

Unit Eight

Hurricanes / Evacuation

Overview

In this unit you will learn about hurricanes and how you can protect your livestock against their effects. This unit also discusses challenges faced during the evacuation of livestock.

Objectives

Upon completion of this unit, you should be able to:

- Identify important consequences of hurricanes
- Identify mitigation and preparedness measures for hurricanes
- Describe common problems associated with evacuation of livestock
- Determine your vulnerability to floods and hurricanes
- Determine your level of preparedness for an evacuation

Hurricanes and floods can have many adverse impacts and consequences in common. In this unit we will concentrate on the effects of hurricanes. Because many of the consequences of hurricanes are related to flooding, you should also read Unit 11 to get a better understanding of the effects of hurricanes.

Hurricanes

The Atlantic hurricane season lasts from June 1 to November 30. On average, six Atlantic hurricanes occur each year. Most of these occur in August, September, and October.

The hurricane storm surge is responsible for 90 percent of all hurricane-related deaths in the United States. A storm surge may cause flooding up to 20 feet above normal sea level along major stretches of coastline where the eye of the hurricane makes landfall. This surge of water is topped by battering waves and powerful winds.

Hurricanes affect more than coastal areas. Long after hurricanes make landfall they continue to deposit large amounts of rain inland. Heavy rains and severe flooding from hurricanes that made landfall in the Gulf States has occurred as far north as Ohio, Indiana, Illinois, and Missouri.

Hurricane watches and warnings

The following terms are used to advise the public on the status of a hurricane and actions people should take.

- A hurricane advisory tells where the storm is located, the intensity of wind speeds, and the direction of movement.
- A hurricane watch is issued for a coastal area when there is a threat of hurricane conditions within 24 to 36 hours. In vulnerable areas, actions for protection of life and property should begin at this point. This includes starting to evacuate large animals, such as horses and cattle. Zoos should also start to move or secure their animal population. If you are evacuating livestock, you must begin to move them well in advance of official evacuation orders to avoid or prevent traffic jams.
- A hurricane warning is issued when hurricane conditions are expected in a specified coastal area in 24 hours or less. Hurricane conditions include winds of 74 mph (64 knots) and dangerously high tides and waves. Final actions for protection of life and property should be completed as quickly as possible before high winds and heavy rains arrive. This is the worst time to attempt to evacuate livestock if you have to transport them a long distance.

Mitigation of hurricanes

There are many actions you can take to protect your farm and livestock from hurricanes. In Unit 11 you can learn more about floods, which are common in hurricanes.

First, buildings should be located in areas that are least likely to flood. Buildings should also be constructed and secured in ways that reduce the impact of winds. Consult FEMA's Construction Manual (FEMA-55) for guidance. Obtain historical data on your farm such as flood maps with elevation levels, and plat maps with locations of rivers and lakes. During heavy rainfall, rivers and lakes will flood.

Make a household and farm inventory with pictures or a video, and keep it with your insurance policies in a safe place such as a safe deposit box. In addition to your property insurance, buy a flood insurance policy. Economic losses can be reduced by insuring animals and the farm for catastrophic losses.

Every home and business should have a disaster plan. Having a plan in advance will reduce stress and save lives.

Livestock may require lots of time and coordination to evacuate, and efforts to prepare for an evacuation should take place long before a hurricane strikes. Additional arrangements should be made to accommodate animals. Resources include other types of farms away from the immediate danger area and common facilities, such as county fairgrounds and livestock markets. Two pre-arranged sites should be selected if you should have to evacuate (primary and secondary sites). Do not wait until a hurricane strikes before you attempt to locate your animals at a common facility. Call the primary site to be sure they can assist you. If not, call the secondary site. If you do not have time to evacuate, it is better to leave your livestock in a large, debris-free open field than to be stranded on a highway with them during a hurricane. Make sure the animals are identified with ear tags or leg bands.

Take pictures of your valuable individual animals and put them with your important insurance papers. Also, compile bills of sales or registrations for animals you own. Send a copy of these documents to an out-of-state contact. These actions will assist you in reclaiming your animals if one or more is missing.

Preparedness for hurricanes

Communities in areas that may be threatened by hurricanes should develop action plans that specify how local emergency managers and first responders should plan for and respond to the needs of livestock farms. Special attention should be given to evacuation routes for trucks and trailers that would carry livestock or horses. These activities should be a joint effort involving local emergency management agencies and the livestock industry. Call your local Emergency Management office to obtain these plans for animals, listings of evacuation routes, and boarding facilities in your area.

At the beginning of the hurricane season you should review your hurricane response plan and replenish any items that you will need to evacuate or otherwise respond to a hurricane, e.g., materials to cover windows and to prevent flooding (such as a sump pump). A list of disaster preparedness items that you should consider is in Appendix A of this unit. Businesses and farms should review their evacuation procedures and business continuity plans at least yearly.

When an area is under a hurricane watch, residents should keep calm. Listen to the weather reports and follow official instructions. This is the time to take actions and to avoid a last-minute rush that might leave one marooned or unprepared. Familiarize yourself with your local radio stations, which are designated as Emergency Alert Stations, and the NOAA weather radio.

Back up any critical data and test your communications strategy since cellular and landline phones may fail due to too heavy volume (cellular phones, pagers or two-way radios should be distributed to designated persons). Test your alternative source of power (check generator and ensure that it is protected from the storm), and prepare a water supply (fill all containers).

During a hurricane watch, prepare for an evacuation. All low-lying areas should be evacuated when officials give the order. Utilities should be turned off at the main switch, if time permits. Do not leave companion animals behind, even if you are not sure where to take them. Have a list of hotels that will accept pets. Before the storm, place a leg band on the front and rear leg of each animal and clearly write your name, address, and telephone number with a permanent marker.

Specific actions that you can take include:

- Board up windows or protect them with shutters or tape to reduce danger from wind-driven debris and high wind pressure
- Secure outdoor objects such as tools, porch furniture, garbage cans, and bicycles that could become deadly projectiles in hurricane winds. Store these objects inside, if necessary. Clean all debris from pastures.
- Move farm equipment and livestock trailers close to fixed buildings and anchor them with mobile home ties and anchors.
- Store valuables and personal papers.

To ease the pressure on those who will be directly affected by the hurricane, people inland should contact their friends and relatives (especially seniors) who live in coastal areas and offer them a place to stay if the coastal dwellers have to evacuate.

After a hurricane

Empty all water containers for animals that contain flood water and disinfect the containers before they are used again. Dispose of any feed or bedding that has gotten wet or damp. Do not feed wet feed or silage or anything that may have been contaminated with pesticides or chemicals.

Inspect all animals for injuries and diseases.

Before horses or any livestock are returned to property that has flooded, inspect all perimeter fences and repair, if necessary. Inspect pastures for any debris. One way to do this is using a metal detector. This device will help you find and remove any metallic debris that may puncture the hooves of animals or that may be ingested by cattle and other livestock. Be aware of downed power lines and call the emergency management office to report any downed lines. Do not walk or drive through floodwaters. Call the local Public Health Service or the emergency management office to report dead animals. Insects, especially flies, may become a problem. Call your veterinarian or county extension office for information.

Following floods, wells are commonly contaminated with bacteria. These have to be killed before the water is safe for humans and animals to drink. Appendix B in this unit contains a description of how to disinfect a well. If there is a "boil water" order in effect, continue to boil and disinfect water for human and animal consumption until officials indicate that tap water is safe to drink.

After hurricanes, it is common for snakes and rats to be trapped inside buildings and barns. Snakes will typically go to high places, e.g., above doors and cupboards. Care should be exercised when looking for snakes. Most of these will slide away peacefully if given an obvious opportunity to exit.

Impact & Consequences

Hurricanes have many adverse consequences. The following table presents some commonly reported problems that arise in hurricanes and the unit where you can learn more about the consequences.

Impact	Consequence	Refer to Unit #
Hurricane wind and debris can disrupt communications and telephone call load can be greatly increased	Communications are challenged	5
Utilities, including water, sewer, and gas can be disrupted in hurricanes	Infrastructure failure	6
Hurricane flood waters are often contaminated with sewage	Threat to public and animal safety	7
Hurricanes can displace people and animals	Need to evacuate people and animals	This unit
Hurricane storm surges can increase the salinity of pasture soils and limit the amount of space available to animals for grazing	Displacement of animals	9
Hurricane flood waters are often contaminated with hazardous materials	Threat to public and animal health	10
Hurricanes can cause lagoons to overflow	Adverse effects on the natural environment and wildlife	11
Animals drown in hurricane storm surges and inland flooding	Need for carcass disposal	12
Animals submerged in water for prolonged periods may suffer severe hypothermia	Need for euthanasia	13
Hurricanes can cause animal feeds to become contaminated with mycotoxins, and displaced animals could eat poisonous feeds	Threat to the well-being of animals	14
Stranded animals in hurricanes attract the public's attention	Public concern	15

Evacuating Livestock

Important considerations

Following are some important considerations when evacuating livestock:

- Is there enough time to evacuate?
- How many animals need to be evacuated? Is there a priority for which animals go first?
- Are there restrictions or permits needed to move livestock? (Consider that interstate regulations may still be in effect during declared emergencies)
- How many trucks and people are available to help with the evacuation?
- To what location will animals be evacuated?
- What will the evacuation cost?
- Can evacuated livestock be returned to the farm of origin?

Depending on the disease status of the herd and where animals are being moved (e.g., across state lines), moving farm animals requires veterinary certification. Preparing health certificates takes time and should be initiated as soon as a hurricane watch is issued, if it hasn't already been done.

Animal vaccination records should be current. Animals may be at higher risk of disease in disasters when they have to be boarded with other animals that may not be vaccinated. Stress may compromise the animals' immune system and trigger a disease.

Studies have shown that farmers often have low confidence in officials who recommend that they evacuate. Such perceptions are dangerous for both farmers and emergency management officials. Working together before a disaster can alleviate any apprehension between emergency managers and the livestock industry and facilitate a rapid, safe response.

Cost-saving measures

Several actions can save farmers common expenses that arise from disasters in which evacuations are necessary. These costs can be reduced by addressing the following:

- Check for farm hazards and secure the premise.
- Identify food and water sources that do not depend on electricity (short and long term).
- Purchase generators, feed supplies, and water pumps.
- Identify primary location and secondary (alternate) locations for evacuations
- Check evacuation routes (maps)
- Preview printed identification of every animal moved and sources of this information (medical, feed records, etc).
- Decide which animals should be evacuated first (best of best, pets).
- Have written agreements in advance with the other dairies, locally and out of the area, especially with other farmers for acreage not impacted by hurricane. Even with prior agreement, call ahead to off-farm evacuation site to ensure availability.
- Maintain basic biosecurity measures.

If you must evacuate without your animals, leave them in pre-selected areas. Leave enough food, hay, and water for 48 hours. Do not rely on automatic watering systems.

Business continuity planning

Evacuating animals from a farm is disruptive. Therefore, farmers should plan how to keep the business aspects of their farm functional. The principles of business continuity planning include:

- Prepare a disaster plan/develop plan of action, and practice the plan.
- Evaluate staffing patterns before a crisis.
- Keep current roster of employees with names, addresses, phone numbers, and driving directions to their homes.

- Meet with employees and include them in the planning process. This will help them to understand why and how to function during a disaster.
- Designate employees to a specific job function, including who is in charge during disasters.
- Discuss with employees the potential to stay home with family during emergencies.
- For large operations, plan for housing essential employee's families in a safe place. This will ensure staffing during disasters.
- List all resources.

Evacuation of horses

Horse owners should have enough trailers to evacuate their horses. If owners do not have enough horse trailers or the proper vehicles to transport other large animals, they should identify someone who is willing to help. Potential sources of help are friends, neighbors, a local horse club, county extension agents, and veterinarians. It is highly recommended that only experienced livestock handlers be used to move or work with horses and livestock.

Evacuation of food animals

As with horses, herds of cattle and other livestock should be evacuated early. This is partly because of the number and size of animals that often cannot be moved without experienced help or additional resources, such as trucks. It is also because these animals will naturally move to the most accessible higher ground as floodwaters encroach. However, if animals have to cross flowing water along their escape route they may refuse to cross, and it will not be possible to move them to higher ground.

The evacuation of dairy herds is not as great a problem as many people envision. One study at the University of Tennessee indicated that 5,000 dairy cows can be safely evacuated within 20 hours. Similar information is available on beef ranchers. Prior planning is key to successful evacuation of large numbers of animals. Check with milk plant to see if their insurance will pay for all or part of the milk in the bulk tank.

Survey property for best loading area and best destination where the livestock will be moved, whether on-site or an alternative location.

Case 1: Heavy rain

Missouri is home to many ostrich farms. Farmers raise these birds and related species to sell for breeding, meat, feathers, and oil.

One day in late fall, an ostrich farmer with 12 breeding pairs and more than 30 hatchlings hears how a hurricane that made landfall in Louisiana is moving across the central U.S. and depositing large amounts of rain. His farm is in a low-lying area, and he is concerned that his property could flood.

What would you do?

What do you think are important considerations for this owner?

Concerned for his animals and his investment in them, the farmer plans an evacuation. Several weeks ago he had already entered into arrangements to sell two adult birds and 12 of the hatchlings. He tries to contact the prospective buyers to advise them that his property might flood in the next 2 to 3 days and that it would best for the buyers to collect the birds they wanted to buy. He is only able to contact one of the prospective buyers. The buyer is pleased with this recommendation and comes to collect his birds.

The owner then calls friends in the ostrich business, and finds a friend willing to help him temporarily house five adult pairs and 12 hatchlings. However, earlier in the year several birds had died unexpectedly on his friend's farm. The cause of death was unconfirmed at the time of the evacuation, but was being investigated at the state veterinary diagnostic laboratory. Nevertheless, he feels he has little choice and thinks that it would be safer to evacuate as many birds as possible.

The farmer still has to care for six adult pairs and 12 hatchlings, which he has not been able to evacuate. To accommodate these, he identifies the highest place on his property and erects a fence around it. Before the floodwaters arrive, he moves all the birds to this location. For 2 days he provides these birds with food and clean water from a boat.

Once the floodwaters recede, he finds that much of his farm is covered with flood debris. This debris is a serious risk to the birds as they are inquisitive animals and may ingest objects.

What would you do?

Can you think of other potential problems that could arise?

The farmer cleans up his farm as best as possible. To help with this he calls on a local church youth group and the local Boy Scouts, who have offered their services to help farmers remove disaster debris.

Once the runs were cleared of debris the owner reintroduced his birds gradually. First, he introduced one breeding pair and observed them closely. Once these birds' behavior indicated that the environment was once again safe, he reintroduced all the other birds.

Review

Let's review these challenges and how they were handled.

This owner was able to accommodate most of his animals and was creative in thinking about how to recruit help and where to move his birds.

None of these animals were to be moved across state lines and, as such, did not require permits.

While none of the animals died, their exposure to flood debris presented a hazard. The birds could ingest or step on objects, and damp soil is conducive to the spread of disease, especially internal parasites.

This owner was worried that the birds housed at his friend's farm might be inflicted with the same condition that had killed some of his friend's birds. When a diagnosis of parasitism was confirmed for his friend's birds, he consulted with his veterinarian on how to detect its early signs. This would allow him to intervene at a time when treatment would be highly effective for his own birds.

By reintroducing his birds slowly, he was able to look for any signs of the problem.

Case 2: Hurricane

Much of the southeastern United States is prone to hurricanes.

Hog farmers watched and listened carefully in 1999 as a hurricane approached the U.S. Approximately 1 week before landfall, predictions were that landfall could be within a 1,000-mile span of coastline.

What would you do?

What are some of the challenges that hog farmers are likely to face with this much notice, knowing that the predictions will be more accurate in a few days?

Many hog farmers started to plan for an evacuation by determining which animals were ready for slaughter, for sale, to be moved to out-of-area fattening farms, and how many animals needed to be temporarily evacuated.

Farmers who planned to evacuate called their veterinarians and made arrangements to have health certificates issued for pigs that were to be moved across state lines.

Some farmers made few or no preparations to evacuate.

Within 3 days of landfall, the prediction of where landfall would occur was narrowed to a 300-mile area of coastline and advisories were issued for people and businesses in that area to start to evacuate.

What would you do?

What do you think would be the most appropriate action for hog farmers to take at this time?

Most farmers who had made preparations started to evacuate. These efforts called for extensive logistical coordination and financial planning.

The few farmers who had decided to take the risk of not evacuating were now under considerable pressure and they had lost valuable time to make arrangements.

How prepared would you be?

How long before a hurricane makes landfall do you think that the animals on a farm should be evacuated?

By the time the hurricane made landfall, farmers had 24 hours to evacuate their animals. In this case it became clear that most of the area in which these farmers resided was going to flood.

Farmers who had waited now had to make frantic phone calls in an attempt to mobilize trucks and people to help with a large-scale evacuation. It is not easy to identify trucks and people under these circumstances, because many other people are trying to recruit these resources too.

Last-minute arrangements are often insufficient. At one farm that had only made last-minute arrangements, one truck arrives to move the animals. However, the trucker quickly realized that evacuation was not going to be easy. The farm had many more animals than could be loaded and evacuated, there were too few people to help load animals, the animals did not have health certificates, and there was no designated place to take the pigs. Unwilling to carry the liability for animals loaded in his truck, the trucker left in frustration and without having loaded any animals.

Things got worse on this farm. As the floodwaters arrived, the farmer attempted to move the pigs to higher ground. However, to do this he had to move the pigs through flowing water. The pigs resisted and refused to be moved. As the floodwaters rose, many of the pigs drowned.

Review

Many farmers had thought and planned ahead and were prepared to evacuate their animals. Prior arrangements are key to implementing large-scale evacuations from disasters.

Evacuation of large numbers of livestock requires planning. Farmers may need to consider how an evacuation will impact them financially. The farmers may also have to determine which animals to sell, what resources were needed to evacuate the animals, as well as where evacuated animals could have been taken.

Issuing veterinary health certificates takes time. Therefore, when necessary, veterinarians should be called early to prepare these certificates.

Additional concerns that would have needed to be addressed are whether evacuated pigs could have been returned to the farm. If the animals had been exposed to floodwaters and survived, they may not be safe for human consumption.

Assess Your Vulnerability

Hurricane	
Item	Vulnerability Score
1. Based on your knowledge of local conditions, are you in an area that is likely to be affected by the direct (coastal) or indirect (inland) effects of hurricanes? 1 (not at all)—5 (at least once every five years)	
2. Based on your knowledge of local conditions, how badly are farms in your county disrupted by the direct (coastal) or indirect (inland) effects of hurricanes? 1 (not much)—5 (severely)	
3. What is your vulnerability to hurricanes? Add 1 and 2	Enter this number on page 16-3
Animal Evacuation	
Item	Vulnerability Score
1. If you had to evacuate all of your livestock within the next 24 hours, how well prepared would you be? 1 (well prepared)—5 (it would not be possible)	
2. If you evacuated all of your livestock, how severely would this disrupt your farm? 1 (not much)—5 (severe disruption)	
3. How prepared are you to evacuate your animals? Add 1 and 2	Enter this number on page 16-5



Learning Check

Directions: Determine if the following statements are true or false based on the material in this unit. When you have finished, check your answers on page 8-18.

1. The Atlantic hurricane season lasts from June 1 to November 30.
True or False?
2. Hurricane storm surges are responsible for most of the hurricane-related deaths in the U.S.
True or False?
3. Hurricanes have sustained winds of 45 mph.
True or False?
4. Hurricanes frequently cause flooding along the coast but do not cause flooding problems inland.
True or False?
5. Debris that is deposited in pastures during a hurricane can cause injuries to livestock.
True or False?
6. During a hurricane warning is a good time to test communications, back up data, and test alternative sources of power.
True or False?



Learning Check

7. The number of animals on the farm is an important factor in determining how quickly a farm can be evacuated.
True or False?

8. Most farms require no more than 24 hours to evacuate their livestock.
True or False?

9. When livestock are moved across state lines, an official health permit signed by a veterinarian is required.
True or False?

10. Once animals are removed from a farm, the farmer must be sure that the animals are not exposed to diseases or hazardous materials that could threaten the human food supply.
True or False?

11. Animals will frequently resist walking through flowing water.
True or False?

12. Determining evacuation routes for livestock is a useful preparedness activity for farmers and emergency managers to engage in.
True or False?



Learning Check

13. Vaccination against common contagious disease is an effective response measure to protect animals once they have been evacuated.

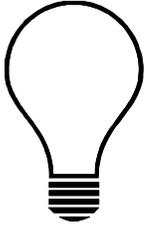
True or False?

14. After a hurricane and before animals are returned, farmers should check all fences and repair any that are damaged.

True or False?

15. Wells with elevated bacterial counts are likely to have been contaminated and should be disinfected.

True or False?



Answers

For every question that you answered incorrectly, review the page listed next to the answer to find out why your answer was incorrect.

1. True8-1
2. True8-1
3. True8-2
4. False8-1
5. True8-4
6. False8-3
7. True8-7
8. False8-2
9. True8-7
10. True8-11
11. True8-7
12. True8-3
13. False8-6
14. True8-4
15. True8-4

Summary

This unit described some of the effects of hurricanes and identified mitigation measures to protect against their consequences. This unit also described some of the problems associated with evacuation of livestock and how you can minimize your losses during an evacuation.