The Maryland plan for disaster recovery:
Disposal of dead animals

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fter a disastrous event, many problems concerning animals need to be addressed. Some of the issues that need to be resolved include, but are not limited to, care and treatment of injured animals, stray animal control (domestic pets and livestock that escape from confined areas), obtaining suitable housing for livestock and homes for pets, return of strays to their owners, providing food to abandoned and owned animals, determination if animals that died during the disaster died because of the event or some other cause such as an infectious disease, and disposal of animal carcasses.

When a single animal dies, arranging for disposal of its body usually is not difficult; however, if 100 cows or 50,000 chickens die, carcass disposal can be a challenging task.

Many private groups and governmental agencies are interested in how to dispose of dead animals. The Department of the Environment wants to ensure that the chosen method of disposal will not contaminate the environment. It is primarily concerned with air quality and prevention of contamination of groundwater.

The Department of Health usually wants the carcass disposed of quickly before it becomes a health hazard to human beings. The USDA and State Department of Agriculture want to prevent spread of potentially infectious or exotic diseases.

The Department of Natural Resources is concerned that decomposing animals could be a source of disease to the wild animal population. It also is concerned about disposal of marine animals, such as whales that die from strandings, and large fish kills.

The Department of Transportation is concerned about animals killed in traffic accidents, such as by the overturning of a cattle truck. When this occurs, it usually wants to remove the carcasses from the highway as quickly as possible so normal traffic flow can resume. The Department of Transportation also is a good source of heavy equipment to move carcasses.

The Department of Defense has the responsibility of carcass removal from military installations. It also can provide heavy equipment. Private renderers are interested in animals that die because their business involves removing and disposing of carcasses. Large numbers of dead animals, however, could exceed their capability to respond.

Private zoos and animal parks also have an interest in plans for carcass disposal. A single elephant carcass can be a major disposal problem. Sheep owners have a special problem in animal disposal. Renderers will not pickup sheep, whether normal or diseased, because of the concern in their industry that scrapie-infected sheep in rendered products fed to cattle could be the source of bovine spongiform encephalopathy.

Finally, the State Emergency Management Agency receives all requests for help after a disaster. They need to know of the plans for dead animal removal and carcass disposal.

The most important part of a dead animal disposal plan is the designation within government of someone authorized to make decisions concerning animal disposal. This person should have the authority to coordinate the responses of the various agencies mentioned. The health annex of the state of Maryland disaster Emergency Operations Plan delegates to the Maryland Department of Agriculture (MDA) to “provide advice about and coordinate the proper disposition of all animals killed in the emergency.” The Department also is delegated the responsibility in the same annex to “coordinate laboratory analysis of carcasses at designated MDA facilities prior to disposal.” It was given the responsibility to determine whether laboratory analysis (necropsy with supportive laboratory tests such as viral and bacterial culture or toxicologic screens) of animals dying at the time of the disaster, or anytime thereafter, was necessary. This was done so that a concurrent zoonoses would not be missed or disputes over the cause of death of an animal could be settled.

The MDA has assigned 2 veterinarians to the

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Maryland Emergency Management Agency (MEMA). These veterinarians are the individuals who implement these provisions of the Emergency Operations Plan. Problems concerning dead animals that reach the MEMA Emergency Operations Center during an event are channeled to the MDA desk for resolution. The veterinarian on duty determines the most appropriate method of disposal, and then meets with other representatives of interested agencies (also at the Emergency Operations Center) to ease resolution of the problem.

The MDA is developing a written agreement with the Department of Transportation for use of their heavy equipment to move carcasses. This agreement details what equipment can be borrowed, at what cost, and how it can be accessed during nonworking hours. It further details who will operate the equipment, what charges will be incurred by whom, and, if payment of overtime expenses is necessary, who will pay them. All this needs to be addressed in writing before a disaster occurs. It is difficult to try to work this out during or after an emergency situation develops. Similar written or oral agreements with other state or private agencies have been developed to institute methods to gain permission quickly for whatever disposal methods are selected for the particular circumstance, without resorting to the usual bureaucratic paperwork normally required to get permission under nonemergency situations.

The usual methods available for disposal of carcasses are burial, cremation, or rendering. When selecting the burial site, consideration should be given to underground cables, water and gas lines, wells, the water table, septic tanks, and rock formations. An area away from public view should be selected. The USDA recommends that to bury a large number of animals, a trench 7 feet wide and 9 feet deep is required. At this depth, 14 ft² of floor space is required for each bovine carcass (5 mature hogs or sheep equal 1 bovine carcass). If conditions permit, a deeper trench (12 to 20 feet) may be desirable, but it must be at least 6 to 10 feet above the water table. For every additional 3 feet in depth, the number of animals per 14 ft² of floor space can be doubled.

Cremation can be performed in an animal crematory or outside in the open air. The number of animals that can be burned in a crematory and the amount of time between loads will depend on the type of unit available. To burn in the open air, a flat area, readily accessible to heavy vehicles hauling material and away from public view, should be selected. The prevailing wind direction should be considered to prevent unnecessary quantities of smoke and odors from blowing toward farm buildings or across public roads. The site should be away from buildings, hay, straw, and feed stacks, as well as overhead electric and telephone cables and shallow underground pipes or gas mains. The fire will burn better if constructed at right angles to the prevailing wind. Carcasses should be elevated on a platform constructed of incendiary material (eg, wood, coal, straw, or old tires). The amount of incendiary material needed depends on the type used and number and species of animals being burned. It is of the utmost importance to monitor the fire during all phases of the burning. Burning or burying carcasses requires coordination with the local Department of the Environment. Some people have suggested that food animals that come under meat inspection regulations and that have been killed by a disaster (eg, flood) should be donated to the homeless for food. Unfortunately, this is against the law. Meat inspection regulations only allow the use of slaughtered, inspected animals for food purposes. Also, by law you cannot give to the indigent any food products of a lesser quality than that sold to the public.

Perhaps the most promising methods of disposal are composting or fermentation. These procedures are being used in Maryland on the eastern shore to dispose of poultry carcasses. Considerable research on these methods has been conducted. Use of the same procedures for disposal of large animals is being investigated, and preliminary results are promising.

To compost animal carcasses in Maryland, permission is needed from the State Department of the Environment. After approval, a boxed area is constructed where the procedure can be conducted. One part by volume of carcass is layered with 2 parts by volume of litter and 1 part by volume of straw. This is repeated in layers until the enclosure is filled. Birds are small enough that they can be placed in their layer without additional cutting or sectioning. Large carcasses need to be cut or sectioned into smaller portions (10- to 12-inch thickness). When composting large carcasses, mature can be substituted for litter. The addition of 10 to 15 pounds of urea/1,000 pounds of large animal carcass also should be added. Thus, there would be 1 layer of carcasses (1 part), then a layer of litter (2 parts), then a layer of straw (1 part), and then it would be repeated. This combination results in a carbon to nitrogen ratio of 25 to 30:1 with 50% moisture and 20% air space. The actual composting is accomplished by Bacillus spp, a thermogenic aerobic bacterium in the litter. The process generates internal temperatures of 60 to 68.3°C. The performance of the composting system can be monitored by measuring its temperature. Over a long period of time, this temperature also kills most pathogenic organisms. The process takes about 14 days to complete. After 7 days, the compost pile should be turned. Surprisingly, little obnoxious odor is generated. When completed, the finished product can be used on the farm for fertilizer.

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Murphy D, Nash Johnson and Sons, Race Hill, NC: Personal communication, 1993.

Fermentation differs from composting. Fermentation takes about 48 hours to complete. You start with a metal container, such as a large barrel tank or tanker truck. The tanks must have a large volume-to-surface characteristic. Carcasses and fermentable sugars are proportioned by weight and mixed. You mix 90% chopped or ground carcass with 10% of fermentable carbohydrate. Lactobacillus spp (bacteria from the digestive tract) ferment the material. If the gastrointestinal tract is unavailable, a supplemental inoculum can be prepared from live-culture yogurt and skim milk. The reaction that develops is anaerobic, and it produces temperatures of 32.2 to 40.5 C. The finished product is called broiler silage. It is stable, pathogen free, and has a pH of 4.0. If desired, the product can be further processed by dehydration. It can then be used for animal feed.7

The advantage of fermenting or composting carcasses is that the resulting product can be used for fertilizer or feed. These methods use a product with no financial value and convert it to one of economic importance.

There are many different ways to dispose of dead animals. Each situation is unique. The method that would be proper in one situation may not be so in another. Also, the disposal method selected may be of interest to various governmental or regulatory agencies. The most important facet of any procedure is to have someone in a position of authority to make decisions and facilitate their implementation. Veterinarians are most suited for this task. The general principles of a plan for carcass disposal should be formulated and put in writing in advance of a disaster.

References

Use of search and rescue dogs

Caroline Hebard, MA

Because of the vast spaces and geographic diversity in the United States, search dogs have emerged as a widely accepted resource over the past 2 decades. They were used historically in Europe during World War I and II in the battlefields to locate injured soldiers or to deliver messages during combat, as well as to search debris after bombing raids. In the late 1960s, Bill Syrotuck, an American dog handler, went to Switzerland to learn more about the training methods and air scent theories for dogs, based primarily on mountain and avalanche search experience. As a result of the knowledge brought back by Syrotuck to the United States, it was possible to develop search techniques and strategies appropriate to the topographic and climactic extremes encountered on this continent.

In subsequent years, some performance and training standards for dogs and handlers in the United States have been developed. This has been a somewhat controversial issue. Progress has been made, however, mostly because of efforts by the Federal Emergency Management Agency, Search & Rescue Dogs of the United States, the National Association for Search and Rescue, and the International Rescue Dog Organization, as well as dedicated individuals within the search and rescue community. In Europe, the testing of teams for mission-ready status is an accepted practice, and testing is administered under a central organization in each country. Through the efforts of the International Rescue Dog Organization, at least 15 nations will have compatible standards and test evaluation rules. States such as California, Virginia, and Maine already have tests that certify a dog and handler team as mission-ready within their state. Hopefully, more states will follow their example.

The Federal Emergency Management Agency