.
 - Install a toilet displacement device.
 - Place a 1 gallon jug of water to displace toilet flow.
 - Do not use a brick, it may dissolve and loose pieces may cause damage to internal parts.
- **Conserve water in the kitchen.**
 - Run your dishwasher only when it is full; select the water-saving cycle, if you have that feature.
 - Store drinking water in your refrigerator to avoid the need to run water in the sink to get it cold.
 - Clean fruits and vegetables in a pan filled with water rather than running water from the tap; reuse the water in the pan for other purposes (e.g., watering plants).
 - Hand wash dishes by filling two containers – one with soapy water, the other with rinse water containing a small amount of chlorine bleach.
 - Avoid rinsing dishes prior to putting them in a dishwasher to conserve water.
 - Kitchen sink disposals require lots of water to operate properly; start a compost pile as an alternate method of disposing food waste.
- **Conserve water while doing laundry.**
 - Operate automatic clothes washers only when they are fully loaded.
 - Set the water level for the appropriate size of your load to avoid wasting water.

- **Conserve water outdoors.**
 - Do not overwater your lawn. Lawns only need to be watered every five to seven days in the summer.
 - Water lawns during the early morning hours when temperatures and wind speed are the lowest; this reduces evaporation and waste.
 - Plant native and/or drought-tolerant grasses, ground covers, shrubs and trees that can survive dry periods without watering.
 - Use mulch to retain moisture in the soil.

During a Drought

- **Stay informed.**
 - Monitor potential drought conditions in your area at the U.S. Drought Monitor website.
<http://droughtmonitor.unl.edu>
 - Listen to the radio or television for situation developments and instruction for water conservation or restrictions for your area.
- **Increase your water conservation measures.**
 - Limit how much water each person may use.
 - Do not flush toilets if it is not necessary.
 - Wash things only when it is necessary to do so. Only wash a full load.
 - Do not take baths; take short showers instead. Turn on the water to get wet and rinse; lather with the water off.
 - Use bottled water when possible, such as for brushing your teeth, washing your face or hands.

After a Drought

- **Once the situation is over, it is still important to continue to conserve water for future droughts.**
 - Continue to be aware of how much water is used on a daily basis.
 - Make changes to your home to conserve water.

Information adapted from publications by the University of Wisconsin Extension Service, Federal Emergency Management Agency, and the American Red Cross.



DROUGHT AND YOUR LIVESTOCK

Natural Disasters

The impact of drought on livestock can be devastating. Limited water supplies occur during a time when the water needs are increased. Feed availability can also become limited. Plants can also concentrate toxins making them lethal to livestock. Planning ahead can help protect the health and well-being of your livestock.

Before a Drought

- **Keep up-to-date forage inventories.**
 - Accurate records of available feedstuffs can help you determine available feed supplies during drought situations.
- **Develop an emergency plan for water and feed resources.**
 - Obtain emergency supplies of forage and grain.
 - Alternative feed sources
 - Additional grazing areas
 - Identify emergency resources for water.
 - Plant alternative forage crops.
- **Good land management before a drought provides greater flexibility when droughts occur.**
 - Maintain healthy soils.
 - Balance stocking rates and land resources.
 - Adjust the stocking rate to the point where only 75% of the available forage is utilized.

During a Drought

- **Provide quality water sources.**
 - Ensure animals have a supply of cool, clean water.
 - Truck water in for livestock.
 - Monitor the water temperature and keep it cool.
 - Monitor water sources, such as watering hole, streams and ponds, which can dry out during drought conditions.
 - Check water delivery systems periodically for proper function.
 - Dry conditions can lead to undrinkable or toxic water sources. Have water quality testing performed.
 - Concentration of naturally occurring salts and minerals can be harmful to animal health.
 - Increased nutrients in water can lead to increased growth of blue-green algae, which can be toxic.

- **Feed management.**
 - Avoid overgrazing or overstocking of pasture and rangeland. Forages should never be grazed “to the roots” under any circumstance.
 - Drought situations can also result in increased grazing by livestock on toxic plants.
 - Move animals to additional pastures. This may involve moving them out of the drought affected area.
 - Providing supplemental feed (e.g., grains, hay) may be necessary.
 - Non-traditional feedstuffs may be an option.
 - Lease additional pastures.
 - Supplemental minerals, vitamins or energy sources may be needed.
- **If feed shortages occur,**
 - You may need to limit the number of animals to conserve water and reduce feed demand.
 - Sell unproductive animals. This option is best considered before the drought becomes too severe.
- **Monitor animals for illness.**
 - If your animals show signs of illness, contact your local veterinarian immediately!
 - **Signs of dehydration:** rapid, shallow breathing
 - reluctance to move
 - weight loss
 - drying of mucous membranes (e.g., eyes, nose, mouth)
 - decreased skin flexibility
 - **Signs of heat stress:** increased respiration rate or panting
 - excessive salivation
 - elevation of the head to make it easier to breathe
 - open mouth breathing

After a Drought

- **If you plan to feed drought damaged crops (e.g., feed, forages) to livestock, be aware of these issues:**
 - Drought conditions can reduce the nutritional quality of forages and lower forage succulence (and protein content).
 - Dry forages are harder to digest.
 - Drought conditions increases plant toxicities (e.g., nitrates, mycotoxins).
 - Test harvested feed and forages for nutrient content and potential toxins prior to feeding.
- **See your county extension office about drought assistance programs and the enrollment process.**

Information adapted from publications by the University of Wisconsin, North Dakota State University, and South Dakota State University Extension Services, the USDA Natural Resources Conservation Service, and National Sustainable Agriculture Information Service (ATTRA).



A prolonged drought can have a serious impact on crops. Decreased precipitation reduces crop and forage growth and can ultimately result in crop loss. Weakened plants are also more susceptible to disease and insects. Drought conditions can increase the level of wind erosion of top soil and the risk of fires. Planning ahead can help protect your crops during drought situations.

Before a Drought

- **Crop management ideas.**
 - Plant crops that withstand dryness, hold water, and reduce the need for irrigation.
 - Rotate crops in ways that increase the amount of water that enters the soil.
 - Shift to cropping systems that are less water dependent than your current system.
- **Land management ideas.**
 - Good land management before a drought provides greater flexibility when droughts occur.
 - . Maintain healthy soils.
 - . Balance stocking rates on pasture areas; do not allow overgrazing.
 - Try to use minimum tillage techniques.
 - . Leaving crop residue from the previous year on the surface can help to minimize evaporation of moisture from the soil.
 - Use conservation practices to reduce runoff, erosion, soil degradation and encourage infiltration of water into the soil.
 - . Establish riparian buffers, filter strips, grassed waterways, and other types of conservation buffers near streams and other sources of water.
 - . Use conservation practices such as crop rotation, contoured row crops, terracing, windbreaks, etc.
- **If irrigation systems are currently used,**
 - Select irrigation systems that will minimize loss of water by evaporation, percolation, and runoff.
 - Make your existing irrigation system more efficient and easier to maintain.
 - Build a water storage system that holds water for use during irrigation season.
 - Install measuring devices that keep track of water use.
 - Identify alternate water sources (e.g., springs, deep wells).
- **Weed management and control.**
 - Weeds, like other plants, consume large quantities of water. Competition for water can lead to reduced crop production.
 - Lack of water can lead to reduced herbicide effectiveness as the efficacy of most herbicides depends on water.
 - Mechanical weed control measures may be needed.

- **The Drought Management Calculator (DMC).**

- Developed by the USDA Natural Resources Conservation Service (NRCS).
- Tool to help ranchers and farmers assess the impacts of drought on forage production, enabling them to make better informed decisions as to alternative drought strategies.
http://www.nrcs.usda.gov/wps/portal/nrcs/detail/nd/technical/landuse/pasture/?cid=nrcs141p2_001670

After a Drought

- **Have your soil tested.**
 - Herbicide and fertilizer carry over may occur, so soil testing is very important following a drought year.
- **If you plan to feed drought damaged crops (e.g., feed, forages) to livestock, be aware of these issues:**
 - Drought conditions can reduce the nutritional quality of forages and lower forage succulence (and protein content).
 - Dry forages are harder to digest.
 - Drought conditions increases plant toxicities (e.g., nitrates, mycotoxins).
 - Test harvested feed and forages for nutrient content and potential toxins prior to feeding.
- **See your county Extension office about drought assistance programs and the enrollment process.**

Information adapted from publications by the University of Wisconsin, North Dakota State University, and South Dakota State University Extension Services, the USDA Natural Resources Conservation Service, and National Sustainable Agriculture Information Service (ATTRA).

WINTER STORMS

Severe winter storms can have a tremendous impact on individuals, animals, and communities. Extremely cold temperatures combined with snow, ice or sleet, blizzard conditions with high winds and dangerous wind chills can all occur.

Winter storms can last for days. Accumulations of snow and ice can result in road closures or blockages – isolating homes and farms for days. Roofs may collapse due to heavy weight burden and knock trees and power lines down resulting in power outages and subsequent loss of heat in homes. Dangerous driving conditions can lead to travelers being stranded on the road.

The Wind Chill Temperature Index (Figure 8) is used to quantify the risk of danger of winter temperatures. High winds, combined with cold temperatures speeds the rate of heat loss to the body, especially exposed skin. As the speed of the wind increases, heat can be carried away from your body much more quickly, causing skin temperature to drop. When there are high winds, serious weather-related health problems are more likely.

Prolonged exposure to low temperatures, wind or moisture can result in serious or life threatening conditions, such as frost bite or hypothermia. Each year, dozens of Americans die due to cold-related illnesses with additional fatalities occurring from vehicle accidents, fires following the misuse of heaters, and other winter weather fatalities (e.g., carbon monoxide poisoning).

Animals are also at risk during severe winter weather and are subject to wind chill factors, hypothermia and frostbite, just as humans are. Unprotected livestock may be lost. Deaths can also occur due to dehydration, when water sources freeze and become unavailable. Winter conditions may make getting food and water to animals more difficult.

Businesses must also make preparations for winter storm situations. Protection of their employees will be necessary to ensure their safety. Employees that must work outdoors during extreme situations should be provided the necessary education on risk and measures to stay safe.

The following factsheets will help you prepare your family, home and farm, animals and business in efforts to minimize the impact and speed the recovery from winter storm situations.

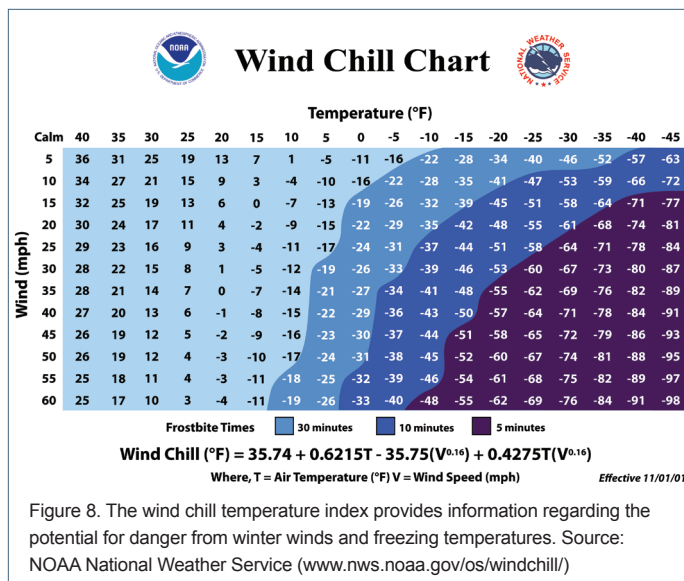


Figure 8. The wind chill temperature index provides information regarding the potential for danger from winter winds and freezing temperatures. Source: NOAA National Weather Service (www.nws.noaa.gov/os/windchill/)

Monitor winter conditions in your area
at the National Weather Service website.
<http://www.weather.gov>

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2. National Safety Council. http://www.nsc.org/safety_home/SafetyObservances/Pages/WinterSafety.aspx
3. American Red Cross. <http://www.redcross.org/prepare/disaster/winter-storm>
4. NOAA National Weather Service. Winter Storms: The Deceptive Killers. http://www.nws.noaa.gov/om/winter/resources/Winter_Storms2008.pdf



Winter storms can bring freezing temperatures, large quantities of snow and ice, high winds and blizzard conditions. As a result, hazards to you and your family's health are possible. Preparing before the storm can help you protect your family.

Before a Winter Storm: Prepare Your Family

- **Stay informed.**
 - Monitor for severe winter weather in your area at the NOAA National Weather Service. <http://www.weather.gov/>
- **Know the terminology.**
 - **Winter Storm Watch:** Severe winter conditions, such as heavy snow and/or ice, are possible for your area in the next 12 to 36 hours. Prepare now!
 - **Winter Storm Warning:** Severe winter conditions are expected in the next 12-24 hours; 4-6 inches of snow or sleet, or 1/4 inch or more of ice is expected. Seek shelter immediately!
 - **Blizzard Warning:** Snow and strong winds (gusts up to 35 mph or greater) will combine to produce a blinding snow (near zero visibility), deep drifts, and life threatening wind chill; expected to occur for three hours or longer.
- **Prepare an emergency kit.**
 - Food, water and necessities for all members of the family to last 3 to 5 days; high energy food (e.g., dried fruit) or canned food that require no cooking or refrigeration is best
 - Any medications needed for family members
 - First aid kit, battery powered radio, flashlight with extra batteries
 - Sleeping bags or blankets
 - Extra clothing and boots, hats, mittens
 - Fire extinguisher
 - Emergency contact numbers
- **Family communication plan.**
 - Inquire about emergency plans at places where your family spends time: work, daycare and school.
 - Have a plan of how you will contact each other if you are in separate locations or establish a location to meet.
 - Have an out-of-state relative or friend serve as the family contact person.
 - Learn the location of the emergency shelters for your area.

Before a Winter Storm: Prepare Your Vehicle

- **Prepare your car for winter.**
 - Have your car systems serviced; check the battery, antifreeze, wipers, etc.
 - Replace wiper fluid with a wintertime mixture.
 - Replace worn tires; check the air pressure in the tires.
 - Keep the gas tank full to avoid ice in the tank or fuel lines.
- **Prepare a survival kit for your car that includes:**
 - Blankets/sleeping bags
 - Extra winter clothes (mittens, hats, scarves), boots
 - High calorie, non-perishable food (e.g., unsalted nuts, dried fruit); hard candy can help keep your mouth moist
 - A can and waterproof matches to melt snow for drinking water
 - Flashlight, extra batteries, battery powered radio, first aid kit
 - Shovel, windshield scraper
 - Road salt, sand or cat litter
 - Cell phone and charger
 - Jumper cables, tow rope, tool kit
 - Compass and road maps

During a Winter Storm

- **Stay informed.**
 - Listen to local news and weather channels for situation developments and road closures.
- **Stay inside.**
 - Avoid traveling during the storm period.
 - This can help you avoid injuries from cold temperatures, slips on the ice or car accidents.
- **Gather your emergency supplies.**
 - Be prepared for power outages or conditions requiring you to remain at home for several days.
- **Stay safe while indoors.**
 - Use fireplace, wood stoves, or other combustion heaters only if they are properly vented to the outside.
 - Use battery-powered flashlights or lanterns.
 - Avoid using candles; if they are used never leave them unattended while lit.
 - If you lose power or heat to your home and do not have back-up heat options, go to a designated public shelter.
- **Stay nourished.**
 - Eat to provide your body with energy to produce its own heat.
 - Keep your body replenished with fluids to prevent dehydration.



WINTER STORMS AND YOUR FAMILY

Natural Disasters

• Cooking safety.

- Never use charcoal grills or portable gas camp stove indoors—the fumes can be deadly.

• If you have to go outside,

- Dress warmly and in layers; loose-fitting, lightweight, warm clothing is best.
- Wear a hat; most body heat is lost through the top of the head.
- Cover your mouth with a scarf to protect your lungs from cold temperatures.
- Stay dry to avoid frostbite and hypothermia.
- Avoid ice. Many cold-weather injuries result from falls on ice-covered sidewalks, steps, driveways, and porches.
- Avoid exertion. Cold weather puts an extra strain on the heart. If you have heart disease or high blood pressure, follow your doctor's advice about shoveling snow or performing other hard work in the cold.

• If you are caught outside during a storm,

- Try to find a shelter out of the wind.
- Stay dry and cover all exposed parts of your body.

• If you must travel,

- Do so during daylight.
- Don't travel alone.
- Stay on main roads.
- Tell others about your route and schedule.

• If you get stranded in your vehicle,

- Stay calm! Staying in your vehicle is often the safest choice.
- Turn on your hazard lights.
- Make yourself visible to rescuers:
 - Tie a distress flag (preferably red) to your antenna or window.
 - Turn on the dome light at night, but only when running the engine. You don't want to wear down your battery.
- Run the motor/heater for only about 10 minutes per hour.
 - Open a window slightly to let fresh air in.
 - Make sure snow is not blocking the exhaust pipe to avoid potential carbon monoxide poisoning.
- As you sit, keep moving your arms and legs to improve your circulation and stay warmer.
- Drink fluids to remain hydrated.
- Do not leave your car unless you know exactly where you are, how far it is to possible help, and you are certain this action will improve your situation.
- Do not let all occupants of the car sleep at once; one person should always remain awake.

After a Winter Storm

• Check on neighbors to see if they need help.

• Clear away the snow safely.

- Wear sturdy shoes or boots, layered clothing, hat and gloves.
- Do not overexert yourself. Shoveling causes many heart attacks, especially in very cold temperatures.
- Pace yourself, work slowly, and rest frequently.
- Take your time and lift small amounts.
- Lift snow/shovel properly to avoid back injuries.
- Make sure you have good footing when lifting the snow shovel.

• Use caution with gas powered equipment.

- Dangerous carbon monoxide can be generated by gas-powered equipment as well as alternative heating sources.
- Use these items only in well ventilated areas.
- **Signs:** dizziness • light-headedness • nausea

• Once the blizzard is over, you may need to leave your vehicle and proceed on foot.

- Follow the road if possible.
- If you need to walk across open country, use distant points as landmarks to help maintain your sense of direction.

Cold-Related Illnesses

• If any of these conditions are suspected, **SEEK MEDICAL CARE IMMEDIATELY!**

• Frostbite.

- Can occur following prolonged exposure to low temperatures, wind or moisture.
- **Signs:** white, waxy or pale appearance to extremities (e.g., fingers, toes, nose, ear lobes); skin is cold and numb

• Hypothermia.

- Occurs when the core body temperature drops to a level at which normal muscle and brain functions are impaired.
- **Signs:** extreme shivering • confusion or disorientation • memory loss • slurred speech • drowsiness • exhaustion
- If you can't get help quickly, warm the person's body **SLOWLY** and start with the body core first, **NOT** the extremities.
- Do not give the person any alcohol, coffee or any **HOT** beverage or food. Warm broth or food is better.

Information adapted from publications from the Federal Emergency Management Agency, the Centers for Disease Control and Prevention, the American Red Cross, and the National Safety Council.



Winter storms can bring freezing temperatures, large quantities of snow and ice, high winds and blizzard conditions. Damage to your home or power outages lasting several days may be possible. Preparing before the storm can help you protect your family and your home.

Before a Winter Storm

- **Weatherproof/winterize your home.**
 - Caulk and weatherstrip doors and windows.
 - Add insulation, insulated doors, storm windows, or thermal-pane windows.
 - Insulate any water lines that run along exterior walls so they will be less likely to freeze.
 - Know how to shut off water valves (in case a pipe bursts).
- **Determine a back-up heating source in case the power goes out.**
 - Gas or log fireplace with plenty of dry firewood
 - Portable space heaters or kerosene heaters
 - Check with your local fire department to make sure that kerosene heaters are legal in your area.
 - Use heating sources only in a well ventilated room to avoid build up of lethal carbon monoxide gas.
 - Keep a fire extinguisher close by.
 - Have your chimney or flue inspected each year.
- **Install a smoke detector and a battery-operated carbon monoxide detector near the area to be heated.**
 - Test them monthly.
 - Replace batteries twice yearly.

During a Winter Storm

- **Keep as much heat as possible inside your home.**
 - Check the temperature in your home often during severely cold weather.
 - Avoid unnecessary opening of doors or windows.
 - Close off unneeded rooms.
 - Stuff towels or rags in cracks under doors.
 - Close draperies or cover windows with blankets at night.
- **Use battery-powered flashlights or lanterns rather than candles, if possible.**
 - Never leave lit candles unattended.
- **Leave all water taps slightly open so they drip continuously.**

- **If back-up heating sources are needed**
 - Never place a space heater on top of furniture or near water.
 - Use electric space heaters with automatic shut-off switches and non-glowing elements.
 - Keep heat sources at least 3 feet away from furniture, drapes, or bedding.
 - Never cover a space heater.
 - Never leave children unattended near a space heater.
- **If backup power supplies are needed,**
 - Never use an electric generator indoors, inside the garage, or near the air intake of your home because of the risk of carbon monoxide poisoning.
 - Do not store gasoline indoors where the fumes could ignite.
 - Use individual heavy-duty, outdoor-rated cords to plug in other appliances.
- **Never use a charcoal or gas grill indoors—the fumes are deadly.**
 - Dangerous carbon monoxide can be generated.

After a Winter Storm

- **Assess the situation.**
 - Make sure heating systems are working.
 - Make sure water pipes are working.
 - Look for any damage that may have occurred to your home.
- **If your pipes do freeze,**
 - Do not thaw them with a torch.
 - Instead, thaw them slowly by directing the warm air from an electric hair dryer onto the pipes.
- **Carbon monoxide poisoning**
 - Buildup of this odorless, lethal gas can occur from the use of alternate fuel sources, or gas powered equipment or vehicles.
 - Ensure good ventilation is available before using any of these items.
- **If there are no other problems, wait for streets and roads to be plowed before you drive anywhere.**

Information adapted from publications from the Federal Emergency Management Agency, the Centers for Disease Control and Prevention, the American Red Cross, and the National Safety Council.



WINTER STORMS AND YOUR PET

Natural Disasters

Winter storms can impact animal health as well as human health. Pets exposed to prolonged cold and wind chills increase their risk for cold-related illnesses. Prepare now to protect your pets during winter storms.

Before the Winter Storm

- **Stock up on food for your pet.**
 - In the event of road closures, be sure to have extra food available for your pet.
 - If your pet is on continual medications, have at least a two-week supply on hand.
- **Identification.**
 - All pets should have some sort of identification (collar with tag, microchip).
 - Take a photo of the pet and keep it with the medical records.
 - Include any proof of ownership materials (e.g., registration, proof of purchase, adoption records, microchip information).

During a Winter Storm

- **Bring your pets inside immediately.**
 - Bring pets indoors, into the house or garage, to provide warm shelter.
 - Keep pets away from any alternate heating sources being used to avoid burns.
- **If you can't bring them inside,**
 - Provide adequate shelter to keep them warm.
 - NEVER leave your pet chained outside or enclosed in a way they cannot escape danger.
 - Pets that live outdoors should be fed a bit more in the winter because they need the extra calories to stay warm.
 - Remember to provide fresh water and ensure that the water does not freeze.
 - Check often to make sure that access to food and water is not blocked by snow drifts, ice or other obstacles.
 - Use a plastic dish to prevent your pet's tongue from freezing to a metal bowl.
- **If your pet goes outdoors,**
 - Most long-haired or full-coated dogs do fine in winter with just their own, natural coats.
 - Shorter-coated dogs need a dog coat to protect them from the wind, snow, and cold.
 - Check their paws upon their return to make sure that ice is not building up between the toes, or that salt or ice melt is not irritating the skin.
 - Never leave your pet alone in the car for prolonged periods during the winter. Your car can become a freezer quickly.
 - Check underneath your car's hood for small animals (like cats) that may have crawled inside seeking warmth.

Winter-Related Illnesses

Prolonged exposure to low temperatures, wind or moisture can result in cold-related illness for pets.

- **If any of these conditions are suspected, SEEK VETERINARY CARE IMMEDIATELY!**
- **Antifreeze.**
 - Ingesting anti-freeze can be fatal for your dog or cat. If you spill some, soak it up immediately.
- **Frostbite.**
 - Pets can get frostbite very easily on the ears, tail and paws. If your pet goes outdoors, be aware of the temperature and wind chill.
 - Signs may not be immediately obvious and may not show for several days.
 - **Signs:** white, waxy or pale appearance to extremities (e.g., toes, nose, ears, tail); skin is cold and numb with loss of feeling; sloughing of skin.
- **Hypothermia.**
 - Occurs when the core body temperature drops to a level at which normal muscle and brain functions are impaired.
 - Pets can become hypothermic after being in cold temperatures for long periods of time or from being wet in cold conditions.
 - **Signs:** extreme shivering • slow, shallow breathing, • gums may be pale or blue, • animal may be unresponsive
 - Warm the animal's body **SLOWLY** and start with the body core first, **NOT** the extremities.
 - Do not give the animal anything **HOT** to drink. Warm broth or food is better.

Information adapted from publications from the American Veterinary Medical Association and the American Animal Hospital Association.



The impact of winter storms on farms can involve a number of issues. Farm buildings can be damaged due to heavy snow or ice accumulation. Power failures or fuel shortages can impact animal production. Prepare now to protect your farm during winter storms.

Before a Winter Storm

- **Stay informed.**
 - Monitor for severe winter weather in your area at the NOAA National Weather Service. <http://www.weather.gov/>
- **Know the terminology.**
 - **Winter Storm WATCH:** Severe winter conditions, such as heavy snow and/or ice, are possible for your area in the next 12 to 36 hours. Prepare now!
 - **Winter Storm WARNING:** Severe winter conditions are expected in the next 12-24 hours; 4-6 inches of snow or sleet, or 1/4 inch or more of ice is expected. Seek shelter immediately!
 - **Blizzard WARNING:** Snow and strong winds (gusts up to 35 mph or greater) will combine to produce a blinding snow (near zero visibility), deep drifts, and life threatening wind chill; expected to occur for three hours or longer.
- **Be prepared for power outages or conditions requiring you to remain at home for several days.**
- **Develop an emergency plan for water and feed resources.**
 - Obtain emergency supplies of forage and grain.
 - Identify emergency resources for water.
 - Have a list of suppliers, truckers, and people that can help with the animals, especially if normal working conditions are disrupted.
- **Stockpile emergency materials.**
 - Standby electric generator for emergency power
 - Sandbags, shovel, road salt or ice melt
- **Winterize any buildings that may provide shelter for your family, livestock or equipment.**
 - Install storm shutters, doors, and windows.
 - Caulk and weatherstrip doors and windows.
 - Check the roof structure for its ability to hold heavy weight accumulations of snow and ice.
 - Repair any roof leaks.
 - Add insulation, insulated doors, storm windows, or thermal-pane windows.
 - Insulate any water lines that run along exterior walls so they will be less likely to freeze.

During a Winter Storm

- **Stay informed.**
 - Listen to local news and weather channels for situation developments and road closures.
- **Have an emergency plan in place for farm workers.**
 - Have shelter and extra food, water, and blankets.
- **If you are caught outside during a storm,**
 - Try to find a shelter out of the wind.
 - Stay dry and cover all exposed parts of your body.

After a Winter Storm

- **Stay safe during cleanup.**
 - Wear sturdy shoes or boots, layered clothing, hat and gloves.
 - Avoid overexertion. Strain from the cold and the hard labor could cause a heart attack - a major cause of death in the winter.
 - Pace yourself, work slowly, and rest frequently.
 - Make sure you have good footing when lifting the snow shovel.
 - Take your time and lift small amounts.
 - Lift snow/shovel properly to avoid back injuries.
- **Use caution with gas powered equipment.**
 - Dangerous carbon monoxide can be generated by gas-powered equipment as well as alternative heating sources.
 - Use these items only in well ventilated areas.
- **Account for your inventory.**
 - Note any livestock losses.
 - Check buildings and fences for damage (e.g., downed power lines or trees, accumulated snow or ice).
 - Take photographs of all damage for insurance or emergency assistance purposes.

Information adapted from publications from the University of Wisconsin Extension Service, the American Red Cross, and the National Safety Council.



WINTER STORMS AND YOUR LIVESTOCK

Natural Disasters

Winter storms can be stressful to livestock, especially those kept outdoors. Wind chills and prolonged cold increases their need for shelter, food and water. Dehydration can be a great hazard during winter storms. Prepare now to protect your livestock during winter storms.

Before a Winter Storm

- **Develop an emergency plan of action.**
 - How will you get feed supplies in the case of road closures?
 - How will you supply water with freezing temperatures?
 - Plan ahead for emergency or alternative heat sources (e.g., for poultry facilities).
 - How will a power outage or fuel shortage impact the care and well-being of my livestock? What back up plan would you use?
 - Have well maintained backup generators for livestock production operations.
 - How will needed services (e.g., milk pickup) be provided? Or what will you do if needed services are not provided due to road closures?
- **Maintain an inventory.**
 - Keep a current list of all animals on your farm.
 - Include their location and any records of vaccinations, testing and ownership.
 - Make sure animals have some form of permanent identification (e.g., ear tags, tattoos).
 - Establish a list of suppliers, truckers, and people that can help with the animals, if needed.
- **Set up shelter or windbreak areas for animals kept outdoors.**
 - Shallow open front sheds
 - Windbreaks or timber-covered lowlands
 - Solid sided feed wagons can serve as temporary wind protection; place plywood or bales of straw under wagon to block the wind.
- **Winterize any building that may provide shelter for your livestock.**
 - Check roof structure and stability to hold the heavy weight of accumulated snow and ice.
 - Repair any roof leaks.
 - Install storm shutters, doors, and windows.

During a Winter Storm

- **Provide food.**
 - Haul extra feed to feeding areas.
 - Check mechanized feeders in case of power outages; provide for emergency feeding procedures.
 - Provide enough space for all animals to get to the feed.

- **Provide water.**
 - Remove ice buildup around waterers.
 - Use heaters in water tanks.
 - If pipes freeze or power is out you may need to haul water to animals.
- **Provide shelter.**
 - If possible, move animals to an indoor shelter or building, especially the young.
 - Provide additional bedding to keep animals insulated from the ground and keep them dry.
 - Place sand or other non-toxic gritty material on icy feedlots to provide good footing.
 - Ensure heaters are working properly and are located in an area with adequate ventilation.
- **Ensure adequate ventilation in the building.**
 - If mechanically ventilated facilities are not functioning properly, animals could suffocate from lack of oxygen.
 - Open vents to facilitate natural air flow.
 - Clear ice and snow from vents.

After a Winter Storm

- **Animal disposal.**
 - Record any animal deaths.
 - Check with your state or local authorities for proper disposal methods for animal carcasses.
- **Check fences and buildings for damage from downed tree branches, contact with downed power lines, or inoperable electric fencing.**
- **Monitor animals daily for signs of illness dehydration, frostbite or hypothermia.**
 - If any of these conditions are suspected, **SEEK VETERINARY CARE IMMEDIATELY!**

Cold-Related Illnesses

- **Frostbite**
 - Extremities (ears, tail) are particularly subject to frostbite. Male reproductive organs may be affected and impair animal fertility. Frozen or chapped teats will impact milk production.
 - Signs may not be immediately obvious or show for several days and may include white, waxy or pale appearance to affected area, sloughing of freeze-damaged tissue.
- **Hypothermia**
 - Signs: extreme shivering • increased respiration • confused, erratic or clumsy behavior; especially young animals.

Information adapted from publications from the University of Wisconsin and University of North Dakota Extension Service.



Severe winter weather can lead to property damage, employee illness or injury, and possible business closures. Preparing before the storm can help you protect your employees, minimize damage and recover quicker following a winter storm situation.

Before a Winter Storm

- **Stay informed.**
 - Monitor for severe winter weather in your area at the NOAA National Weather Service. <http://www.weather.gov/>
- **Know the terminology.**
 - **Winter Storm Watch:** Severe winter conditions, such a heavy snow and/or ice, are possible for your area in the next 12 to 36 hours. Prepare now!
 - **Winter Storm Warning:** Severe winter conditions are expected in the next 12-24 hours; 4-6 inches of snow or sleet, or 1/4 inch or more of ice is expected. Seek shelter immediately!
 - **Blizzard Warning:** Snow and strong winds (gusts up to 35 mph or greater) will combine to produce a blinding snow (near zero visibility), deep drifts, and life threatening wind chill; expected to occur for three hours or longer.
- **Stockpile emergency materials.**
 - Standby electric generator for emergency power
 - Sandbags, shovel, road salt or ice melt
- **Establish shelter locations on your property.**
 - There should be enough room for all employees, any customers or suppliers who may be at your business during the hazardous situation.
 - Stock the shelter with emergency supplies (e.g., flashlights, battery powered radio, first aid kit, food, water, and blankets).
- **Make plans regarding customers.**
 - Determine the likelihood of customers being present if a severe storm situation.
 - Have an emergency plan for customers; review it with employees regularly.
- **Have a business emergency/continuity plan**
- **Be prepared for power outages that often accompany severe weather.**
 - Determine any essential equipment or processes that rely on electrical power.
 - Have emergency power (e.g., backup generators) available for these items.
 - Maintain an inventory of all equipment and assets for your business in the event of structural damage.
 - Install surge protectors to protect electronic equipment.

- **Determine a back-up heating source in case the power goes out.**
 - Use heating sources only in a well ventilated room to avoid build up of lethal carbon monoxide gas.
 - Keep a fire extinguisher close by.
- **Install a smoke detector and a battery-operated carbon monoxide detector near the area to be heated.**
 - Test them monthly.
 - Replace batteries twice yearly.
- **If employees work outdoors,**
 - Schedule work during the morning and late-afternoon hours, if possible.
 - Avoid strenuous activities outdoors.
 - Postpone nonessential tasks.

During a Winter Storm

- **Stay informed.**
 - Listen to local news and weather channels for situation developments and road closures.
- **Ensure employee and customer safety.**
- **Stay safe while indoors.**
- **If backup power supplies are needed,**
 - Never use an electric generator indoors, inside the garage, or near the air intake of your home because of the risk of carbon monoxide poisoning.
 - Do not store gasoline indoors where the fumes could ignite.
 - Use individual heavy-duty, outdoor-rated cords to plug in other appliances.

After a Winter Storm

- **Clear away the snow safely.**
 - Avoid overexertion. Strain from the cold and the hard labor can lead to a heart attack - a major cause of death in the winter.
 - Pace yourself, work slowly, and rest frequently.
 - Make sure you have good footing when lifting the snow shovel.
- **Assess the situation.**
 - Make sure heating systems and water pipes are working.
 - Look for any damage that may have occurred to your home.
- **Account for your inventory.**
 - Check buildings for damage (e.g., downed power lines or trees, accumulated snow or ice).

Information adapted from publications from the University of Wisconsin Extension Service, the American Red Cross, and the National Safety Council.

WILDFIRES

Wildfires have steadily become a more pronounced threat across the United States. Wildfires occur when a combination of weather conditions and fuel loads come together to create favorable conditions for both ignition and spread. Wildfires are most prevalent in the Plain States during the late winter and early spring. In the West, wildfire season generally peaks during the mid to late summer; however, wildfires can occur year-round.

Wildfires pose a particular risk for rural communities because of the vast amount of resources needed to combat them. A large-scale response to a wildfire may last several days to weeks and be made up of a combination of local, state, and federal resources. It is not uncommon to see dozens of local jurisdictions responding collectively to a fire.

Wildfires can severely impact rural communities in a number of ways. Fires can significantly damage infrastructure - homes, barns, sheds, fencing - as well as farm equipment, vehicles, and structural damage to essential services such as electricity and water. If evacuations are necessary, communities will need a plan for short-term or long-term sheltering as well as for dealing with supplies both requested and donated. Livestock or pets that are in the path of a fire may be killed or injured from the fire itself or from smoke inhalation. Even if livestock are not physically injured, the loss of feed, either from burnt pasture land or consumed hay, may make continued livestock production difficult.

Understanding and identifying your risk to wildfires is the first step in potentially limiting their impact on your home, farm, or livestock. The following factsheets provide suggestions to reduce your risk during wildfires, take action during wildfire situations, and recover after a wildfire has impacted your family.

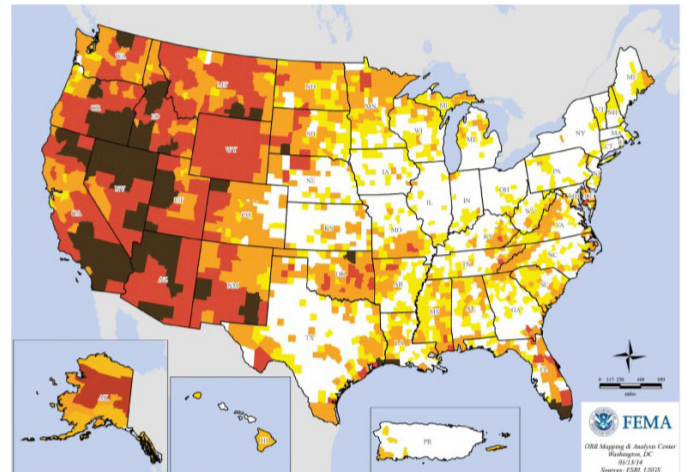


Figure 9. Wildfire activity in the U.S., by county, 1994-2013. The color scale represents the frequency of wildfires greater or equal to 300 acres. Orange 1-20, red 21-100, brown 101-1,308. Yellow indicates counties where the largest wildfires were less than 300 acres. White indicates counties with no recorded wildfires. Source: FEMA/Jana Baldwin <https://www.fema.gov/media-library/assets/images/115288>

Monitor fire weather conditions in your area at the National Weather Service Storm Predictions Center's Fire Weather Outlook Page

www.spc.noaa.gov/products/fire_wx

Monitor large fire incidents at the U.S. Forest Service website

<https://fsapps.nwcg.gov/afm/current.php>

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2. FireWise USA – National Fire Protection Association (NFPA). <http://www.firewise.org/>
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Wildfires can occur anywhere and at anytime. Preparing your family for wildfire situations can help you avoid or minimize injury and speed the recovery process.

Before a Wildfire

- **Determine the risk of wildfire in your area.**
 - NOAA's National Weather Service National Hazards Map at <http://www.weather.gov/>.
 - Fire weather and forecasts, current hazards and fire situations at <https://fsapps.nwac.gov/afm/>.
 - Favorable conditions for wildfires include:
 - High winds, low humidity/dewpoint, above normal temperatures, dormant vegetation, drought conditions.
- **Know the terminology.**
 - A **Fire Weather Watch** is issued when the potential for severe fire weather exists in the near future – usually between 12 and 24 hours in the future, though they can be issued for days in advance.
 - A **Red Flag Warning** is issued to indicate the imminent danger of severe fire weather with a relatively high probability of occurrence.
- **Sign-up for local emergency alerts.**
 - Check with your local emergency management agency or fire department for local emergency alert programs that can be sent directly to your phone, tablet, or other device.
- **Prepare an emergency kit:**
 - Food, water and necessities for all members of the family to last 3 to 5 days
 - Any medications needed for family members
 - First aid kit, flashlight, solar, battery-powered, or crank radio, batteries, fire extinguisher
 - Important family documents (e.g., insurance policies, emergency contact numbers)
- **Develop an evacuation plan.**
 - Learn the evacuation routes and locations of emergency shelters in your area.
 - Identify several escape routes for your location, in case roads are blocked.
 - Have your vehicles loaded and full of fuel, facing the direction of travel.
- **Create a family communication plan.**
 - Determine where you will go and how you will communicate if a fire occurs and an evacuation is needed.
 - Designate an out-of-state relative or friend as the family contact person.

During a Wildfire

- **Stay informed.**
 - Listen to the radio or television for situation developments, evacuation instructions and routes, and road closures.
- **Gather your emergency kit.**
- **If an evacuation order is given, leave immediately.**
 - Do not return for any reason until told it is safe.
 - Let someone know where you are going – a designated emergency shelter, a family member's home, or other location.
 - If possible, take your family pets with you.
- **Drive carefully when evacuating.**
 - Smoke may reduce visibility.
 - Fleeing wildlife or animals may cross the roadway.
 - Debris from the fire may impede your path.
- **Follow evacuation routes and expect heavy traffic.**
- **Take health precautions.**
 - If you have asthma, emphysema, or other respiratory conditions, avoid smoke inhalation.
 - If you must be outside in a smoke-filled area, use an N-95 mask or a dry cloth over your mouth and nose.
- **If you become trapped,**
 - Crouch in a pond, river or pool.
 - Do not put wet clothing or bandanas over your mouth or nose. Moist air causes more damage to airways than dry air at the same temperature.
 - If there is no body of water:
 - Find shelter in a cleared area or among a bed of rocks.
 - Lie flat, face down, and cover your body with soil.
 - Breathe the air close to the ground to avoid scorching your lungs or inhaling smoke.

After a Wildfire

- **Do not return home until authorities tell you it is safe.**
- **Use caution when entering burned areas.**
- **Seek medical attention for injuries as soon as possible.**
 - If you are someone you are with has been burned, call 9-1-1 or seek help immediately.

Information adapted from publications from the Federal Emergency Management Agency, the National Weather Service, and the National Fire Protection Association.



WILDFIRES AND YOUR HOME

Natural Disasters

Many rural homes exist in areas at an increased risk of being affected by wildfires. Follow this guide to prepare and protect your home from a wildfire.

Before a Wildfire

- **Build a defensible space around your home.**
 - Clear all debris within 30 feet of your home.
 - Trim away any branches that may overhang your roof.
 - Keep your lawn trimmed short.
 - Regularly clean the roof and gutters.
 - Remove highly flammable materials, such as evergreen trees, woodpiles, or dead trees, from your property.
 - Prune tree limbs 6 to 10 feet from the ground or 1/3rd the height of the tree.
 - Consider landscaping with less flammable trees or vegetation – generally species with low sap or resin content or with high moisture content like succulents.
 - Store firewood at least 100 feet away from any structures.
 - Maintain a 100-foot-wide defensible space beyond your most distant out building.
 - Connect garden hoses long enough to reach all areas of the home.
 - Fill canisters, such as garbage cans, buckets, or other large containers with water.
- **Maintain proper insurance.**
 - Review your homeowner's policy to ensure that you have proper protection for your home and belongings.

During a Wildfire

- **Stay informed.**
 - Listen to the radio or television for situation updates, evacuation instructions and routes, and road closures.
- **If there is time, and no risk to human life, take steps to protect your home.**
 - Close all entrances, windows, or other openings.
 - Remove flammable drapes.
 - Turn off any home fuel sources (propane) at the source.
 - If you have a sprinkler system, turn it on and leave it on.
- **After evacuating,**
 - Inform firefighters about any potentially hazardous materials on your property (e.g., diesel, pressurized cylinders, or highly combustible material).
- **Sheltering in Place**
 - If no evacuation is ordered, shelter-in-place and be prepared to extinguish incipient fires in attics, guttering, under siding, etc.

After a Wildfire

- **Do not return home until authorities tell you it is safe and allow you into an evacuation zone.**
- **Returning home**
 - Use extreme caution when entering burned areas.
 - Beware of hazards that may exist in areas that have burned – including hot spots, downed power lines, and smoldering items.
 - Check your property often over the next several hours for sparks or embers that may reignite especially on your roof or in the attic.
 - Use caution when moving damaged structures or material.
- **Document any damage to your home.**
 - Photograph damage to property for insurance purposes.
 - Pictures will note the date, time, and location that the damage occurred.
- **Contact your insurance agent for home related losses.**
 - It may be several days before insurance adjusters can make individual visits.
- **Cleaning your home**
 - Wear a dust mask to minimize breathing dust or ash particles.
 - Discard any food that has been exposed to heat, smoke, or soot.
- **Be prepared for the possible disruption of services for extended periods of time, including electric, phone and local food and water sources.**

Information adapted from publications from the Federal Emergency Management Agency, the National Weather Service, and the National Fire Protection Association.



A wildfire can significantly disrupt your farming operation, both during and after an event. By taking steps before a wildfire, this disruption can be limited and recovering from a major incident may be expedited.

Before a Wildfire

- **Monitor and determine the risk of wildfire in your area.**
 - The National Weather Service monitors fire weather and conditions and posts forecasts, current hazards and fire situations. Information is available at <http://www.srh.noaa.gov/ridge2/fire/>.
- **Practice proper rangeland management.**
 - Clear brush or debris piles on an annual basis.
 - Limit growth and spread of highly volatile plant life, such as cedar trees.
 - Keep fence rows and ditches from being overgrown with seasonal weeds, trees, or bushes.
 - If applicable, practice safe seasonal controlled burns.
- **Store equipment in safe locations.**
 - Store fuel, chemicals, tractors, trucks, and other flammable equipment in areas that are fire resistant.
 - Maintain a fire-resistant plot for this purpose.
- **Keep up-to-date records.**
 - Maintain equipment, chemical, and hay/forage inventories.
 - Take regularly updated pictures of farm equipment and structures for reference in case of a loss.
 - Back up your records off site or in a digital location.
- **Protect hay or forage supplies.**
 - If possible, do not store all of your hay, forage, or feed supplies in the same location.
 - Much like your home, create and maintain a defensible space around any barns or feed storage structures.
 - Limit weed and grass growth around hay stored outdoors.
- **Alter day-to-day activities.**
 - Avoid burning on days with high fire danger.
 - Do not use welders during windy and dry conditions.
 - If you are burning, take precautions to create fire breaks and let your local fire department know when and where you will be burning.

During a Wildfire

- **Listen to local officials.**
 - While efforts can be taken to minimize on-farm losses during a fire, the most important step is to listen to local officials for evacuation notices.
 - If an evacuation order is given, leave immediately.

- After evacuating, let firefighters know about any potentially hazardous materials on your property that may be impacted by fire (e.g., farm chemicals, diesel, pressurized cylinders, or highly combustible material such as hay or forage).
- **Move equipment.**
 - If time permits, equipment can be moved to ground that is either fire-resistant or concrete.
- **Assist with water access.**
 - Rural firefighting efforts often struggle with access to adequate water supply. Notify first responders in advance of accessible fill sites on your property.
- **Build fire breaks.**
 - If it can be done safely, creating fire breaks on your property using a plow, disc, or other implement can slow or stop the spread of fire.
 - Only consider this option if fire behavior and spread rates are somewhat predictable. In some cases, fire behavior will be so extreme that this is not a viable option.

After a Wildfire

- **Contact your insurance agent for farm related losses.**
- **Take pictures and document damage to equipment, crops, or structures.**
 - After a fire, take pictures noting the date, time, and location that the damage occurs.
 - In a widespread incident, it may be several days before insurance adjusters can make individual visits—pictures create ground truth for what happened and when.
- **Be careful moving damaged structures or burned hay.**
 - Wooden structures that have been damaged or destroyed by a wildfire may smolder for days or weeks after the initial fire is over.
 - Moving or removing hay that has been tightly stacked can lead to reignition once bales are exposed to oxygen.
- **Determine eligibility for federal assistance.**
 - Federal assistance related to wildfire losses may be available depending on the scope of the incident.
 - This information will be available from your local extension agent or FSA office.
 - State FSA offices can be found at <https://www.fsa.usda.gov/state-offices/index>.

Information adapted from publications from the Federal Emergency Management Agency, the National Weather Service, and the National Fire Protection Association.



WILDFIRES AND YOUR LIVESTOCK

Natural Disasters

Livestock can be lost, injured, or killed during a wildfire. Take the following actions to protect your livestock before a wildfire occurs and speed recovery after a wildfire has passed.

Before a Wildfire

- **Maintain detailed livestock records.**
 - Possible indemnity payments may be based on verifiable livestock records.
 - Records should be backed up in multiple locations, including digitally.
 - Records should be kept for multiple years of production.
 - Include the location of animals and fences on the property.
- **Use clearly distinguishable identification methods.**
 - Make sure animals have some form of permanent identification (ear tags, tattoos, electronic microchips, brands, etc.).
 - Pictures of animals, especially high-value animals such as horses, should also be maintained.
- **Employ land use practices that discourage fire spread.**
 - Limit weeds, debris, or highly flammable trees and bushes in fencerows.
 - Remove woody debris piles in a timely manner.
 - Remove non-native species that may not be suited for your environment.
 - During times of high fire danger or dormant vegetation, practice general fire prevention.

During a Wildfire

- **Above all, ensure the safety of your family and yourself in a wildfire situation.**
- **If it can be done safely, allow for animal movement.**
 - This could mean opening gates, cutting fences, or herding livestock into areas of lower fire risk (e.g. wheat pasture).
- **Proactively corral animals to prepare for off-farm movement.**
 - During a **Red Flag Warning**, some animals, such as horses, could be corralled to allow for fast movement.
 - If you have a vehicle designated for moving livestock, consider having it hitched to a trailer in a position to quickly load and evacuate animals.
 - Only consider this option if you have ample time.
- **Once you leave your property, do not return until told to do so by first responders.**

- **Communicate with neighbors and/or first responders.**
 - If animals are left on your property after you evacuate, let neighbors and first responders know to be on the lookout for your animals.
- **Use emergency identification methods.**
 - If animals are set loose, you can be creative with short-term identification methods.
 - Some producers have used spray paint to add personal identification marks on animals set loose during a wildfire situation.

After a Wildfire

- **Document livestock losses.**
 - Take pictures of dead livestock where they lay.
 - Document the location of livestock where they are found.
 - Do not move livestock until approved by insurance or local, state, or federal authorities.
- **Practice safe and humane euthanasia methods.**
 - Animals may be severely injured after a wildfire and need to be humanely euthanized.
 - Work with local officials to determine the safest and most humane means of euthanasia.
- **Dispose of carcasses.**
 - After documentation has taken place, check with local or state authorities for proper disposal methods (e.g. burial, rendering, composting, etc.)
- **Accept emotional or mental health assistance.**
 - Losing livestock can be a traumatic experience. Accept emotional or mental health resources that may be available after an incident.
 - Seek out help for dealing with long-term emotional stress.
 - Understand that grieving is a natural process after experiencing a major disaster.
- **Apply for federal assistance.**
 - Federal assistance related to wildfire losses may be available depending on the scope of the incident.
 - This information will be available from your local extension agent or FSA office.
 - State FSA offices can be found at <https://www.fsa.usda.gov/state-offices/index>.

Information adapted from publications from the Federal Emergency Management Agency, the National Weather Service, and the National Fire Protection Association.

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BIOLOGICAL EMERGENCIES IN RURAL COMMUNITIES

Biological emergencies for rural communities can involve any number of infectious microorganisms. While there are hundreds of bacteria, viruses, fungi and other pathogens constantly present in our environment, many of which pose little threat, some of these organisms are of special concern, even of emergency priority, based on their ability to rapidly spread or cause severe disease in humans, animals or plants. Many can lead to large outbreaks or involve new (or emerging) pathogens that may be unfamiliar.

Diseases can be spread by any number of ways, including person-to-person, from the environment (air or contaminated surfaces), insects (e.g., mosquitoes and ticks), even animals (directly or food products). Contagious diseases are those that can be spread quickly and easily.

Pandemics involve any disease that is widespread and affects many people, in many countries around the world. There have historically been a number of pandemic situations, including smallpox, typhoid fever, and plague. In 2009, the world experienced its first influenza pandemic in more than 40 years. The new influenza virus strain (2009 H1N1) spread worldwide to more than 214 countries, resulted in substantial illness, hospitalizations and over 18,400 deaths. Infections in numerous animal species, including swine, turkeys, ferrets, cats and dogs also occurred.

Emerging diseases are another biological threat. This involves any newly discovered disease, or one that spreads to new or additional locations or different hosts, or increases in its occurrence. One example was the introduction of West Nile virus into the United States in 1999 and its subsequent spread across the nation in the years to follow. Others such as *E. coli* O157:H7, bovine spongiform encephalopathy (“mad cow disease”), and monkey pox have “emerged” within the last 25 years. Many of the recent emerging diseases are also considered zoonotic diseases – diseases of animals that can be transferred to humans – increasing the potential risk of disease for individuals in close contact with animals.

Animals can also be at risk to biological hazards. The increased globalization of trade and transport of animals between countries can lead to the unintentional import of “exotic” or foreign animal diseases – those that are believed to be absent from the United States. Emerging diseases can also threaten our pets and livestock. The occurrence of any of these pathogens can have severe consequences, from the loss of naïve livestock or poultry populations to possible export restrictions or bans placed on animals or animal products by other countries. Crops are also susceptible to emerging or foreign pathogens, as well as pests or invasive species. The impact can have similar economic consequences.

This chapter will discuss some of the biological hazards or microbial threats to rural communities. Any of these situations have the potential to impact human or animal health as well as cause economic disruption for rural communities and businesses. However, planning ahead and implementing proper prevention can help to protect yourself, your family, your livestock and crops, and your business.

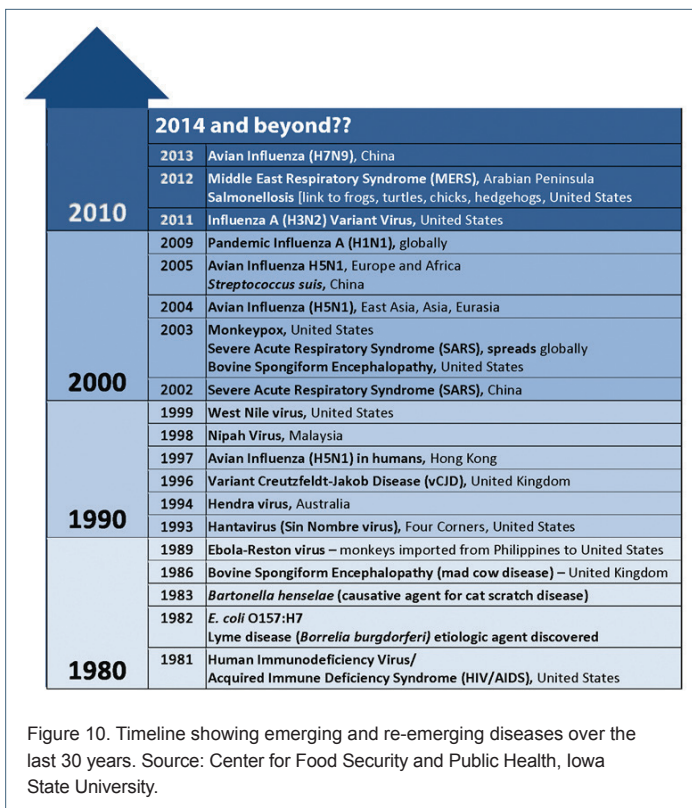


Figure 10. Timeline showing emerging and re-emerging diseases over the last 30 years. Source: Center for Food Security and Public Health, Iowa State University.



Influenza, or the “flu”, is a contagious, respiratory disease caused by different strains of the virus. Each year the seasonal flu affects people throughout the world. More recently two new strains of the virus, H5N1 and 2009 novel H1N1, were discovered and spread worldwide. While most healthy people recover from the flu without problems, some are at high risk for serious complications. Pets may also become infected from their sick owners. Prevention is the key to protecting your family and pets from these viruses.

Prevention Measures

- **Practice good health habits to maintain your body’s resistance to infection and avoid getting sick.**
 - Eat a balanced diet.
 - Drink plenty of fluids.
 - Exercise daily.
 - Manage stress.
 - Get plenty of rest/sleep.
 - Avoid close contact with sick people.
- **Get vaccinated.**
 - Vaccination is one of the most effective ways to minimize illness and death.
 - The 2010-2011 seasonal influenza vaccine will protect against the 2009 H1N1 virus and two other common influenza virus strains (H3N2 and influenza B).
- **Stockpile supplies.**
 - Have plenty of nonprescription drugs, such as pain relievers, cold medicines, vitamins, tissues, and hand sanitizer on hand.

If You Become Ill

- **Signs of the flu include:**
 - Rapid onset of high fever and body aches
 - Headache, extreme tiredness, sore throat, cough, runny or stuffy nose
 - Vomiting and diarrhea may occur, but are more common in children
- **Prevent transmission.**
 - Flu is spread person-to-person by coughing or sneezing of an infected person or by contamination of surfaces from these fluids.
 - Cover your nose and mouth with a tissue when sneezing or coughing and throw the tissue in the trash after use.
 - If there is no tissue available, cough or sneeze into your elbow to avoid spreading germs.
 - Wash hands often with soap and water or alcohol-based hand sanitizers.
 - Avoid touching your eyes, nose, or mouth.

- **If you or someone in your home develop signs of the flu,**
 - Stay home from work, school and other public places until you have been fever-free (without fever-reducing medicine) for at least 24 hours.
 - Get plenty of sleep and drink lots of fluids.
 - Eat to keep your strength up.
 - Designate one person as the caregiver – this will help minimize further spread.
 - Keep personal items separate. Avoid sharing pens, papers, clothes, towels, sheets, blankets, food or eating utensils – unless cleaned between uses.
 - Disinfect doorknobs, switches, handles, computers, telephones, toys and other commonly touched surfaces.
 - Wash dishes in the dishwasher or by hand using very hot water and soap.
 - Wash clothing with detergent and hot water; wash your hands after handling dirty laundry.
 - Wear disposable gloves when cleaning up body fluids; wash your hands after removing gloves.
- **Seek treatment.**
 - Many different illnesses can have similar signs.
 - Talk to your healthcare provider about possible medications (e.g., antivirals) that may make illness milder and help speed recovery.
 - Beware of bogus products and scams. The FDA warns the public to be wary of internet sites and other promotions for products that claim to prevent, treat, or cure the flu.

Individuals at High Risk

- **Some people are considered high risk for flu-related complications. These include:**
 - People age 50 or older
 - Pregnant women
 - People with chronic medical conditions
 - Children age 6 months and older
 - People who live with or care for those at high risk
- **High risk individuals should consult their healthcare provider about needed prevention measures.**

Influenza and Your Pets

Influenza viruses can cause illness in your pet. Dogs, cats, ferrets and pet birds can be susceptible to certain influenza viruses. Cases are not common, and most pets fully recover. Exposure can occur from sick owners. Prevention is the key to protect your pet from flu viruses.

- **Keep your pet healthy.**
 - Have animals seen regularly by your veterinarian to ensure they are healthy.
 - Feed them a well-balanced diet.



INFLUENZA AND YOUR FAMILY

Biological Emergencies

- **Monitor your pet for illness. Contact your veterinarian if you see these signs,**

- Lethargy, loss of appetite
- Fever
- Runny nose and/or eyes
- Sneezing, coughing
- Difficulty or changes in breathing

- **If you are sick with influenza-like-illness,**

- Take the same precautions with your pets that you would to keep family and friends healthy.
- Cover your coughs and sneezes.
- Wash your hands frequently.
- Avoid or minimize contact with your pets until 24 hours after your fever is gone without the use of fever reducing medication.

- **There is currently no vaccine available for influenza in pets.**

Prepare for a Pandemic Situation

The impact of a severe influenza pandemic could be much greater than that of regular flu season. It could lead to high levels of illness or death. Everyday life could become disrupted due to the large numbers of people becoming seriously ill at the same time. Impacts could range from school and business closings to the interruption of basic services, such as public transportation or food delivery.

- **Don't panic.**

- Plan ahead for the situation.

- **Stay informed.**

- Listen to the radio or television for information and updates.
- Follow the situation at www.pandemicflu.gov.
- Follow instructions from public health and medical health professionals. This may involve staying at home to avoid further spread of the virus.

- **Plan for disruption in essential services.**

- Transportation and consumer services (e.g., hospitals, healthcare facilities, banks, restaurants, government offices, phone companies, post offices) may be disrupted during a pandemic.

Food and water supplies may be interrupted.

- Temporary shortages could occur or you may not be able to get to a store.
- Store at least one to two weeks supply of non-perishable food.
- Store two weeks of water – 1 gallon of water per person per day. (2 quarts for drinking, 2 quarts for food preparation/sanitation).

- **Being able to work may be difficult or impossible.**

- Ask your employer how your business will function during an influenza pandemic.
- Discuss alternatives such as, staggered shifts or working at home with your employer. Discuss telecommuting possibilities, accessing remote networks, and using portable computers.
- Discuss with your employer how much leave you can take to care for yourself or a family member. Discuss possible flexibility in leave policies.
- Plan for possible loss of income if you are unable to work or the company you work for temporarily closes.

- **Schools and daycare centers may be closed for an extended period of time.**

- Talk to your teachers and administrators about your school's pandemic plan.
- Plan for children staying at home for extended periods of time, as school closings may occur along with restrictions on public gatherings, such as at malls or movie theaters.
- Plan home learning activities and exercises that your children can do at home. Have learning materials, such as books, school supplies, and educational computer activities on hand.
- Have materials and activities (e.g., reading books, coloring books, games), on hand for your children to use.

- **Medical care for people with chronic illness could be disrupted.**

- In a severe pandemic, hospitals and doctors' offices may be overwhelmed.
- If you have a chronic disease, such as heart disease, high blood pressure, diabetes, asthma, or depression, you should continue taking medication as prescribed by your doctor.
- Make sure you have necessary medical supplies.
- Talk to your healthcare provider to ensure adequate access to your medications.
- If you receive ongoing medical care, such as dialysis, chemotherapy, or other therapies, talk with your healthcare provider about plans to continue care during a pandemic.

Information adapted from publications from the Centers for Disease Control and Prevention and the American Red Cross and www.flu.gov.



In 2009, a new strain of influenza (2009 H1N1) caused the first influenza pandemic in more than 40 years. The disease primarily affected humans, but transfer of the virus to some livestock species – swine and turkeys – occurred. Most animals were infected following contact with ill people. Prevention is the key to protecting your livestock from these viruses.

2009 Pandemic H1N1 Influenza

Pigs can get a number of types of influenza viruses, any of which can cause high rates of illness in pigs, but generally few deaths in the herd. In October 2009, the first case of the 2009 H1N1 influenza virus was confirmed in the United States and several other countries. The 2009 H1N1 influenza virus was also found in turkey flocks in Chile, Canada and the U.S.

- **The influenza virus is spread by:**
 - Close contact with infected individuals
 - Indirectly by contaminated surfaces.
 - Possibly aerosol when in close or confined areas.
- **Signs of H1N1 influenza in pigs.**
 - Sudden high fever
 - Depression, lack of appetite (going off feed)
 - Coughing (“barking”)
 - Discharge from nose or eyes
 - Sneezing
 - Difficulty breathing
 - Eye redness or swelling
- **Signs of H1N1 influenza in turkeys.**
 - Decline in egg production and shell quality
 - Respiratory signs or mortality may not occur

Prevention Measures

- **Monitor animals for illness.**
 - Observe animals daily for signs of illness.
 - Sick animals should be isolated as soon as possible.
- **Implement strict biosecurity measures on your farm.**
 - Restrict access to your property and your animals.
 - Isolate any new or returning animals to your farm before placing them with resident stock.
 - Only allow essential workers and vehicles on your farm.
 - Prohibit visitors near animals unless absolutely necessary.
 - Have all personnel or allowed visitors wear clean footwear (disposable boots) and clothing (coveralls) while on the farm.
 - Clean and disinfect clothes, shoes, equipment, vehicles and hands after contact with animals.
 - Clean vehicles before leaving the farm.
 - Do not share equipment with other farms, unless items have been cleaned and disinfected.

Human Safety

Individuals who care for swine or poultry should take steps to protect themselves from getting the flu or spreading it to animals.

- **Get vaccinated with the human flu vaccine.**
- **Wear protective clothing or equipment when working with animals.**
 - Coveralls that can be laundered or disposed of after each use
 - Rubber boots that can be cleaned and disinfected or disposable protective shoe coverings
 - Disposable gloves or heavy duty waterproof gloves that can be disinfected
 - Head or hair covers help prevent contamination of hair if a shower-out facility is not available
 - Masks, especially if working in confined areas or in close contact with animals
- **Wash hands thoroughly for at least 20 seconds with soap and water.**
 - Before and after working with animals
 - After removal of any personal protective clothing
- **Avoid contact with animals having signs of flu-like illness.**
 - Contact your veterinarian.
- **Be aware for flu-like symptoms in yourself or others working on your farm.**
 - These include: fever, cough, sore throat, runny or stuffy nose, body aches, headache, chills, and fatigue.
 - Limit contact with other people or animals, especially pigs or poultry.
 - Stay home for 7 days after symptoms begin or until symptom free for 24 hours (whichever is longer).
 - Contact your healthcare provider.

Information adapted from publications from the U.S. Department of Agriculture, the American Veterinary Medical Association, the Centers for Disease Control and Prevention, and www.pandemicflu.org.



INFLUENZA AND YOUR BUSINESS

Biological Emergencies

Influenza, or the “flu”, is a contagious respiratory disease caused by different strains of the virus. Each year the seasonal flu affects people throughout the world. In 2009, a new strain of influenza (2009 H1N1) caused the first influenza pandemic in more than 40 years. Business planning is essential to protect your employees’ health and safety and limit the negative impact the situation may have on both your business and community.

Keeping Your Employees and Business Healthy

- **Encourage workers to get vaccinated.**
- **Provide resources and a work environment that promotes personal hygiene.**
 - Include access to tissues, no-touch trash cans, hand soap, hand sanitizer, disinfectants, and disposable towels for workers to clean their work surfaces.
- **Provide education and training materials appropriate for all employees.**
 - Provide workers with up-to-date information on flu risk factors, protective behaviors, and instruction on cough etiquette and hand hygiene.
- **Have surface items in your business cleaned routinely.**
 - This should include all frequently touched surfaces, such as workstations, countertops, and doorknobs.
 - Provide disposable wipes so commonly used surfaces (e.g., doorknobs, keyboards, remote controls, desks) can be wiped down before use.

Prepare for a Pandemic Situation

- **Identify a pandemic plan coordinator.**
 - The coordinator will be responsible for dealing with pandemic flu issues and their impact on the business. Some of the duties would include:
 - Contacting the local health department/ health care provider to set up vaccination clinics for employees, if possible.
 - Developing a plan and protocol for ill employees.
- **Examine workplace policies.**
 - The “leave” policies should be flexible, well-communicated, and without punishment.
 - Employees who have flu symptoms should stay home and not come to work until at least 24 hours after fever.
 - Employees should be allowed to stay home and care for sick family members.
 - Be prepared to allow employees to stay home in the event of school closings.

- **Identify what is essential to the business.**
 - Determine the factors necessary to maintain business operations should there be interruptions due to a large number of influenza cases.
 - Address issues such as reduction in employees, business functions, and critical inputs (e.g., raw materials, suppliers, subcontractor services and products, logistics).
 - Explore ways you can continue business operations if there are supply chain breaks or other problems.
 - Cross-train employees to perform essential functions, such as accounting, payroll and information technology, in the event of large scale absences.
- **Keep everyone informed.**
 - Make sure employees are up-to-date on your pandemic influenza plans and know your expectations.
 - Review the policies regarding absences, working from home, and compensation with all employees.
 - Stay informed about the situation at www.pandemicflu.gov.
- **Prepare continuity plans.**
 - In the event of significant absences, or changes in the way you need to conduct business, you need to have a plan so that you can maintain operations.
 - School closings and daycare closures may increase absenteeism.
 - Health officials may also advise increasing the distance between people and decreasing the frequency of contact among people to reduce the spread of illness.
- **Establish emergency communication plans.**
 - Make plans to communicate business status to employees, customers, suppliers and other stakeholders.
 - Make plans on how to communicate with people that perform essential tasks to provide them assignments and work direction.
 - Update employee telephone rosters and records.

Information adapted from publications from the Centers for Disease Control and Prevention, Occupational Safety and Health Administration, and www.flu.gov.



While there are many microorganisms present in our environment, some can be of special concern based on their ability to spread rapidly or cause severe disease; some can be new or “emerging” threats. Fortunately most can be avoided by understanding the risks and taking basic preventive measures.

Emerging & Zoonotic Diseases

- **Emerging diseases**
 - Diseases that are newly discovered, have increased in occurrence or have spread to new locations or species.
 - Examples include: West Nile virus, Lyme disease.
- **Zoonotic diseases**
 - Diseases of animals that can be transferred to people. Many of the recent emerging diseases of humans are also considered zoonotic diseases.
 - Examples include: rabies, ringworm, salmonellosis.

Hand Washing and Hygiene

Hand washing is one of the most effective ways to prevent the spread of disease.

- **Wash your hands often.**
 - Use soap and warm water for at least 20 seconds.
 - Antimicrobial hand gels can be effective when hands are not visibly dirty.
 - Teach children about proper hand washing.
 - Wash hands before preparing food or eating.
 - Wash hands after contacting pets or other animals, cleaning pet waste or cages, using the restroom, and coughing or blowing your nose.

Personal Protection While Outdoors

Insects and wildlife can serve as sources for some emerging and zoonotic diseases.

- **Take precautions when going outdoors.**
 - Avoid contact with wild animals or waterfowl.
 - Avoid insect bites while outdoors.
 - Avoid being outside during the peak activity times (e.g., dusk and dawn for mosquitoes).
 - Wear insect repellent containing DEET.
- **Remove insect breeding areas around your home.**
 - Stagnant water sources are mosquito breeding grounds.
 - Tall vegetation can harbor ticks.
 - Animal feces attracts flies and other insects.
- **Rodent-proof your home.**
 - Keep pet food in containers with tight lids.

Food Safety

- **Handle and prepare foods safely.**
 - Don't eat raw or undercooked meat or eggs.
 - Cook foods thoroughly until the internal temperature is 160°F.
 - Wash fruits and vegetables before eating.
 - Avoid raw milk or unpasteurized dairy products.
 - Store foods at the proper temperature.
 - Avoid cross contamination by using separate cutting boards and knives for meat items, and fruits and vegetables.

Children and Animals

- **Children, especially those under 5 years of age and persons with weakened immune systems can be at greater risk for diseases, including zoonotic diseases.**
 - Children under five years old should never be left unsupervised with animals.
 - Teach children to avoid rough play with pets, to avoid being bitten.
 - Monitor children's contact with animals. Don't let children put their hands or other objects into their mouths after playing with pets.
 - Don't allow children to kiss pets or allow pets to lick the children's face.
 - Be sure children wash their hands after contact with animals and pet food or treats.

Pet Health

- **Maintaining good health in your pets, not only keeps them healthy, but reduces the risk for zoonotic diseases to you and your family.**
 - Have your pet checked at least twice a year by a veterinarian.
 - Keep your pets' vaccinations current.
 - Check your pet regularly for parasites.
 - Use recommended flea and tick prevention products.
 - Do not allow pets to interact with wildlife.
 - Do not allow your pet to eat other animals' feces.
 - Do not feed raw or undercooked meat to your pets.

Information adapted from publications from the Centers for Disease Control and Prevention and the Center for Food Security and Public Health.



HIGH CONSEQUENCE DISEASES AND YOUR LIVESTOCK

Biological Emergencies

While there are many disease threats for livestock, some can be of special concern based on their ability to spread rapidly and cause severe illness, and often death. These diseases include emerging, and “exotic” or foreign animal diseases. These high consequence diseases can have devastating economic effects, (such as loss or disruption of trade, loss of consumer confidence), and lead to restrictions on animal movement, costing the animal industry millions of dollars. Prevention measures and rapid response for these diseases are essential for minimizing the further spread and impact to your livestock.

Definitions

- **High Consequence Livestock Diseases.**
 - Diseases that spreads rapidly from animal-to-animal and, if given the opportunity, from herd-to-herd; includes most emerging and foreign animal diseases.
- **Emerging Diseases.**
 - Diseases that are newly discovered, have increased in occurrence or have spread to new locations or species. Examples include: bovine tuberculosis, brucellosis, vesicular stomatitis.
- **“Exotic” or Foreign Animal Diseases.**
 - Livestock disease not currently found in the U.S., but is present in other areas of the world, thereby making it a potential biological threat to U.S. livestock. Examples include: foot-and-mouth disease, highly pathogenic avian influenza, Rift Valley fever.

Disease Transmission

Disease-causing organisms can be spread by a variety of methods. These are important to consider when setting up biosecurity protocols, to reduce further transmission.

- **Direct contact:** Entry of disease agent into open wounds, mucous membranes, or the skin; may occur by contact with blood, saliva, nose-to-nose contact, rubbing, or biting from an infected animal.
- **Indirect contact or fomites:** Transfer of disease agent by an inanimate object (e.g., equipment, vehicle, clothing, footwear).
- **Aerosol:** Infectious droplets passed through the air from one animal to another.
- **Ingestion:** Consumption of disease agent in contaminated feed or water or by licking or chewing contaminated environmental objects.
- **Vector-borne:** Disease agent spread by insects (e.g., mosquitoes, ticks, biting midges, flies)

Prevention: Biosecurity Measures

- **Isolate new introductions or returning animals.**
- **Monitor animals for illness.**
 - Observe animals daily for signs of illness.
 - Sick animals should be identified and isolated as soon as possible.
 - Contact your veterinarian immediately!
- **Implement strict biosecurity measures on your farm.**
 - Restrict access to your property and your animals.
 - Only allow essential workers and vehicles on the premises.
 - Prohibit visitors near animals unless absolutely necessary.
- **Wear protective clothing to minimize spread.**
 - Ensure all personnel or allowed visitors have clean footwear (disposable boots) and clothes (coveralls) while on the farm.
- **Cleaning and disinfection.**
 - Clean and disinfect clothes, shoes, equipment, vehicles and hands after contact with animals.
 - Clean and disinfect premises and equipment regularly.
 - Do not share equipment with other farms, unless items have been cleaning and disinfected.
- **For additional biosecurity measures to implement, visit http://www.cfsph.iastate.edu/Infection_Control**

During an Outbreak Situation

The response needed for a high consequence livestock disease will involve various state and federal agencies in efforts to control the further spread of the disease.

- To learn more about the necessary response to a high consequence disease, visit http://www.aphis.usda.gov/publications/animal_health/content/printable_version/fs_fmd_con_07.pdf
- **What you can do.**
 - Cooperate with veterinarians and officials to prevent the disease from spreading further.
 - Implement strict biosecurity measures on your farm.
 - Monitor your animals for signs of illness.
 - In some situations, vaccines may be available and used to aid in controlling the disease spread. Determination will be made by state or federal animal health authorities.

Information adapted from publications from the U.S. Department of Agriculture and the Center for Food Security and Public Health.

HIGH CONSEQUENCE LIVESTOCK PATHOGENS

Biological Emergencies



These pathogens (listed by affected animal species) are considered high consequence due to their ability to spread rapidly, cause severe disease in livestock or have severe economic impacts.

Ruminants		
These pathogens can occur in cattle, sheep, and goats.		
Anthrax <i>cattle, sheep, goats</i>	Contagious caprine pleuropneumonia <i>sheep</i>	Peste des petits ruminants <i>sheep, goats</i>
Akabane virus <i>cattle, sheep, goats</i>	Foot and mouth disease <i>cattle, sheep, goats</i>	Q Fever <i>cattle, sheep, goats</i>
Bluetongue virus (exotic strain) <i>cattle, sheep, goats</i>	Goat and sheep pox <i>goats, sheep</i>	Rinderpest <i>cattle, sheep, goats</i>
Bovine spongiform encephalopathy (mad cow disease) <i>cattle</i>	Heartwater <i>cattle, sheep, goats</i>	Rift Valley fever <i>cattle, sheep, goats</i>
Brucellosis <i>cattle, sheep, goats</i>	Lumpy skin disease <i>cattle</i>	Screwworm myiasis <i>cattle, sheep, goats</i>
Coccidioidomycosis <i>cattle, sheep</i>	Malignant catarrhal fever <i>cattle, wild ruminants</i>	Tularemia <i>sheep</i>
Contagious bovine pleuropneumonia <i>cattle</i>	Melioidosis <i>sheep, goats</i>	Vesicular stomatitis virus <i>cattle</i>
Swine		
These pathogens can occur in swine.		
African swine fever	Foot and mouth disease	Nipah virus
Brucellosis	Japanese encephalitis virus	Rinderpest
Classical swine fever virus (hog cholera)	Melioidosis	Swine vesicular disease
Coccidioidomycosis	Menangle virus	
Horses		
These pathogens can be found in horses, donkeys, mules, and zebras.		
African horse sickness	Hendra virus	Vesicular stomatitis virus
Coccidioidomycosis	Japanese encephalitis virus	Viral encephalitis viruses Eastern Equine Encephalitis virus, Western Equine Encephalitis virus Venezuelan Equine Encephalitis virus
Glanders	Screwworm myiasis	West Nile virus
Avian		
These pathogens can be found in chickens, turkeys, wild birds and waterfowl.		
Avian influenza virus	Exotic Newcastle disease virus	Viral encephalitis viruses Eastern Equine Encephalitis virus, Venezuelan Equine Encephalitis virus
Screwworm myiasis		

***Bolded diseases** indicate human can also be affected.

To learn more about any of these diseases, visit <http://www.cfsph.iastate.edu/DiseaseInfo>



HIGH CONSEQUENCE PLANT DISEASES/ PESTS AND YOUR CROPS

Biological Emergencies

Crop diseases and pests (insects, mites, weeds, and vertebrates) are one of the top concerns for any farmer. Some of these are of special concern based on their ability to spread rapidly, cause severe disease in plants and devastating economic losses. These high consequence diseases include emerging, and “exotic” or foreign diseases of plants. Prevention and rapid detection are essential for minimizing the impact to your crops.

Definitions

- **Emerging Diseases:** Diseases or pests that are newly discovered, have increased in occurrence or have spread to new locations. Examples include: soybean rust, the emerald ash borer.
- **“Exotic” or Foreign Animal Diseases:** Diseases or pests not currently found in the U.S., but are present in other areas of the world, thereby making them a potential biological threat to U.S. crops and plants. Examples include: bacterial wilt, brown striped downy mildew.

Pest Detection

Most plant pest introductions occur accidentally as a result of increased global travel and trade. Federal and State agencies work together to promptly detect any high consequence plant diseases or pests. These include the USDA Plant Protection and Quarantine, the Department of Homeland Security, the National Plant Diagnostic Network, and others.

- **Additional information on these and other program can be found at** <http://www.aphis.usda.gov/wps/portal/aphis/ourfocus/planthealth>

Pest Management and Control

Pest management involves measures to reduce pest population or to reduce their harmful effects. Management techniques can be classified into these different categories.

- **Chemical controls.**
 - Immediate and temporary elimination of localized pest populations using chemical pesticides.
- **Cultural controls.**
 - Farming practices that make the environment less favorable to pests. Examples include: crop rotation, tillage, plant density, timing of harvest, and water management.
- **Biological controls.**
 - Biological controls are natural methods of pest management. Predators (e.g., wasps, lacewings, lady beetles), parasites, competitors, and antagonistic microorganisms all fall under the category of biological controls.

- **Integrated pest management.**

- Involves diverse methods of pest controls, paired with monitoring to reduce unnecessary pesticide applications; the use of pesticides in combination with other crop management approaches.

Emerging Crop Diseases

New infectious plant diseases and pests are emerging all the time. It is important to stay informed about these threats and know what to look for. Some of the recently significant diseases can be found on the table on the next page.

Regional and national pest alerts can be found at http://www.csrees.usda.gov/nea/pest/in_focus/ipm_if_pestalert.html.

Prevention: Crop Biosecurity Measures

- **Monitor plants for signs of disease.**
 - Routinely inspect your fields for signs of disease or pests.
 - Wear clean shoes and clothing when walking between fields, greenhouses, etc.
- **Restrict access to your farm.**
 - Only allow essential workers and vehicles on your farm.
 - Minimize vehicle traffic on your land, especially near fields.
 - Do not allow new or foreign plants to be brought onto your property.
- **Cleaning and disinfection.**
 - Clean and disinfect clothes, shoes, equipment, vehicles and hands after contact with plants.
 - Make sure tools are cleaned between fields/greenhouses, or have separate sets for each.
 - Do not share equipment with other farms, unless items have been cleaning and disinfected.

Information adapted from publications from the U.S. Department of Agriculture, National Agriculture Pest Information System, and the North Central Integrated Pest Management Center.

HIGH CONSEQUENCE/EMERGING PLANT DISEASES AND PESTS

Biological Emergencies



These diseases or pests are considered high consequence or emerging due to their ability to spread rapidly, cause severe damage to crops or plants, or have severe economic impacts.

Disease Name and Agent	Characteristics
Bacterial Wilt <i>Ralstonia solanacearum</i> Race 3	<ul style="list-style-type: none"> Bacterial disease of geraniums, potatoes, eggplant, tomato Considered potential plant agroterrorism agent Found in Europe, Asia, South and Central America, Australia Has occurred in U.S. (2004) but was eradicated
Brown Striped Downy Mildew <i>Sclerophthora rayssiae</i> var. <i>zeae</i>	<ul style="list-style-type: none"> Fungal disease of corn Reduces production by damaging leaves Currently found in Asia
Philippine Downy Mildew <i>Peronosclerospora philippinensis</i>	<ul style="list-style-type: none"> Fungal disease of maize and corn; can also affect sugarcane, some sorghum, and grass species Found in parts of Asia and Africa
Soybean Rust <i>Phakopsora pachyrhizi</i>	<ul style="list-style-type: none"> Fungal disease of soybean, kudzu, lupine, common bean, vetch, clover, cowpea, sweat clover, medic Confirmed in continental United States in November 2004
Soybean Aphid <i>Aphis glycines</i> Matsumura	<ul style="list-style-type: none"> Insect that infests soybeans Found in several states of the United States, including Midwestern states Damages soybean leaves, stems, and pods Reducing production, stunting, can kil plants. Aphids can also transmit a number of soybean viruses, such as soybean mosaic, alfalfa mosaic, and others.
Emerald Ash Borer <i>Agrilus planipennis</i> Fairmaire	<ul style="list-style-type: none"> Insect that damages and kills ash trees Confirmed in U.S. in 2002; now found in 14 Midwestern states For more information, http://www.emeraldashborer.info/
Asian Longhorned Beetle <i>Anoplophora glabripennis</i> Motschulsky	<ul style="list-style-type: none"> Insect that burrows in deciduous hardwood trees (maple, boxelder, birch, horse chestnut, poplar, willow, elm) eventually killing them Confirmed in northeastern U.S. in 2007; eradication efforts are underway For more information, http://beetlebusters.info/

For additional plant pathogens of concern:

North Central Integrated Pest Management Center (USDA CSREES). Pest Alerts from the North Central Region.

<https://www.ncipmc.org/action/alerts/index.php>

National Cooperative Agricultural Pest Survey Target Species Listing at

<http://www.invasive.org/species/list.cfm?id=13>

USDA APHIS Regulated Pest List at

<http://www.invasive.org/species/list.cfm?id=4>



FOOD SAFETY RECALLS AND YOUR FAMILY

Biological Emergencies

Food recalls are necessary to protect the public from unsafe or contaminated food products. It is important to stay informed about current recalls and to know what to do in case of a recall to protect yourself and your family.

What is a Food Recall?

Recalls are procedures used to identify and recover potentially adulterated, misbranded, and/or hazardous foods in order to prevent potential food safety problems or economic fraud.

- **A recall is conducted by the responsible company.**
 - To remove or correct a product being sold that is or would be considered violation of their federal, state, or local food laws.
 - To protect the public from products that may cause health problems or possible death.
- **There are a number of situations that can result in a food product recall. Some are emergency situations; others are not.**
 - Examples include allergens, foreign objects, chemical or bacterial contamination, illness or communicable diseases, misbranding, packaging defects.
- **There are three different classes of recalls, depending on the severity of the suspected problem.**
 - **Class I:** Dangerous or defective products that could cause serious health problems or death.
 - **Class II:** Products that might cause a temporary health problem, or pose only a slight threat of a serious nature.
 - **Class III:** Use of products that are unlikely to cause any adverse health reaction, but violate FDA labeling or manufacturing laws.

Who Decides When a Recall is Necessary?

- The U.S. Food and Drug Administration (FDA) and the U.S. Department of Agriculture's Food Safety and Inspection Service (USDA FSIS) are the federal authorities that govern food recalls.
 - FSIS has authority over meat, poultry and processed egg products.
 - FDA has authority over most other food products, as well as human and animal drugs, medical devices, human vaccines, animal feed, and cosmetics.
- Local or state agencies may coordinate voluntary recalls for firms operating within their jurisdiction, or assist federal regulators with recall investigations.
- Many state agencies also have the authority to embargo or seize adulterated or misbranded products if a firm does not adequately remove products from commerce.

- **Food recalls are generally voluntary.**
 - They are initiated by the manufacturer or distributor upon request of the Federal agencies (i.e., FDA, FSIS).
 - Federal agencies can take more stringent actions if,
 - A product poses a significant risk to human health.
 - The manufacturer or distributor is unwilling to launch a voluntary recall.
 - The agency decides the company's voluntary action is ineffective.

Food Recall Process

- **Unsafe products are discovered by several methods:**
 - Identification by the manufacturer or distributor
 - Consumer hotlines
 - Sample testing or routine inspections by state or federal agencies
 - Consumer health issues detected by state and local health departments
- **Once the recall is issued, it is considered complete only when:**
 - The company's corrective actions have been deemed appropriate.
 - All of the product is suitably destroyed or reconditioned.
 - An investigation is conducted to determine why and how the product was defective.

Reporting a Suspected Food Safety Problem

If you suspect a problem with a food product,

- **Call the USDA Meat and Poultry Hotline.**
 - For help with meat, poultry, and egg products
 - Call 1-888-MPHotline (1-888-674-6854).
- **Call the Food and Drug Administration.**
 - For complaints about other food products, such as cereal, fruits, vegetables
 - Call 1-888-723-3366 (1-888-SAFEFOOD).
- **Contact your State or Territorial Health Department.**
<http://www.cdc.gov/mmwr/international/relres.html>
- **Have the following information ready:**
 - The brand name, product name, and manufacturer of the product
 - The original container/packaging
 - Any foreign object you may have found in the product
 - Any uneaten portion of the food
 - Where and when you bought it
 - Your name, address, and phone number



Food Safety Recall Alerts

- Recall notices can be found in the news, at your local grocery store or online at www.recalls.gov.
- You can also sign up for food safety recall alert emails at www.foodsafety.gov/keep/recalls/index.html.

What to Do with Recalled Products

When a food recall alert is issued, it usually includes information to help you identify whether you have the product in your pantry, refrigerator, or freezer and advises you what to do with it.

- **Check the recall notice.**
 - Manufacturers will provide information on what to do with the product.
 - Typically, the instructions will tell you to either return the product to the store where you bought it for a refund, or to dispose of the product properly (especially if it has been opened).
 - The recall of one product does not mean all forms of that product are a potential problem.
 - Occasionally recalls will be expanded to include additional products as more information is gathered.
- **To identify if a recall product is in your home,**
 - Match identifying marks of the product with the recall notice details, such as:
 - . Product name and brand
 - . Container size and codes
- **Do not panic.**
 - Most recalls are not associated with a food illness outbreak, and many are issued because there is a potential for the food to be contaminated. Often recalls are issued as a precautionary measure.
- **Do not eat the food.**
 - Even if you believe the recall to be just a precaution, do not eat the food! It is better to be safe than sorry.
 - Do not donate the food to food banks or feed it to your pets.
- **Do not open the food container.**
 - Opening the food and checking it can potentially release bacteria or viruses that cause food illnesses into your home.
 - If you do open or handle the product, wash your hands thoroughly with warm water and soap.
- **Preserve the evidence.**
 - If a portion of the suspect food is available, keep it, wrap it securely, mark "DANGER" and freeze it.
 - Save all packaging materials (e.g., cans, labels, cartons).
 - Save all purchase receipts.

- **Seek treatment if necessary.**
 - If you become ill and believe your illness is due to a food product, contact your healthcare provider.
- **Call your local health department if the suspect food was served at a large gathering, from a restaurant or other food service facility.**

Information adapted from publications from the Food and Drug Administration, the U.S. Department of Agriculture and www.foodsafety.gov.



ANIMAL FEED SAFETY AND RECALLS

Biological Emergencies

Safe animal feed products are necessary for healthy pets and livestock. Animal feed and product recalls do occur – so it is important to stay informed to ensure that your animals are receiving safe, healthy food.

Requirements and Responsibilities

- **Animal feed products are regulated by the Food and Drug Administration (FDA).**
- **Animal feed, like human foods, must be:**
 - Pure and wholesome
 - Produced under sanitary conditions
 - Free of harmful substances
 - Truthfully labeled

Additives and Medicated Feed

Some animal feeds may contain additives or medications, such as antibiotics, hormones, anti-parasitic drugs, and anti-bloating drugs (in cattle), to prevent or treat diseases or to improve animal growth or productivity.

- Any and all additives or drugs that are used in feed products must be approved by the FDA.
- The drugs used in feeds must not leave hazardous residues in human foods, such as meat milk and eggs, and the drugs should not contribute to bacterial drug resistance.
- By law, feed manufacturers must be licensed if they intend to use certain medications in their feeds.
- Routine inspections ensure that the laws and regulations are being followed.

Feed Ingredients and Mad Cow Disease

- In April 2008, FDA issued a final regulation banning certain cattle materials from all animal feed, including pet food.
- The banned materials are the cattle tissues that have the highest risk for carrying the agent thought to cause BSE (bovine spongiform encephalopathy or “mad cow disease”).

Pet Food Regulations

Pet foods and treats are regulated by the FDA. Pet food labeling has regulations at both the state and federal level. The FDA's Center for Veterinary Medicine establishes standards that apply to all animal feeds:

- Proper product identification
- Net quantity statement
- Manufacturer's address
- Proper listing of ingredients

Many state regulations follow the pet food regulations of the Association of American Feed Control Officials. These regulations are more specific than federal regulations, and cover aspects of labeling such as:

- Product name
- Nutritional adequacy statement
- Feeding directions
- Calorie statements

Reporting a Suspected Animal Feed Problem

- **You can report a complaint about animal feed, electronically through the FDA's Safety Reporting Portal at www.safetyreporting.hhs.gov**
- **When reporting a complaint, have the following information ready:**
 - Name of product
 - Type of container (e.g., box, bag, can, pouch)
 - Lot number
 - Best by, best before or expiration date
 - The expiration, best by, or use-by dates apply only to the manufacture-sealed packaging.
 - Once a container is opened, these dates do not apply to the unused portion of the product.
 - UPC (or bar) code
 - Net weight
 - Purchase date and location where purchased
 - How food was stored, prepared, handled
 - Description of the problem

Food Safety Recall Alerts

- **There are three different classes of recalls, depending on the severity of the suspected problem.**
 - **Class I:** Dangerous or defective products that could cause serious health problems or death.
 - **Class II:** Products that might cause a temporary health problem, or pose only a slight threat of a serious nature.
 - **Class III:** Use of products that are unlikely to cause any adverse health reaction, but that violate FDA labeling or manufacturing laws.
- **You can find current recalled products, at:**
 - <https://www.foodsafety.gov/recalls/recent/>
 - You can also sign up for food safety recall alert emails.



What to Do with Recalled Products

When a food recall alert is issued, it usually includes information to help you identify whether you have the product and advises you what to do with it.

- **Check the recall notice.**
 - Manufacturers will provide information on what to do with the product.
 - Typically, this will involve returning the product to the store where you bought it, for a refund, or disposing of it properly (especially if it has been opened).
- **Do not feed the material to your animal.**
 - Even if you believe the recall to be just a precaution, do not use the food.
- **Do not open the food container.**
 - Opening the food and checking it can potentially release bacteria or viruses that cause illnesses.
 - If you do open or handle the product, wash your hands thoroughly with warm water and soap.
- **Preserve the evidence.**
 - If a portion of the suspect food is available, keep it, wrap it securely, mark “DANGER” and freeze it.
 - Save all packaging materials (e.g., cans, labels, cartons).
 - Save all purchase receipts.
- **Seek treatment, if necessary.**
 - If your animal becomes ill and you believe the illness may be due to a feed product, contact your veterinarian.

Safe Handling Tips for Pet Foods and Treats

Pet foods and treats can be potential sources of bacterial contamination, such as Salmonella. Take the following steps to help prevent illness in you, your family or your pet.

- **Hygiene.**
 - Purchase products in good condition, without signs of damage to the packaging such as dents or tears.
 - Wash your hands for 20 seconds with hot water and soap before and after handling pet foods and treats.
 - Wash pet food bowls, dishes and scooping utensils with soap and hot water after each use.
 - Dispose of old or spoiled pet food products in a safe manner, such as in a securely tied plastic bag in a covered trash receptacle.
 - Keep pets away from garbage or household trash.

- **Storage.**
 - Refrigerate promptly or discard any unused, leftover wet pet food.
 - Dry products should be stored in a cool, dry place – under 80°F.
 - If possible, store dry pet food in its original bag inside a clean, dedicated plastic container with a lid, keeping the top of the bag folded closed.
 - Keep pets away from human food storage and preparation areas.
- **Raw food diets.**
 - Raw food diets can lead to significant health risks for your pet or yourself.
 - Keep raw meat and poultry products frozen until ready to use.
 - Thaw in refrigerator or microwave.
 - Keep raw food diets separate from other foods. Wash working surfaces, utensils (including cutting boards, preparation and feeding bowls), hands, and any other items that touch or contact raw meat, poultry or seafood with hot, soapy water.
 - For added protection, kitchen sanitizers should be used on cutting boards and counter tops periodically.

Information adapted from publications from the Food and Drug Administration, American Veterinary Medical Association, and the U.S. Department of Agriculture.

MAN-MADE OR TECHNOLOGICAL THREATS TO RURAL COMMUNITIES

Man-made or technological emergencies that may impact rural communities can include things such as agrochemical spills, power outages or acts of terrorism. Because the occurrence of these incidents is typically unpredictable, proper preparedness and response for these situations is essential.

Agricultural chemicals (agrochemical) are a common component found in rural communities and on farms. These may include any number of products from pesticides and herbicides to fertilizers (e.g., anhydrous ammonia) or disinfectant products. Proper use and application of agrochemicals can aid in agricultural tasks, however precautions must be taken to prevent chemical accidents or spills that can affect the individual, community and environment. Safety when using these products is paramount. Additionally, some products can be the target of thefts for illegal use (e.g., methamphetamine production). Prevention measures include understanding the proper use of these chemical and any safety the issues involved, knowing the actions to take in the event of a chemical accident or spill, as well as implementing measures to deter the theft of any agricultural chemicals.



Photo source: Alex Ramirez, Iowa State University.

Power outages are another technological hazard for rural communities that can occur from a variety of situations, such as natural disasters (e.g., flooding, ice storms) or from overwhelmed power systems during extreme heat situations. The loss of power to farms using mechanical ventilation, bulk milk-handling equipment, automated feeding systems, heat or refrigeration can result in economic and livestock losses. In homes, food safety can become an issue without proper refrigeration.

Since September 11, 2001, our country has become more aware of the potential of terrorism in our country. Bioterrorism involves the deliberate release of germs or other biological substances to cause illness, death, fear, social disruption and economic damage. When agricultural commodities, such as livestock or crops, are targeted, it is referred to as agroterrorism. The resulting impact can cause economic damage, loss of confidence in the food supply and possible loss of life.

This section provides information on prevention and recovery actions for man-made and technological hazards. Protecting your family, home and farm, animals and business during these situations will require preparedness actions.



Bioterrorism involves the intentional use of germs (e.g., bacteria, viruses) or other biological substances (e.g., toxins) to cause illness, death, fear, social disruption and economic damage. Here are some steps you can take to prepare and protect yourself and your family for bioterrorism threats.

Before a Bioterrorism Situation

- **Make a family emergency supply kit.**
 - Depending on the situation, you could be asked to “shelter-in-place” or to evacuate a specific area. Have essential supplies on hand for your family.
 - Canned food: 3-5 days worth – don’t forget a non-electric can opener
 - Water to last 3-5 days -- about 1 gallon of water per person per day
 - Any medications needed by family members (e.g., heart or high blood pressure medication, insulin, contact lens supplies)
 - A first aid kit and first aid manual
 - Personal hygiene supplies (e.g., soap, toothpaste, toilet paper, garbage bags, etc.)
 - Hand sanitizer
- **Don’t forget items for pets.**
 - See the ‘Pet Emergency Supply Kit’ handout.
- **Make a family communication plan.**
 - Know how you will contact each other if you are at work, school or other separate locations.
 - Have an out-of-state friend or relative serve as an emergency contact for everyone to call.
 - Keep a list of emergency phone numbers.
 - Healthcare provider
 - Local public health department
 - Local hospital
 - Give emergency numbers to all family members and post by every phone.
- **Install a HEPA filter in your furnace return duct.**
 - High Efficiency Particulate Air (HEPA) filters can remove particles in the 0.3 to 10 micron range; this may help filter out most biological agents that may enter your house. HEPA filters will not filter chemical agents.
 - If you do not have a central heating or cooling system, a stand-alone portable HEPA filter can be used.
- **Animals can be affected by many bioterrorism agents and may show signs of illness before humans.**
 - Monitor your pets for signs of illness.
 - Keep ill pets away from healthy animals and people.
 - Contact your veterinarian.

During a Bioterrorism Situation

- **Do not panic!**
 - Remain calm and be patient.
- **Gather your emergency supplies.**
- **Stay informed.**
 - Listen to the radio or television for official news and information.
 - This will include the signs and symptoms of the disease, areas in danger, if medications or vaccinations are being distributed, and where you should seek medical attention if you become ill.
 - Information will surface from various sources, not all may be reliable.
- **Be prepared for possible disruption of services.**
 - There may be a large number of casualties.
 - Workplaces, businesses and schools may close in efforts to keep the disease from spreading.
 - You and your family may have to evacuate.
 - Public services (e.g., law enforcement, emergency, healthcare) may be strained.
- **If you become aware of an unusual and suspicious substance nearby:**
 - Cover your mouth and nose with layers of fabric (e.g., t-shirt, handkerchief, towel) to filter the air but still allow breathing.
 - Move away quickly.
 - Wash with soap and water.
 - Contact the proper authorities.
 - Contact a healthcare provider if you become ill.
- **If you are exposed to a biological agent:**
 - Remove and bag your clothes and personal items.
 - Wash with soap and water; put on clean clothes.
 - Follow official instructions for proper disposal of contaminated items.
 - Contact your healthcare provider. You may be advised to stay away from others or even be quarantined.
 - To avoid the further spread, stay in your home unless advised otherwise by the proper authorities.
 - Listen to official warnings and instructions. The delivery of medical services for a biological event may be handled differently due to increased demand.
- **If you are instructed to stay inside and not evacuate:**
 - Close and lock all windows and doors.
 - Turn off all fans, and heat or air conditioning.
 - Seal gaps under doorways and windows with duct tape.

Information adapted from publications from the Federal Emergency Management Agency and Centers for Disease Control and Prevention.



POTENTIAL BIOTERRORISM AGENTS

Man-Made and Technological Threats

The Centers for Disease Control and Prevention (CDC) has identified several agents that are considered potential bioterrorism threats. These are divided into categories based on several criteria. The category descriptions and corresponding agents are listed below.

Category	Description	Biological Agent
<p>Category A High priority organisms or toxins that pose the highest risk to the public and national security.</p>	<ul style="list-style-type: none"> • They can be easily spread or transmitted from person-to-person. • They result in high death rates and have the potential for major public health impact. • They might cause public panic and social disruption. • They require special action for public health preparedness. 	<ul style="list-style-type: none"> • Anthrax • Botulism • Plague • Tularemia • Viral hemorrhagic fever viruses
<p>Category B These agents are second highest priority.</p>	<ul style="list-style-type: none"> • They are moderately easy to spread. • They result in moderate illness rates and low death rates. • They require enhanced laboratory techniques and disease monitoring. 	<ul style="list-style-type: none"> • Brucellosis • Glanders • Melioidosis • Psittacosis • Q Fever • Typhus fever • Viral encephalitis viruses • Ricin and other toxins
<p>Category C These third highest priority agents include emerging pathogens that can be engineered for mass spread in the future.</p>	<ul style="list-style-type: none"> • They are easily available. • They are easily produced and spread. • They have potential for high illness and death rates and major health impact. 	<ul style="list-style-type: none"> • Nipah virus • Hantavirus

For more information about these agents, go to: <http://emergency.cdc.gov/agent/agentlist.asp>



Agroterrorism is the deliberate use of biological agents (e.g., bacteria, viruses, toxins) against agricultural commodities, such as livestock or crops. The result can include economic damage, loss of confidence in the food supply and possible loss of life. These attacks may be extremely difficult to detect initially as signs of illness may not occur for several hours or days. Here are some steps you can take to prepare and protect your farm, livestock and crops from agroterrorism threats.

Before an Agroterrorism Situation

- **Implement biosecurity measures on your farm.**
- **Limit entry to your farm.**
 - Limit access to your farm to one gated road. This will help in monitoring visitors to your farm.
 - Keep all gates locked when not in use.
 - Keep all unused buildings locked.
 - Implement rodent and bird control in barns, especially feed areas.
- **Monitor and document all visitors to your farm.**
 - Post signs to inform visitors of rules to follow while on farm.
 - Do not take visitors to livestock areas or barns unless necessary.
 - Provide coveralls and boots (rubber or disposable) to any visitors accessing livestock.
- **Employees.**
 - Pre-screen new employees.
 - Train employees to recognized disease signs and patterns, so they can promptly detect illness in animals.
- **All personnel on the farm should use personal protection measures.**
 - Wash hands thoroughly with disinfectant soap before and after accessing livestock areas.
 - Wear clean coveralls and rubber or disposable boots when accessing livestock areas.
 - Coveralls and boots should remain on the farm for disposal, or cleaning and disinfection.
 - Do not wear contaminated clothing or boots off of the farm.
- **Vehicles.**
 - Post signs to designate specific parking and driving areas.
 - Park vehicles away from barns and livestock areas, preferably on concrete.
 - Clean and disinfect vehicles before and after transporting livestock.
 - Avoid the transfer of dirt, mud or manure by vehicles.
- **Maintain an inventory.**
 - Keep a current list of all animals on your farm.
 - Include their location and any records of vaccinations or testing.

- **Animals.**
 - Isolate any new or returning animals for a few weeks before adding them to the resident stock or herd.
 - This will help to detect any disease potential without exposing the entire herd.
 - Do not feed table scraps or garbage to farm animals.
 - Call your herd veterinarian immediately if unusual illness or sudden deaths are noticed.
- **Keep a list of important phone numbers.**
 - Herd veterinarian
 - Your State Veterinarian's office
 - Local law enforcement
 - Local extension agent
 - Local and State public health department
- **If you detect suspicious activity,**
 - Contact personnel on the above list.
 - Isolate any livestock the intruder may have contacted.
 - Monitor livestock until authorities arrive.

During an Agroterrorism Situation

- **Signs that may indicate possible agroterrorism:**
 - Unusually high number of sick animals, deaths, or abortions.
 - Abnormal or unusual signs of disease not normally seen.
 - Disease occurring outside of its normal expected season (e.g., flu-like signs in the summer).
 - Repeated outbreaks of the same type of illness.
 - Illness occurring in both animals and persons in contact with animals.
 - Unusual traffic, suspicious activity, or trespassers near your farm.
 - Obvious signs of tampering or entry into vulnerable areas, such as tire tracks or shoe prints around storage areas, water supplies, or animal housing areas.
 - Open bags, empty containers, and other trash in vulnerable or remote locations.

Information adapted from publications from the Extension Disaster Education Network and the Center for Food Security and Public Health.



BIOTERRORISM AND YOUR BUSINESS

Man-Made and Technological Threats

Bioterrorism involves the intentional use of germs (e.g., bacteria, viruses) or other biological substances (e.g., toxins) to cause illness, death, fear, social disruption and economic damage. Here are some steps you can take to prepare and protect your business and employees for bioterrorism threats.

Before a Bioterrorism Situation

- **Establish a business preparedness/continuity plan.**
 - In the event of significant absences, supply shortages or limitations, or other events that would change the way you need to conduct business, you need to have a plan so that you can maintain operations.
 - Document the essential processes and personnel that keep your business running -- from answering the phones, to tracking finances, to distributing your product or service.
 - Make a plan for a temporary location if your company is forced to relocate.
- **Establish an emergency communication plan.**
 - Update employee telephone rosters and records.
 - Create a phone tree and designate individuals who will initiate the communication process.
 - These plans include key contacts (with back-ups), a chain of communications including suppliers and customers, and steps for tracking and communicating business and employee status.
- **Identify an internal shelter in the event that authorities tell you to “shelter-in-place.”**
 - There should be enough room for all employees, any customers or suppliers who may be at your business during the hazardous situation.
 - Stock the shelter with emergency supplies (e.g., flashlights, battery powered radio, first aid kit, food, water, and blankets).
- **Make plans regarding customers.**
 - Determine the likelihood of customers being at your business during a disaster situation.
 - Have an emergency plan for customers; review it with employees regularly.
 - Label exit locations for the building.
- **Install a HEPA filter in your furnace return duct.**
 - High Efficiency Particulate Air (HEPA) filters can remove particles in the 0.3 to 10 micron range; this may help filter out most biological agents that may enter your business. HEPA filters will not filter chemical agents.
 - If you do not have a central heating or cooling system, a stand-alone portable HEPA filter can be used.

During a Bioterrorism Situation

- **Do not panic!**
 - Remain calm and be patient.
- **Stay informed.**
 - Listen to the radio or television for official information.
 - This will include the signs and symptoms of the disease, areas in danger, if medications or vaccinations are being distributed, and where you should seek medical attention if you become ill.
- **Be prepared for possible disruption of services.**
 - There may be a large number of casualties.
 - Workplaces, businesses and schools may close in efforts to keep the disease from spreading.
 - Public services (e.g., law enforcement, emergency, health care) may be strained.
- **If you become aware of an unusual and suspicious substance nearby:**
 - Cover your mouth and nose with layers of fabric (e.g., t-shirt, handkerchief, towel) to filter the air but still allow breathing.
 - Move away quickly.
 - Wash with soap and water.
 - Contact the proper authorities.
 - Contact a healthcare provider if you become ill.
- **If you, an employee or customer are exposed to a biological agent:**
 - Remove and bag clothing and personal items.
 - Wash with soap and water; put on clean clothes.
 - Follow official instructions for proper disposal of contaminated items.
 - Contact a healthcare provider. You may be advised to stay away from others or even be quarantined.
- **If you are instructed to stay inside and not evacuate:**
 - Close and lock windows and doors.
 - Turn off all fans, heat or air conditioning.
 - Seal gaps under doorways and windows with duct tape.

After a Bioterrorism Situation

- **Pay close attention to all official warnings and instructions on how to proceed.**
 - The delivery of medical services for a biological event may be handled differently to respond to increased demand.

Information adapted from publications from the Centers for Disease Control and Prevention and www.readybusiness.gov.



Agricultural chemicals (agrochemicals) are commonly found on farms and in rural communities. This can include any number of products, from pesticides, herbicides and fertilizers to diesel fuel or disinfectant products. Many of these products can be hazardous if used inappropriately. Follow these guidelines to stay safe when using chemical products on the farm.

Agrochemical Usage Safety

- **Always read packaging labels, as it will tell you:**
 - Proper use of product
 - Proper handling procedures
 - Safe storage instructions
 - First aid information
- **Obtain Material Safety Data Sheets (MSDS) for all chemical that you use.**
 - These contain health hazard and handling information, and spill or leak procedures.
 - Have copies near the chemical storage area; keep an additional set in a separate location.
- **Prevent injury and exposure.**
 - Guard against splashes, spills and skin contact when mixing, handling and applying chemicals.
 - At a minimum, wear, long pants, long sleeves (or coveralls) and enclosed shoes.
 - Wear additional protective equipment as recommended by the label. This may include: chemical-resistant gloves, goggles and/or face shield and an approved respirator.
 - Avoid inhaling sprays, dust and vapors.
 - Launder chemical-soiled clothing separately from other laundry and triple rinse.
- **Preparation and application safety measures.**
 - Mix and prepare products in a well-ventilated area.
 - Use only the amount and concentration specified by the label.
 - Do not mix different products unless allowed by label directions.
 - Keep children and pets away when mixing and applying chemicals.
- **In case of exposure,**
 - If chemicals get into your eyes, follow emergency directions on the label. Flush eyes with water for 10-15 minutes and get medical attention.
 - If you accidentally swallow the chemical or become ill shortly after use, call your health care provider or get medical attention immediately! Take the chemical label with you.

- If a chemical gets on your skin:
 - Immediately remove all contaminated clothing;
 - Wash the exposed area, including hair, with generous amounts of water and soap.
 - Put on fresh, clean clothes.
 - See your healthcare provider immediately.

Chemical Storage Safety

- **Limit storage areas to the minimum needed to discourage storing unneeded chemicals.**
- **Store chemical in a secure area.**
 - Keep chemicals in locked, weather proof storage areas. Make sure these areas are well lit.
 - Post a sign indicating the storage area contains chemicals. The sign should also include at least 2 emergency contact numbers – yours and local emergency response (e.g., law enforcement or fire).
 - Keep storage areas dry and well ventilated; keep it from freezing and extreme high temperatures.
 - Store chemicals above ground level to prevent moisture problems (rusting or disintegration).
 - Locate storage areas at a safe site that will not be subjected to flooding.
 - Keep chemicals out of reach of children and pets.
- **Store chemicals in their original containers.**
 - Keep containers tightly closed and clearly labeled.
 - If labels become worn or damaged, re-label the container with its contents or discard the chemical.
 - Do not store chemicals in damaged containers.
 - Never use food or beverage containers to store chemicals.

Disposal Safety

- **Do not pour chemicals down any drain, toilet, sink or storm drain.**
- **Do not dispose of empty containers or extra chemicals where they may be a hazard to fish, wildlife, domestic animals or water sources.**
- **Do not save or reuse empty chemical containers.**

Information adapted from publications from the Environmental Protection Agency, Oklahoma State University and Mississippi State University Extension Service, Clemson University Extension and the National Safety Council.



AGROCHEMICALS ON YOUR FARM: LABELS

Man-Made and Technological Threats

Agricultural chemicals (agrochemicals) are a common component found in rural communities and on farms. Products range from pesticides to herbicides to fertilizers or disinfectants. Many of these products can be hazardous if used incorrectly. Product labels are often overlooked but contain important information for the safe and appropriate use for agrochemical products. An overview of information found on agrochemical labels is discussed below.

Chemical Labels

- **Agrochemicals are regulated by the U.S. Environmental Protection Agency.**
 - It is a federal violation to use products inconsistent with their package labeling.
- **Always read packaging labels, as it will tell you**
 - Proper use of a product
 - Proper handling procedures
 - Safe storage instructions
 - First aid information
- **Read the label before purchasing a product.**
 - The chemical must be registered for your intended use.
 - You must make sure there are no restrictions that would prohibit its use.
- **Read the label before mixing and applying chemicals.**
 - Understand how to mix and safely apply the chemical.
 - Know the necessary first aid measures should an accident occur.
- **Read the label when storing chemicals.**
 - Know how to properly store chemicals to prevent breakdown, contamination and fire hazards.
 - Keep the storage area securely locked.
- **Read the label before disposing of unused chemicals and empty containers.**
 - Special measures may be needed to prevent environmental contamination and human health hazards.

Product Information

- **Brand (trade) name.**
 - Unique name used to advertise the product.; different names are used by different manufacturers even though their products contain the same active ingredient.
- **Product type.**
 - General term for what the product is used for or what it will control. Example: "Herbicide for the control of lawn weeds (dandelion, clover, thistle)."

- **Name and address of manufacturer.**
 - The law requires the maker or distributor of a product to put the company name and address on the label. Often the manufacturer will also list a telephone number and/or web address where users may seek technical advice.
- **EPA registration number.**
 - Indicates the product has been reviewed and registered by the Environmental Protection Agency.
- **EPA establishment number.**
 - Identifies the facility that formulated the product.
- **Ingredient statement.**
 - Provides the common and/or chemical name, amount of each active ingredient and the percentage of inert ingredients in the container.
- **Use classification or registered uses.**
 - Classification of the use (e.g., use pesticide versus a restricted use pesticide) or uses of the product that are approved by the EPA.
 - If the intended use is not on the label, the product should not be used!
- **Directions for use.**
 - Correct application of a product is accomplished by following the use instructions found on the label.
 - It is a violation of federal law to use products in any manner inconsistent with its labeling.
 - Labels may list the number of days which must pass between application and activities such as crop harvest, slaughter, or grazing livestock useage.
 - These intervals are set by EPA to allow time for the pesticide to breakdown in the environment and prevents illegal residues on food, feed, or animal products and possible poisoning of grazing animals.

Storage and Disposal

- **General instructions for the appropriate storage and disposal and its container.**
 - Generally includes temperature requirements (minimum and maximum).
 - Should include information on the disposal of containers or mixtures (e.g., triple-rinse procedures, recycling of punctured containers)
 - State and local laws vary considerably, so specific instructions usually are not included.



Warnings

Warning and caution statements tell you in what ways the product may be poisonous to humans and domestic animals.

- **Child hazard warning.**
 - KEEP OUT OF REACH OF CHILDREN
- **Signal words (toxicity categories).**
 - Printed in large letters on the front of the label
 - Indicates how acutely (rapidly) toxic the product is
 - See table on back for categories and description.
 - Danger, Warning, Caution.
- **Precautionary statements.**
 - Information about possible hazards and how to avoid them.
- **Physical and chemical hazards.**
 - Tells the type of hazard of product (corrosive, flammable, toxic, etc.).
 - Makes recommendations on how to avoid the hazard.
 - Example: “Protective equipment needed. For proper handling and use of the chemical. This may include masks, gloves, and respirators” or “Do not use or store near heat or open flame”.
 - Hazard statements are listed in their order of immediacy and severity.
- **Specific Action Statements.**
 - These statements usually follow the route of entry statements and recommend the specific action needed to prevent poisoning accidents.
 - Examples: “DANGER! Do not breathe vapors or spray mist. Do not get on skin or clothing. Do not get in eyes.” Or “CAUTION = Avoid contact with skin or clothing. Avoid breathing dusts, vapors or spray mists. Avoid getting in eyes.”

Medical/Treatment Information

- **First aid or statement of practical treatment.**
 - Details on what to do in case of exposure.
 - This is not a substitute for medical advice.
 - Always call poison control or your healthcare provider.
- **All DANGER levels and some WARNING and CAUTION labels have a section on:**
 - First aid treatment
 - Poison signs or symptoms
 - Note to physician or antidote
 - An Emergency Assistance telephone number

- **ALWAYS call the National Poison Center Hotline at 1-800-222-1222**

- For further medical instructions
- Have the label available when calling the hotline.
- Take the product label with you to the hospital; it will have specific instructions and information the healthcare provider will need,
- Examples: “If swallowed: DO NOT induce vomiting” or “If in eyes: Hold eyelids open and flush with a steady, gentle stream of water for 15 minutes.”

Agrochemical Safety

- **All chemicals should be stored and handled in a safe manner. For more information, see the “Agrochemicals on Your Farm: Safety” factsheet in this booklet.**
- **Material Safety Data Sheets (MSDS)**
 - All chemical products have a MSDS sheet which contains the following information:
 - Name & trade name of the substance
 - Hazardous ingredient(s) it contains
 - Physical characteristics of the chemical
 - Detailed toxicity information
 - Protective equipment to be used
 - What to do in event of a leak of spill
 - Precautions needed for emergency personnel
 - Any other precautions to be followed

Environmental Hazards

Chemical residues can contaminate water supplies, accumulate to dangerous levels in the environment or harm birds, fish or wildlife. This section of the label explains potential hazards and the precautions needed to prevent impact to the environment. Examples include “This product is highly toxic to fish and aquatic invertebrates.” Or “Do not apply where runoff is likely to occur.”

Information adapted from publications from the University of Florida Extension, Penn State Cooperative Extension, Iowa State University Extension and the Environmental Protection Agency.



AGROCHEMICAL LABEL HAZARD WARNINGS

Man-Made and Technological Threats

Signal Words

Signal words indicate the relative acute toxicity of the product to humans and animals.

Signal word	Category	Oral lethal dose	Examples
DANGER, POISON (skull and crossbones)	I. Highly toxic	A few drops to a teaspoonful	DANGER! Fatal if swallowed. DANGER! Poisonous if inhaled. DANGER! Extremely hazardous by skin contact.
WARNING	II. Moderately toxic	Over a teaspoonful to one ounce	WARNING! Harmful or fatal if swallowed. WARNING! Harmful or fatal if absorbed through the skin. WARNING! Causes skin and eye irritation.
CAUTION	III. Slightly toxic	Over one ounce to one pint	CAUTION! Harmful if swallowed. CAUTION! May be harmful if absorbed through the skin. CAUTION! May be harmful if inhaled
CAUTION	IV. Relatively non-toxic	Over one pint to one pound	CAUTION! Harmful if swallowed. CAUTION! May be harmful if absorbed through the skin. CAUTION! May be harmful if inhaled

U.S. National Fire Protection Association (NFPA) Chemical Hazard Labeling System

The NFPA Chemical Hazard Labeling System provides a visual rating system to quickly summarize the hazards associated with various chemical products. It is not intended as a substitute for reading the label or consulting a MSDS sheet.



Source: www.nfpa.org



Proper use and application of agrochemicals can aid in agricultural tasks, however precautions must be taken to prevent chemical accidents or spills that can affect the individual, community and environment. It is important to be well prepared in case of a spill.

Agrochemical Spill Prevention

- **Always read packaging labels for information on their proper use, handling and actions in case of spills.**
- **Use original or appropriate containers to store and transport chemicals.**
- **After using application equipment,**
 - Make sure valves are closed, hoses are empty, and pumps are turned off.
- **Clean equipment frequently,**
 - Especially before switching to a new mix.
- **Inspect equipment routinely for damage that could cause a leak.**
 - Keep a record of these inspections and repairs.

Have a Spill Response Plan

- **Develop a plan for responding to spills. This should include:**
 - Emergency phone numbers to call should a spill occur – include your state’s agrochemical hotline.
 - An inventory of chemical products on your farm, include any protective equipment.
 - A copy of the Material Safety Data Sheets (MSDS) for all chemicals on your farm.
 - Evacuation plans for the room or building containing chemicals.
 - Instructions for containing and cleaning up spills. You may need separate instructions for different chemicals.
- **Keep response supplies organized and readily accessible.**
- **Plan for the proper disposal of cleaned up materials, including any tools or clothing used.**
 - Discuss the plan with any farm employees.
- **Post signs with chemical spill response procedures.**

Reporting Spills

- **Chemical spills are reportable in most states, and may be at the federal level. In the event of a spill:**
 - Contact your state agriculture or environmental agency.
 - Information may also be reported to the National Response Center [1-800-424-8802 or <http://www.nrc.uscg.mil/nrchp.html>] or the National Pesticide Information Center [1-800-858-7378 or <http://npic.orst.edu/mlr.html>].

Responding to Spills

- **Follow the 3 C’s: Caution, Control/Contain, Clean up!**
- **Caution: Personal Safety.**
 - Do not expose yourself unnecessarily to chemicals.
 - Avoid situations where you may become trapped.
 - Wear Personal Protective Equipment (PPE), such as rubber gloves, boots, long sleeves, long pants; use additional PPE as instructed by the label.
 - Approach the spill from a safe direction (e.g., upwind, upstream).
 - Avoid spills that are reacting (hissing • bubbling • smoking • gassing • burning). Evacuate and call 911.
 - If you or others have been contaminated, wash with running water at least 15 minutes.
 - If anyone has become incapacitated, call 911.
- **Control the source/Contain the spill.**
 - If possible, **safely** stop the spill (e.g., place a leaking container in a larger container, close a valve), immediately!
 - Keep the spill from spreading by using absorbent material, sandbags or by digging a trench to contain fluid.
 - If the spill is too big for one person to control and clean up, call 911 or your local emergency number.
 - Evacuate the area; set up barriers to keep people (and animals) out.
 - Stay with the spill site until someone relieves you.
- **Clean up.**
 - For general spills:
 - Spread absorbent material (fine sand, vermiculite, clay, pet litter) on the spill area.
 - Avoid using sawdust. Strong oxidizing chemicals can combust and be a potential fire hazard.
 - Sweep and scoop all material; work from the outside toward the inside to reduce further spread.
 - Scoop material into a steel or fiber drum lined with a heavy duty plastic bag.
 - Repeat until the spill is soaked up.
 - Seal the bag. Double bag it, label it clearly and dispose of it properly.
 - Some chemicals (e.g., organophosphates) may require special handling. Check the product label for information.
 - For spills on soil:
 - Apply activated charcoal immediately for minor spills.
 - For larger spills, the top 2-3 inches of soil must be removed and properly disposed of; then cover the area with at least 2 inches of lime and fresh top soil.

Information adapted from publications from the Michigan State University Extension, Penn State University Extension and Canada Farm Safety Association.



AGROCHEMICALS ON YOUR FARM: SECURITY

Man-Made and Technological Threats

Agrochemicals are a common component in rural communities and on farms. Unfortunately, some (e.g., anhydrous ammonia) can be the target of theft for illegal use (e.g., methamphetamine production). Follow these prevention measures to deter chemical thefts on your farm.

Prevention Measures

• Chemical storage

- Keep chemicals stored in a locked building, storage cabinet, closet or room.
- Make sure doors and windows are secured.
- Post signs on the door, building, fence to indicate chemical storage. Examples: “No Trespassing”, “Danger – Unauthorized Persons KEEP OUT.”
- Signs should have at least two emergency phone numbers posted.
 - Your phone number
 - Emergency response (e.g., law enforcement or fire department)

• Inventory

- Know your inventory so you can identify missing chemicals quickly.
- Keep storage areas neat and organized to keep track of equipment and chemicals.

• Know potential signs of tampering or illegal activity.

- Unattended chemicals or tanks are often targeted.
- Possible signs of theft or tampering:
 - Footprints in the soil
 - Stained soil
 - Valves or caps that are not tightly closed or which have been tampered with
 - Items left near site (duct tape, garden hose, plastic tubing, barbeque grill propane tanks)

• Educate your employees about theft prevention measures.

- Have them maintain enhanced security awareness to unusual or suspicious actions.
- Make sure they know signs of theft or tampering to look for.

Anhydrous Ammonia Tanks

• Minimize the time the chemicals are on your farm.

- Have tanks delivered as close to application time as possible.
- Return tanks immediately when the application is finished.

• Store in secure location.

- Locate tanks in well-lit, secure areas where they are visible from your house and where valves are clearly visible.
- Make sure all tanks are labeled with signs that warn of hazardous chemicals.

- Contact local law enforcement or local drug force personnel to help identify security measures and encourage nighttime patrols of your area.
- Deter intrusion with motion-detector lights, fences, walls, locked doors and alarms, security lighting, video cameras.
- Consider building a fence or other barrier around chemical tanks, with clearly visible warning signs.
- Block roads, lanes or entrances near the chemical tanks with a gate or barricade to complicate thefts.

• Tanks should be secured or disabled so unauthorized persons cannot access material in containers.

- Purchase or rent locking devices for nurse tank valves.
- Bleed and remove hoses at the end of the day to remove excess liquid and prevent use of them to steal your material.
- Return excess chemicals to the chemical distributor.
- Remove hoses from storage tanks during the off-season and store them separately from the tanks.

• Visually inspect tanks regularly for signs of tampering or illegal activity.

- Place brightly colored plastic wire ties or seals between the valve wheel and the roll cage; check regularly to see if they have been broken.
- Be extremely cautious when finding empty containers at your farm.
- Write down any suspicious vehicle or person that you notice. Send the information to your local law enforcement.

If You Suspect a Theft

• Contact law enforcement immediately!

- Report suspicious vehicles or persons, thefts, signs of tampering, leaks, or any unusual activity to local law enforcement officials.

• If you discover someone near the tank who should not be there:

- Do not confront the person. Users of methamphetamine may become violent with little provocation.
- Contact law enforcement immediately.
- Do not disturb a crime scene.

Information adapted from publications from the Ohio State University Extension, Penn State Cooperative Extension, and the Environmental Protection Agency.



Power outages can occur from a variety of situations (e.g., natural disasters) and can last for prolonged periods of time. This can present unique challenges in the home for ensuring your families safety. Taking preparedness actions now can help keep your family safe and healthy.

Before a Power Outage

- **Prepare an emergency supply kit.**
 - Food, water and necessities for all members of the family to last 3 to 5 days
 - Non-perishable food or food that doesn't require refrigeration
 - Water: One gallon per person per day
 - Any medications needed for family members
 - First aid kit, battery powered radio, flashlight with extra batteries
 - Avoid using candles as they can be a fire hazard.
 - Sleeping bags or blankets, and extra clothing
 - Emergency contact numbers
 - Food thermometer
- **Family communication and evacuation plan.**
 - Know how you will contact each other if you are in separate locations or establish a location to meet.
 - Have an out-of-state relative or friend serve as the family contact person.
- **Protect electrical equipment.**
 - Install surge protectors and/or battery back-up systems for sensitive electronic equipment (e.g., computers).

During a Power Outage

- **Stay informed.**
 - Listen to your battery powered radio for situation developments.
- **Decide whether to stay or go.**
 - Depending on the amount of time you will be without power, it may be best to remain at home (e.g., temporary outage) or evacuate (e.g., power outage in winter with loss of home heat).
 - If driving to another location, proceed with caution and be alert to traffic lights that are not working.
- **Backup power.**
 - Use standby or backup power sources for emergency power. Only use generators in well-ventilated areas. Generators are a major cause of fatal carbon monoxide poisoning.
 - Use battery-operated light sources (flashlights or glow sticks). Do not use candles due to the risk of fire.
 - Never use gas ovens, gas ranges, barbecues or propane heaters for indoor heating.

- **Protect electrical equipment.**
 - Surges or spikes can occur when the power returns; this can damage electrical equipment. Turn off and unplug any electrical equipment (e.g., electronics and appliances).
- **Turn off as many lights and other electrical items as possible.**
 - This helps to eliminate potential fire hazards and lessens the power draw when service is restored.
 - Keep one light turned on so you will know when the power is back on.
- **Keep your food supply safe.**
 - Keep your refrigerator and freezer closed as much as possible throughout the power outage.
 - If your freezer is completely full, the food inside it should be safe for up to 48 hours. If it is half-full, the food inside should be safe for up to 24 hours.
 - If you have been without power for over 48 hours, do not eat any of the food in your freezer.
 - NEVER taste a food to determine its safety!
 - Check the temperature of any and all food before you cook or eat it.
 - Throw away any food that has a temperature higher than 40°F or has been out for more than two hours.
 - If the food in your freezer still contains ice crystals or is 40°F or below, then the food is safe to cook and eat, or refreeze.
 - When in doubt, throw it out!

Water Safety

- **Water purification systems may not be fully functioning during power outages.**
 - Check with local authorities to be sure your water is safe to drink.
 - If your water is not considered safe, boil or treat any water used for drinking, cooking, washing dishes, brushing teeth, washing and preparing food, washing your hands, making ice, or preparing baby formula.
 - "Safe" water includes bottled, boiled, or treated water.
 - Contact your local public health department for water treatment directions.

Information adapted from publications from the American Red Cross, and the Centers for Disease Control and Prevention.



POWER OUTAGES ON YOUR FARM

Man-Made and Technological Threats

Power outages can occur from a variety of situations, such as ice storms. The loss of power to farms using mechanical ventilation, bulk milk-handling equipment, automated feeding systems, heat or refrigeration can result in economic and livestock losses. Preparing now can minimize the impact and protect your livestock and equipment.

Before a Power Outage

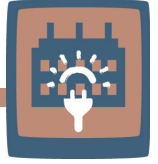
- **Have a standby or backup power source.**
 - This is especially important if you have vital electrical equipment on your farm.
 - If and when possible, buy equipment that has a battery powered backup system.
- **Protect electrical equipment.**
 - Install surge protectors and/or battery back-up systems for sensitive electronic equipment (e.g., computers).
 - Prepare a list of equipment that will need to be turned off during an outage.
- **Develop a emergency preparedness plan.**
 - Have a list of emergency contact numbers.
 - Have a plan on how to maintain operations on your farm should the power go out.
- **Have an emergency plan for water and feed resources for your livestock.**
 - Obtain emergency supplies of forage and grain.
 - Identify emergency resources for water.
 - Have a list of suppliers, truckers, and people that can help with the animals, especially if normal working conditions are disrupted.

During a Power Outage

- **Backup power.**
 - Use standby or backup power sources for emergency power.
 - Only use generators in well-ventilated areas. Generators are a major cause of fatal carbon monoxide poisoning, which can cause loss of consciousness and death.
 - The most common symptoms are headache, dizziness, weakness, nausea, vomiting, chest pain, and confusion.
 - Use battery-operated light sources (flashlights or glow sticks). Do not use candles due to the risk of fire.
- **Equipment safety.**
 - Unplug or turn off all electrical equipment to prevent damage from electrical surges or spikes when power is eventually restored.

- **Ventilation for livestock.**
 - Do not close buildings tight to conserve heat, since animals could suffocate from lack of oxygen.
 - Open vents to facilitate natural air flow. Clear any debris from all vents.
 - Poultry facilities should be equipped with knock-out panels for emergency ventilation.
 - In dairy facilities, open doors or turn cows outside.
- **Food for livestock.**
 - Mechanical feeders will be inoperable during a power failure.
 - Have a plan in place for emergency feeding procedures.
- **Water for livestock.**
 - Provide all animals with plenty of water.
 - Your water pump may be driven with a small gasoline-powered engine; otherwise, you will need to haul water.
 - If you have an outside source of water, cattle can be turned out.
 - Regardless of the source of water, be sure it remains clean and safe for animal consumption.
 - As a last resort, dairy cattle can be fed their own milk if there is no water available.
- **Environmental conditions for livestock.**
 - If the power outage occurs during winter weather, back up heating measures will be needed.
 - If the power outage occurs during hot weather, back up air conditioning or ventilation will be needed.
 - Plan ahead to have the necessary equipment ready for these situations.

Information adapted from publications from the University of Wisconsin Extension.



Power outages can occur from a variety of situations, such as overwhelmed power systems during extreme heat situations or natural disaster situations. Power outages present unique challenges when they occur in the workplace. Prepare now to ensure the safety of your employees and protect your equipment and business.

Before a Power Outage

- **Have a business emergency/continuity plan.**
 - Determine the processes and equipment that would be affected by a power outage: electrical equipment such as computers, security or alarm systems, elevators, as well as lighting, heating, ventilation.
 - Maintain an inventory of all equipment used by your business. Prepare a list of equipment that will need to be turned off during an outage and then reset when power is restored.
 - Determine the impact of service disruption.
 - Back up computer data frequently and store the information in a secure off-site location.
 - Make sure computers and other electronics are plugged into surge protectors.
 - Test your backup battery systems, emergency lighting, phone, security and fire protection systems regularly.
- **Obtain an alternate power source.**
 - Use standby or backup power sources for emergency power.
- **Have an emergency lighting ready.**
 - Use battery-operated light sources (flashlights or glow sticks). Do not use candles due to the risk of fire.
 - Consider installing an emergency lighting system.
- **Establish shelter locations on your property.**
 - In the event that shelter-in-place measures are needed, have enough room for all employees, any customers or suppliers who may be at your business during the situation.
 - Stock the shelter with emergency supplies (e.g., flashlights, battery powered radio, first aid kit, food, water, and blankets).
- **Prepare your employees.**
 - Inform your employees of the business emergency plan; review it with them regularly.
 - Identify employees with special needs who may need assistance if you need to evacuate.
- **Make plans regarding customers.**
 - Determine the likelihood of customers being present if a power outage situation occurs.
 - Have an emergency plan for customers; review it with employees regularly.

During a Power Outage

- **Stay informed.**
 - Listen to your battery powered radio for situation developments.
- **Backup power.**
 - Use standby or backup power sources for emergency power.
 - Only use generators in well-ventilated areas. Generators are a major cause of fatal carbon monoxide poisoning, which can cause loss of consciousness and death.
 - The most common symptoms are headache, dizziness, weakness, nausea, vomiting, chest pain, and confusion.
- **Equipment safety.**
 - Unplug or turn off all electrical equipment to prevent damage from electrical surges or spikes when power is eventually restored.

After a Power Outage

- **Turn on the most essential equipment first.**
 - Wait 10-15 minutes before reconnecting other equipment, to avoid overloading the electrical system.
 - Give the system time to stabilize.
- **Check your facility to make sure everyone is safe and equipment is operating correctly.**
- **Review your preparedness plan to determine what worked and what areas can be improved.**

Information adapted from publications from the Centers for Disease Control and Prevention and the Federal Emergency Management Agency.

PREPAREDNESS WEBSITES AND RESOURCES

Federal Agencies

Centers for Disease Control and Prevention (CDC)

www.cdc.gov

Emergency Preparedness and Response

<http://www.emergency.cdc.gov>

National Ag Safety Database

<http://www.nasdonline.org>

Department of Health and Human Services (HHS)

<http://www.hhs.gov/>

Public Health Emergency Preparedness

<http://www.phe.gov/preparedness/pages/default.aspx>

Department of Homeland Security (DHS)

<http://www.dhs.gov/>

Disaster Preparedness, Response and Recovery

<http://www.dhs.gov/topic/disasters>

Environmental Protection Agency (EPA)

www.epa.gov

Natural Disasters and Weather Emergencies

<http://www.epa.gov/naturalevents/>

National Pesticide Information Center (NPIC)

EPA/Oregon State University: 1-800-858-7378

<http://npic.orst.edu/>

National Response Center: 1-800-424-8802

Report oil or chemical spills

<https://www.epa.gov/emergency-response/national-response-center>

Safe Drinking Water Hotline: 1-800-426-4791

<https://www.epa.gov/ground-water-and-drinking-water/safe-drinking-water-hotline>

Small Business Hotline: 1-800-368-5888

<https://www.epa.gov/aboutepa/about-office-small-business-programs-osbp>

Food and Drug Administration (FDA)

<http://www.fda.gov/>

Emergency Preparedness and Response

<http://www.fda.gov/EmergencyPreparedness/default.htm>

Federal Emergency Management Agency (FEMA)

www.fema.gov

Ready.gov - Prepare. Plan. Stay Informed

<http://www.ready.gov/>

Citizen Corps, FEMA

<http://www.ready.gov/citizen-corps>

Disaster Recovery Center Locator

<http://asd.fema.gov/inter/locator/home.htm>

Assistance Hotline – 1-800-621-3362

Call TTY 1-800-462-7585 for people with speech or hearing disabilities

Disaster Fraud Hotline – 1-800-323-8603

FEMA Regional Contacts

<http://www.fema.gov/fema-regional-contacts>

National Flood Insurance Program (NFIP)

<http://www.floodsmart.gov/floodsmart/>

Internal Revenue Service

Taxpayer Assistance Centers

<http://www.irs.gov/localcontacts/index.html>

National Oceanic and Atmospheric Administration (NOAA)

www.noaa.gov

National Weather Service (NWS)

Maps of current weather hazards in the US

www.weather.gov

Weather Safety

<http://www.nws.noaa.gov/safety.php>

Occupational Safety and Health Administration (OSHA)

Emergency Preparedness and Response

<http://www.osha.gov/SLTC/emergencypreparedness/>

Safety and Health Topics

<http://www.osha.gov/SLTC/index.html>

United States Department of Agriculture (USDA)

www.usda.gov

Animal and Plant Health Inspection Service (APHIS)

www.aphis.usda.gov

Cooperative Extension Offices (County Extension)

<https://nifa.usda.gov/partners-and-extension-map>

Farm Service Agency (FSA)

<http://www.fsa.usda.gov>

Food Safety and Inspection Service (FSIS)

www.fsis.usda.gov

Meat and Poultry Hotline – 1-888-674-6854

National Integrated Pest Management System Centers

<http://www.ipmcenters.org/>

National Plant Diagnostic Network

<http://www.npdn.org/>

PREPAREDNESS WEBSITES AND RESOURCES

Natural Resources Conservation Service (NRCS)

www.nrcs.usda.gov

Small Business Administration (SBA)

<http://www.sba.gov/>

United States Geological Survey (USGS)

www.usgs.gov

Natural Hazards Gateway

<http://www.usgs.gov/hazards/>

Multiple Federal Agencies

DisasterAssistance.gov

www.DisasterAssistance.gov

DisasterAssistance Hotline: 800-621-3362

FoodSafety.gov

<http://www.foodsafety.gov/>

Non-Governmental Agencies

American Red Cross (ARC)

<http://www.redcross.org/>

Disaster Assistance Hotline: 1-800-842-2200

Local American Red Cross Chapter Locator

Directory of local ARC chapters, searchable by ZIP code

<http://www.redcross.org/where>

Safe and Well Registry

<https://safeandwell.communityos.org/cms/>

American Veterinary Medical Association (AVMA)

Saving the Whole Family

https://ebusiness.avma.org/files/productdownloads/STWF_English.pdf

Extension Disaster Education Network (EDEN)

<http://eden.lsu.edu>

National Emergency Management Association

www.nemaweb.org

National Safety Council

www.nsc.org

State Contacts

State Animal Health Officials/Veterinarians

<http://www.usaha.org/Portals/6/StateAnimalHealthOfficials.pdf>

State Departments of Agriculture

<http://www.nasda.org/9383/States.aspx>

State Departments of Health/Public Health

<http://www.cdc.gov/mmwr/international/relres.html>

State Emergency Management Offices and Agencies

<http://www.fema.gov/state-offices-and-agencies-emergency-management>

State Public Health Veterinarians

<http://www.nasphv.org/Documents/StatePublicHealthVeterinariansByState.pdf>

Cooperative Extension – Midwest Region

University of Illinois Extension – Disaster Resources

<http://web.extension.illinois.edu/disaster/>

Iowa State University Extension - Dealing with Disasters

<http://www.extension.iastate.edu/topic/recovering-disasters>

Kansas State Extension Disaster Education Network

<http://www.kseden.ksu.edu/>

Kentucky State University Extension Disaster Education Network

<http://www.wagwx.ca.uky.edu/EDEN/EDEN.html>

Michigan State University Extension – Agriculture

<http://msue.anr.msu.edu/topic/info/agriculture>

University of Minnesota Extension – Extreme Weather

<http://www.extension.umn.edu/extreme-weather/>

University of Missouri Extension – Emergencies and Disasters

<http://extension.missouri.edu/main/DisplayCategory.aspx?C=244>

University of Nebraska-Lincoln – Emergency Planning and Preparedness

<http://emergency.unl.edu/>

North Dakota State University Extension Service – Disaster Education

<http://www.ag.ndsu.edu/disaster/>

Ohio State University Extension – Emergency Management Planning and Education

<http://agsafety.osu.edu/programs/emergency-management>

Oklahoma State University Extension – Tornado Information

<http://www.oces.okstate.edu/tornado-info/tornado-information/>

Purdue Extension Disaster Education Network

<https://ag.purdue.edu/extension/eden/Pages/default.aspx/>

PREPAREDNESS WEBSITES AND RESOURCES

South Dakota State University Extension – Disaster Preparedness

<http://igrow.org/community-development/communities/disaster-preparedness-resources-for-communities/>

University of Wisconsin Extension – Disaster Management and Recovery

<http://lgc.uwex.edu/Disaster/>

The Multi-State Partnership for Security in Agriculture

The Multi-State Partnership for Security in Agriculture (MSP)

<http://www.multistatepartnership.org/>

The Multi-State Partnership for Security in Agriculture - a 15- state consortium – has developed various risk-communication materials – including this booklet and its corresponding website - agricultural emergency planning templates and exercises for crop, livestock and food emergencies, business continuity strategies to ensure the future viability of agriculture during and after emergencies, and state-to-state networking to ensure efficient and effective responses to any agricultural emergency (natural or manmade).

Illinois Department of Agriculture

<http://www.agr.state.il.us>

Indiana Board of Animal Health

<http://www.in.gov/boah/>

Indiana State Department of Agriculture

<http://www.in.gov/isda/>

Indiana State Department of Health

<http://www.in.gov/isdh/>

Iowa Department of Agriculture and Land Stewardship

<http://www.agriculture.state.ia.us>

Iowa Homeland Security Emergency Management Division

<http://homelandsecurity.iowa.gov/>

Kansas Department of Agriculture

<http://agriculture.ks.gov/>

Kansas Animal Health Department

<https://agriculture.ks.gov/divisions-programs/division-of-animal-health>

Kentucky Department of Agriculture

<http://www.kyagr.com>

Michigan Dept. of Agriculture and Rural Development

<http://www.michigan.gov/mdard>

Minnesota Department of Agriculture

<http://www.mda.state.mn.us/>

Missouri Department of Agriculture

<http://agriculture.mo.gov/>

Nebraska Department of Agriculture

<http://www.nda.nebraska.gov/>

New Mexico Department of Agriculture

<http://www.nmda.nmsu.edu/>

North Dakota Department of Agriculture

<http://www.nd.gov/ndda/>

Ohio Department of Agriculture, Division of Animal Industry

<http://www.ohioagriculture.gov>

Oklahoma Department of Agriculture, Food and Forestry

<http://www.oda.state.ok.us>

South Dakota Animal Industry Board

<https://sdda.sd.gov/>

Wisconsin Department of Agriculture Trade and Consumer Protection

<http://www.datcp.wi.us>

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