

Unit Nine

Landslides / Animal Escape

Overview

In this unit, you will learn about landslides, including mudslides and avalanches, and how you can protect your farm and livestock against their effects. You will also examine the importance of animal identification in disasters.

Objectives

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

- Describe the typical causes of landslides, including mudslides and avalanches
- Identify mitigation measures for landslides
- List common problems associated with animal identification in disaster situations
- Determine your vulnerability to landslides
- Determine how well your animals are identified

Landslides

On average, there are two federal disaster declarations each year in response to landslides. The typical cost of landslide damage to the U.S. because of landslides is \$ 1 - 2 billion/year. Examples of major landslides have been after the 1964 earthquake in Alaska (60 percent of damages were due to landslides), after the eruption of Mount St. Helen (30 percent of damages were due to landslides), and following extensive rainfall and storms in California in 1998.

Landslides occur in many parts of the country. They are characterized by the down-slope movement of rock, soil, or other debris. Landslides may be triggered by heavy rains, earthquakes, volcanic eruptions, storm-generated ocean waves, or other landslides.

In addition, landslides can result from freeze-thaw cycles, shrink-swell cycles, root wedging, animal burrows, natural erosion or deposition, or the thaw of ice-bearing soils such as permafrost. Sometimes, landslides follow forest fires after the fire has stripped the soil of vegetation and sliding support.

While most landslides are single events, more than one-third of landslides are associated with heavy rains or winter snowmelts. Increased housing development in landslide-prone areas increases the potential damage if a landslide occurs.

Mudflows are defined as flows or rivers of liquid mud down a hillside. Mudflows are most commonly triggered by high-intensity rainstorms but can also occur following forest fires when soil is newly bare. They tend to flow in channels but will often spread out over the floodplain. Mudflows frequently recur in the same area.

Avalanches

Avalanches typically occur on slopes of 25 - 60°. Avalanches occur most commonly after snowfalls of at least 4 inches, and can weigh up to 50 tons per square yard.

Between 1900 and the end of 1995, more than 900 people died as a result of avalanches. Recently, a renewed interest in snow-related leisure activities has increased the death rate. Local forecasts are the most reliable indicator and source of information for protection against avalanches.

There are two types of avalanche:

- One type forms when loose snow starts to move from a single point and spreads outward. These avalanches are usually limited in their size.
- The second, and more dangerous, type of avalanche results from the rupture of slabs of bonded snow. These are typically 10-100 feet wide, but have been seen to be up to a mile in width. Wet snow usually moves at a slower speed, whereas dry snow can move faster than 100 mph.

Avalanches usually occur at the same location as previous landslides and take a similar path each winter. This has important implications for wildlife and hunters. Avalanches clean chutes free of trees, allowing elk, moose, and mountain goats to graze there. These species will take advantage of the easier access to vegetation where avalanches have fallen in the spring. However, it is estimated in Canada that 10 – 20 percent of all mortality in mountain caribou is due to avalanches.

Additional information

Additional sources of information include:

<http://www.fema.gov/library/landslif.htm>

<http://nsidc.org/snow/avalanches/index.html>

<http://landslides.usgs.gov/index.html>

Mitigation of Landslides

Before buying land or building on any property, check with the county land commissioner or the local office of the U.S. Geological Survey for ground composition, drainage, and stability. Surveys of land that may be susceptible to landslides should include grazing land.

Practical things you can do to reduce the chance of landslide on your property include:

- Plant ground cover on slopes
- Build retaining walls
- Reinforce the foundation and walls of your home and barn
- Install flexible, rather than stiff, pipe fittings to avoid gas or water leaks in the event of a landslide or mudflow
- Construct channels or reinforced masonry walls to direct the mudflows around your home, buildings, or barns (be careful not to simply direct the flow of mud onto a neighbor's property).
- Clear obstructions from waterways
- Check with officials to ensure your protective measures are compliant with local, state, and federal laws.

Mudflow is covered by flood insurance policies from the National Flood Insurance Program (NFIP). Buy flood insurance through your local property insurance agent.

Preparedness for Landslides

When landslides occur, seconds may make the difference between life and death. Because of the speed with which a landslide travels, people rarely have time to save any possessions or implement any precautionary measures. Humans and livestock are saved by moving to high ground without any hesitation.

Signs that may indicate slope failure include:

- Doors or windows sticking or jamming for the first time
- New cracks appearing in plaster, tile, brick, or foundations
- Outside walls, walks, or stairs beginning to pull away from the building
- Slowly developing, widening cracks appearing on the ground or on paved areas such as streets or driveways
- Underground utility lines breaking
- Fences, retaining walls, utility poles, or trees tilting or moving
- Water or bulging ground appearing at the base of a slope

If you live in an area where landslides or mudflows can occur, and you notice any of the above signs, you should be on constant alert to evacuate your home, farm, and animals.

If you suspect a slope is unstable, you should have it examined by a specialist.

Impact & Consequences

Mudslides and avalanches are associated with many adverse consequences. The following table presents some commonly reported problems that arise in mudslides and avalanches and the unit where you can learn more about the consequences.

Impact	Consequence	Refer to Unit #
Mudslides can separate people	Communications are challenged	5
Utilities, including water, sewer, and gas can be disrupted from mudslides	Infrastructure failure	6
The weight of mudslides is dangerous	Threat to public and animal safety	7
Mudslides displace people and animals	Need to evacuate people and animals	8
Mudslides distort the environment	Displacement of animals	This unit
Mudslides often contain hazardous materials	Threat to public and animal health	10
Mudslides and avalanches disturb wildlife habitat	Adverse effects on the natural environment and wildlife	11
Animals can be killed in mudslides and avalanches	Need for carcass disposal	12
Animals trapped in mud and snow may suffer hypothermia and injuries	Need for euthanasia	13
Mudslides can disrupt the normal care of animals	Threat to the well-being of animals	14
Stranded animals attract the public's attention	Public concern	15

Animal Escape

Important considerations

Several important issues arise when animals escape. These issues include or arise because of the following:

- Owners may have to prove ownership to people who do not know them
- Many animals look alike
- The owner may be held liable for damages caused by his/her livestock

Proof of ownership

In large-scale disasters, when many animals are evacuated or escape, identifying animals and their owners can be challenging.

Ideally, all animals would be uniquely and permanently identified. Identification serves two purposes:

- The owner can positively identify his or her animal
- Others can trace the animal to its rightful owner

Identification

Many livestock are identified with ear tags, tattoos, and brands. Microchips, freeze marking, or tattoos can permanently identify horses. Owners should have current front and side view photographs of both sides of individual valuable livestock. New identification technology includes electronic and radio frequency identification devices.

Emergency identification methods for your livestock include:

- Painting or etching the hooves
- Body marking with crayon
- Clipping phone numbers in the hair
- Neck banding
- Identification tags on halters
- Glue-on numbers

Capture

Having to catch escaped animals raises several important issues. These include:

- Animals scatter
- Animals can be hard to find (dead and alive)
- Animals face threats from wildlife, dogs, and hunters
- Escaped animals can be hard to catch. Catching escaped animals often requires somebody knowledgeable of the animals' normal behavior
- The safety of the rescuers has to take precedence over that of the animals

Liability

Escaped animals can be a nuisance to others or damage the environment. The owner may be liable for these effects.

Case 1: Landslide

The following case is intended to demonstrate typical consequences of animal escapes. Put yourself in the position of the owner.

An earthquake shakes a rural part of California. A small landslide occurs and knocks down the fence on a goat dairy. Within a few minutes the goats escape.

The goat dairy is surrounded by a fragile ecosystem that is famous for its wildlife, including mountain lions.

What are your concerns?

What are some concerns that this owner may have with his animals escaping?

The owner is concerned that the goats will browse on plants and shrubs and compromise the fragile balance of nature. Some plants may be endangered and others may be toxic to the goats. Ingestion of toxic plants could make the goats' milk unfit for human consumption.

He is also greatly concerned that his goats could be attacked or killed by predators.

What would you do?

If your animals escaped from your farm, would you be able to catch them?

The owner calls on his neighbors and finds some that are willing to help. They split into three groups to search for the goats.

One group is able to catch a few. Another sees a group of six goats, but as they walk toward them the goats scatter and cannot be caught. The third group is not able to find any goats. While looking for the goats in a remote area, they identify footprints of an adult mountain lion and her cub. They decide that the search may be too dangerous and return without success to the farm.

Over the next week the owner erected a temporary enclosure, and puts out feed and keeps other toggled goats. Although some of the goats were caught this way, others were never found again.

What can you do?

What could the owner do to mitigate animal escapes in the future?

After this incident, the owner decides to erect a double perimeter fencing in areas that appear prone to landslides.

He also starts working more closely with other farmers in his area to organize search and capture teams.

Review

The owner recognized that successful rounding up of animals requires persons skilled at animal handling. Also, human safety has to be addressed before animal safety. Predators of livestock are a threat when livestock escape. Statistics on the number of livestock lost from predation in the U.S. can be found by searching for “predator” at: <http://www.usda.gov> or at <http://www.mannlib.cornell.edu>.

Case 2: Avalanches

After a heavy snowfall in Nevada, crews at a ski resort discharge avalanche explosives to reduce the risk of uncontrolled avalanches. Several small avalanches are induced.

Several days later, the local police station receives several calls from concerned citizens. A small band of horses has been sighted on the outskirts of town. One of the horses has riding tack, but no riders can be seen anywhere.

Who would you call?

Given this situation, who would you contact to assist with searching for the owners?

The police officer contacts the Park Services Search and Rescue team and Animal Control.

The Park Service Search and Rescue is there to find and save people in need. When they received this call, they were concerned about the rider of the horse with a saddle. The team prepares for action, but without any indication where the victim might be, they do not deploy. In the meantime, they initiate an intense search effort by phone and radio communication to see if anybody had clues on where to start searching.

Animal Control is responsible for abandoned and lost animals. Staff scanned the horses for microchips but could not find any.

How prepared are you?

The last few times you went riding (or were on another excursion, such as working a field with a tractor, going on a trip) think about what would occur if some sort of emergency happened. Would you be able to notify your family or appropriate authorities in an emergency?

In an attempt to identify the owner of the horses, the Animal Control released public service announcements over the local radio and in the local newspaper.

Soon a purported owner of the horses came to the Animal Control shelter to claim his horses. He indicated that the horses had escaped, he had a trailer ready to load them, and wanted to see them, “to tell if they were really his.”

However, when asked for details about the horses’ colorings and the type of saddle, he could only vaguely describe the horses using descriptions such as: buckskin, bay, mare, gelding with white socks and a blaze.

How prepared are you?

If these were your animals, how would you positively identify each of them?

Personnel at Animal Control were not convinced that this person was the rightful owner. To substantiate this “owner’s” claim, they insisted that they see irrevocable documentation of ownership. He said he would return with this information.

In the meantime, they decide to wait for a few more days and continue with public service announcements.

After two more days of advertising, a different person identified himself as the owner. He indicated that he had been rounding up four of the horses on horseback when the avalanche explosives had gone off. His horse, the one with the saddle, had startled and thrown him. He was injured and was in the hospital.

This person was able to describe in detail the coloring of the horses, even without seeing them, as well as give unique details of the saddle. He also said he could have a family member bring photos of the horses, and a copy of the horses’ most recent Coggin’s test. He also indicated the name of his regular veterinarian who was willing to testify to his legitimate ownership.

The owner rapidly recovered and the horses were returned.

Review

The rider should not have been riding alone.

When his horses wandered off, he should have advised Animal Control or someone else about this and sought help to round up the horses as soon as possible.

If the horses had been micro-chipped, it might have been possible to identify the owner quickly.

In large-scale disasters, staff at animal shelters may not have the time or experience to be as diligent as the staff was in this case in ensuring that the animals are returned to their rightful owner.

Assess Your Vulnerability

Landslides	
Item	Vulnerability Score
1. Based on your knowledge of local conditions, are properties in your county prone to landslides, mudslides, or avalanches? 1 (no, these have never occurred in my county)—5 (yes, at least one property in my county has been affected in the last five years)	
2. If a landslide or avalanche occurred on your farm, how severely would this disrupt your operation? 1 (very little)—5 (it would cause severe disruption)	
3. What is your vulnerability to landslides? Add 1 and 2	Enter this number on page 16-3
Animal Escape / Identification	
Item	Vulnerability Score
1. How common is it for animals to escape while under your care? 1 (it has never happened)—5 (it happened at least once in the last year)	
2. How easy would it be for you to prove ownership of your animals to somebody who does not know you or your animals? 1 (I can positively identify all of my animals)—5 (I could not prove ownership for any of them)	
3. How well prepared are you to identify your animals in a disaster? 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 presented in the unit. When you have finished, check your answers on page 9-15.

1. Landslides occur in many parts of the U.S.
True or False?

2. Landslides cannot occur in areas previously affected by forest fires.
True or False?

3. Accumulation of water and bulging ground at the bottom of slopes may indicate a pending landslide.
True or False?

4. Most human deaths in avalanches are associated with farming.
True or False?

5. The rupture of bonded slabs of snow can result in very dangerous avalanches.
True or False?

6. Significant numbers of wildlife are killed each year by avalanches.
True or False?



Learning Check

7. Planting deep-rooted ground cover is an effective mitigation measure against landslides.
True or False?

8. Damage from mudflows is not covered under the National Flood Insurance Program.
True or False?

9. Many animals look alike and can be difficult for persons other than the owner to distinguish.
True or False?

10. The owner of an escaped animal may be held liable for damages the animal creates.
True or False?

11. For an owner to claim a lost animal, he/she only needs to be able to describe the animal.
True or False?

12. When animals escape, they may scatter and be difficult to catch.
True or False?

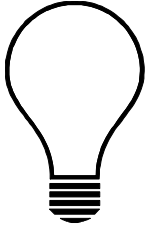


Learning Check

13. Escaped animals can invade and damage fragile environments.
True or False?

14. If escaped livestock ingest toxic plants, their milk may not be suitable for human consumption.
True or False?

15. The local Park Service Search and Rescue department is the legal entity in most communities to deal with lost animals.
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. True.....9-1
2. False.....9-1
3. True.....9-4
4. False.....9-2
5. True.....9-2
6. True.....9-2
7. True.....9-3
8. False.....9-3
9. True.....9-6
10. True.....9-6
11. False.....9-9
12. True.....9-7
13. True.....9-7
14. True.....9-7
15. False.....9-9

Summary

This unit described landslides, mudslides, and avalanches and presented ways to mitigate their effects. This unit also reviewed animal escapes and the importance of animal identification in disasters.