

Managing Livestock Mortalities

Introduction

Death of animals is a normal occurrence and represents a loss to the operator. Even the best livestock producers will have losses between two and three per cent, but higher rates can occur. There are several options for managing livestock mortalities.

Cause of Death

The death of an animal may be an indication of a problem area that needs prompt attention. Cause of death may include disease, predation, poor nutrition or accidents. Analyze the cause of death and identify measures to minimize further losses.

Confirm that feed is providing sufficient nutrition by consulting a livestock agrologist. If poor feed is contributing to death loss, the agrologist will help improve the feeding regime for fewer deaths and improved herd performance.

Contact a veterinarian if the death rate increases noticeably. The veterinarian will help identify the cause of death and prepare a suitable treatment program if appropriate. Identify the source of infection if the animal died from a transmissible disease. Review bio-security measures, as animals from other herds or barns may carry disease. Rodents, insects and birds may also carry disease.

Verify the cause of death with laboratory analysis. Deliver the animal carcass or tissue samples to an appropriate laboratory. The laboratory will notify the Canadian Food Inspection Agency's (CFIA) District Veterinarian if the cause of death is a reportable disease. Links to lists of federal and provincial reportable diseases are found in Appendix B. Links to CFIA's district veterinarians are found in Appendix C.

If the mortality is a bovine that fits the Bovine Spongiform Encephalopathy (BSE) surveillance requirements (greater than 30 months of age), submit a sample to CFIA's BSE surveillance program. Contact a CFIA district veterinarian or call 1-877-SASK-BSE (1-877-727-5273). Moving specified risk materials off premise requires a permit from CFIA. For more information please contact a CFIA District Veterinarian or call 1-800-442-2342.

Rendering

Rendering is a process that converts waste animal tissue into stable, usable materials. The high temperature (about 130 C or 265 F) will destroy most pathogens if any are present. The process temperature, length of retention time and sensitivity of the pathogen affect survival. Evaluate animals that died under suspicious conditions to determine if rendering is an appropriate disposal option (some diseases may not be destroyed by rendering).

Rendering is not an option for most producers. Call the rendering processor to determine if rendering is a viable option. Carcasses must be in good condition and storage of the carcass and timing of delivery to the rendering processor is important.

In the winter, store animals to prevent access by scavengers prior to pickup. A non-insulated building is ideal for storage, but a fence or bale enclosure also works. In the summer, cold storage will generally be required to hold the carcass before pickup.



Rendering pick-up bin

Bio-security is an important consideration. Be aware that the rendering vehicle usually stops at several farms on its route. Select a pickup location that is separate from healthy livestock, convenient for both the driver and producer and screened from public view. Bins may be available from the rendering company to allow the carcass to be loaded easily. Otherwise, equipment such as a front-end loader must be made available.



Air curtain incinerator

Incineration

Incineration is an acceptable method of disposal if performed properly. Incinerators are more often associated with poultry and swine, but larger animals may also be incinerated. The capital cost may be prohibitive to some producers, but many operations may find incineration a convenient and economical option. Remember to estimate the cost of energy and fuel when comparing incineration to other disposal options.

Fuel type is a consideration. Natural gas is suitable but may not be available in some areas. Diesel will burn hotter than

natural gas, and is an option where natural gas is not available.

Some incinerators burn propane and others burn wood. Some incinerators require a source of electrical power (usually 220V). Locate the incinerator near an electrical source, or install power at the incinerator location. Although less convenient, a generator is an option in the absence of power lines.

Size the incinerator to handle the largest expected carcass. The incinerator will not operate properly if the incinerator is overfilled because airspace is required around the carcass to achieve a proper burn. If the incinerator is too small, the carcass must be reduced to an appropriate size. Consult the incinerator supplier to select a unit that meets the operation's requirements.

Maintain the operating temperature above 850 C (1,560 F) to limit emissions and achieve thorough and complete incineration, including bones. Following incineration, some bones may appear intact but will crumble easily. The incinerator should have a secondary chamber to ensure complete combustion.

Neighbours will not notice incineration if it is operating properly. Regardless, be aware of wind conditions and the location of neighbours when operating the incinerator. Strong winds help to reduce the travel distance of odour, whereas calm conditions (often dusk or dawn) help odour to travel further distances.

Composting

Although composting is commonly associated with small animals like poultry, large animals such as cattle will compost under proper conditions. Control the composting process carefully to promote proper decomposition. Burying a carcass in a pile of straw to rot is not considered composting.

Two common on-farm composting systems are bins and windrows. "In-vessel" composters are also available and may be suitable for some operations. "In-vessel" systems are usually produced commercially, and reduce the composting time with active aeration and heat.

The bin system requires at least three bins. One bin is filled with carcasses and a bulking agent (straw, sawdust, etc.) and then left to compost while a second bin is filled with carcasses and a bulking agent. When the second bin is full, the carcasses are moved from the first bin to a third bin for further decomposition.

Windrow composting is an outdoor system often used to compost



Hog carcass bin composting



"In-vessel" composter

manure. The carcasses are layered and covered with a bulking agent to form a pile roughly triangular in cross-section. The windrow grows longer as more carcasses are added, and eventually the windrow will be turned to encourage further decomposition.

Compost production requires careful management. Moisture content, temperature and carbon-to-nitrogen ratio are important variables. Monitor the process to maintain these variables within an acceptable range. Composting time ranges from six to 18 months, depending on a number of variables: management, size of carcasses, climate and compost pile design. The finished compost product is a stable source of nutrients and is generally weed and pathogen free.

The capital cost of composting includes constructing or adapting existing structures, and grading or earthwork to prevent runoff. Bins could be roofed for control of moisture content. Access to water is important to control moisture content, and access to equipment is required to move animals and compost.

Consider the proximity of surface water, groundwater and neighbours when locating the compost facility. The site should be convenient, accessible in winter and screened from view. Cover the mortalities with sufficient bulking agent to prevent access by scavengers and reduce odour.

For further information, refer to the Saskatchewan Ministry of Agriculture publication [Composting Animal Mortalities: A Producer's Guide](#).

Burial of Normally Occurring Mortalities

Burial of mortalities is a common and appropriate method of disposal if managed properly. The carcass is disposed of quickly and potential nuisance is eliminated.

Locate the burial pit in clay or till soils. Fortunately, much of Saskatchewan is underlain by till material that extends to a significant depth beneath the surface. Dig test holes to a minimum depth of 4 m (13 ft.) with a backhoe and wait 24 hours. If water appears in the test hole, choose an alternate location for a burial pit. Avoid locations with sand and gravel. The burial pit and pit area should not be subject to flooding.



Burial pit cover

Consider the depth to a useable water source. Maintain at least 4 m (13 ft.) between the bottom of the burial pit and a useable groundwater water source, depending on site conditions. A good description of subsurface conditions may be available from records of nearby wells. The Saskatchewan Water Security Agency has a record of wells and known aquifer locations.

Winter burial is a challenge. However, burial pits may be prepared in the fall and a final cover placed in the spring. Estimate the winter death loss (Appendix D) and allow 0.75 cubic metres (1 cu. yd.) of burial pit volume per 450 kg or 1,000 lb. of carcass. A lid will protect mortalities from scavengers and prevent snow from filling the pit. The location must be accessible by equipment during winter conditions.

Alternatively, the carcass may be stored until spring at a site that is inaccessible to scavengers. A sheltered building, metal bin or a round bale enclosure with chain link provides good protection.

Burial Pit Management

Puncture the abdominal cavity of large ruminants to prevent bloating. Be careful to avoid contact with abdominal material.

Cover the animals as soon as possible. As the burial pit fills, cover each layer of carcasses with at least 0.3 m (1 ft.) of soil. In the winter, 0.6 m (2 ft.) of straw is an acceptable interim cover.

Maintain at least 1 m (3 ft.) between the top surface of the carcasses and the natural ground surface. Mound the final soil cover about 1 m (3 ft.) above the surrounding terrain to ensure that water doesn't pond above the burial pit.

Maintenance of the area around the disposal site may be required for several years until decomposition of the animals has occurred and the soil has finished settling. Unless the pit is in a cultivated field, seed the top of the burial pit to grass or other vegetative cover to prevent erosion and weed growth.

For assistance in locating a site for disposal of mortalities from your livestock or poultry facility, contact the Agricultural Operations Unit at 306-787-2150.

Catastrophic Mortalities

Producers should develop a plan in the event that they suffer a catastrophic event that results in a large number of deaths. This includes events such as fire, flood, building collapse, suffocation or the outbreak of a major disease.

If the death of the animals is a result of a federally reportable disease, the CFIA is the authority responsible for directing the disposal of mortalities. The CFIA will assist in advising on the safe disposal of carcasses.

If a large number of animals or poultry die due to an unlisted infectious disease, a fire, flood or another natural disaster, the appropriate municipal authorities and various provincial government departments will direct disposal of the mortalities.

If disposal sites are pre-selected and approved, carcass disposal can begin immediately. In some cases where a highly infectious disease is involved, it is desirable and important to dispose of the carcasses quickly to contain the disease and prevent its spread to neighbouring farms. Rapid disposal of the carcasses is also important in hot weather as carcasses start to decompose very quickly and can become a nuisance.

On-site disposal is the preferred option for a catastrophic death loss.

Site Selection for Mass Burial

The selection of a carcass disposal site requires some knowledge of the environmental conditions at the proposed site. Factors such as the topography, depth to useable groundwater, soil type and depth, distance to neighbours and the location of roads are important. A good site will have natural features that protect the environment and minimize future maintenance.

Consider the livestock producer's own land as the first site (particularly land close to the facility) to minimize transportation, allow for timely disposal and control spread of disease.

If the producer has obtained an approval under *The Agricultural Operations Act*, the test hole logs provide excellent information about the soil type and depth at the site and may provide information on depth to water sources in the area. Well logs, which are available from the Saskatchewan Water Security Agency, are another excellent source of information on the type of sub-surface soils and groundwater potentially in the area.

Locate the burial pit in an area not subject to flooding. The livestock producer must be aware of any underground utilities located at or near the selected burial site. The site must be accessible by wheeled vehicles. Give consideration to location of neighbours and the prevailing winds in the area. If possible, the site should be screened from public view.

Regulations

There may be requirements for carcass disposal under the following legislation. Contact the appropriate authority for further information.

Saskatchewan Health

The Health Hazard Regulations

Section 14 - Subject to The Wildlife Regulations, 1981, when an animal dies or is unintentionally killed, the owner or the person in possession of the animal shall cause the carcass to be removed and buried or disposed of to the satisfaction of the local authority.

Saskatchewan Agriculture

The Agricultural Operations Act

Section 19(2) - No person shall manage the waste from an intensive livestock operation that belongs to a class prescribed as a class of intensive livestock operation for which a waste management plan is required, except in accordance with a waste management plan approved by the minister.

The Agricultural Operations Regulations

A dead animal management plan is required for certain intensive livestock operations.

Agriculture and Agri-Food Canada

Health of Animals Act

Section 5(1) - A person who owns or has the possession, care or control of an animal shall notify the nearest veterinary inspector of the presence of a reportable disease or toxic substance, or of any fact indicating its presence, in or around the animal, immediately after the person becomes aware of the presence or fact.

Glossary

Aquifer: An aquifer will yield sufficient volumes of water for domestic or commercial use. An aquifer is a saturated permeable geologic unit that can transmit significant quantities of water under ordinary hydraulic gradients. Hydraulic conductivities in such formations are typically greater than 10⁻⁷ m/sec.

BSE: Bovine Spongiform Encephalopathy, also referred to as mad cow disease.

Till: A mixture of clay, silt, sand, gravel and boulders. Till is typically very good at preventing water movement, because hydraulic conductivities are typically less than 10⁻⁹ m/sec.

Topography: Natural or physical surface features of a region commonly shown on a map by contour lines.

Appendix A - Contacts

1. Saskatchewan Institute of Agrologists: 306-242-2606
2. West Coast Reduction Ltd: 1-800-803-9714
3. Saskatchewan Water Security Agency - Groundwater Approvals: 306-694-3980

Appendix B - Reportable Diseases

1. [CFIA Animal Disease Lists](#) (visit inspection.gc.ca and search for "Animal Disease List")
2. [Saskatchewan's Notifiable Animal Disease List](#) (visit saskatchewan.ca and search for "Notifiable Disease List")

Appendix C - CFIA District Veterinarians

1. [CFIA Animal Health Offices](http://inspection.gc.ca) (visit inspection.gc.ca and search for "Animal Health Offices")

Appendix D - Death Loss

Type	Kind of Animal	Weight	Annual Death Loss (%)
Beef cattle	Cows and bulls	550 kg or 1,212 lb	1
	Feeder cattle	450 kg or 992 lb	1.5
	Replacement heifers	360 kg or 794 lb	1
	Calves	135 kg or 298 lb	4
Dairy cattle	Cows and bulls	600 kg or 1,323 lb	4
	Replacement heifers	450 kg or 992 lb	4
	Calves	135 kg or 298 lb	8
Hogs	Boars or sows	150 kg or 331 lb	4
	Feeder pig	100 kg or 220 lb	3
	Weanling pigs	16 kg or 298 lb	1.5
Poultry	Hens, cockerels, capons	1.8 kg or 4 lb	6
	Chicks, broilers	1.5 kg or 3.3 lb	2
	Hen turkeys, geese, ducks	8 kg or 18 lb	5
	Heavy tom turkeys	2 kg or 26 lb	7
Sheep	Rams or ewes	45 kg or 99 lb	3
	Lambs	20 kg or 44 lb	5
Goats	Does or bucks	45 kg or 99 lb	3
	Kids	20 kg or 44 lb	5
Horses	Mares and studs	600 kg or 1,323 lb	1
	Replacements	400 kg or 882 lb	1
	Colts or ponies	135 kg or 250 lb	4
Bison	Cows or bulls	550 kg or 1,212 lb	0.25
	Calves	135 kg or 250 lb	1
Elk	Cows or bulls	227 kg or 500 lb	3
	Calves	113 kg or 250 lb	5
Deer	Does or bucks	90 kg or 200 lb	5
	Fawns	23 kg or 50 lb	10