

Roadkill Composting in Montana. A Seasonal Rotation Approach.

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INTRODUCTION

Whole carcass composting of road killed large game animals, primarily deer, can be problematic in the winter when the carcasses arrive frozen. The Montana Department of Environmental Quality (DEQ) and Montana Department of Transportation (MDT) developed a method that successfully composted more than 600 deer in Victor, MT in 2005-2006. The MDT has licensed seven sites around Montana with the DEQ and will experiment with regional feed stocks such as spoiled hay, excess straw, and animal bedding.

Montana is a very large state, the fourth in size in the union, approximately 145 thousand square miles. The human population of Montana is less than one million and we have about 550,000 deer and 140,000 elk, plus antelope, big horn sheep, mountain goats, moose, wolves, black and grizzly bears, and domestic livestock. All of these animals have been killed on Montana highways and pose a disposal problem. Montana is a northern state, bordered by Canada, Idaho Wyoming, North and South Dakota. Conditions are hot and dry in the summer and cold in the winter. Annual precipitation is less than 14 inches where most people live and where the roadkill composting operations take place. The mountains receive considerably more precipitation. The climate leads to problems in carcass composting in the remote locations we deal with. In the summer, water balance is a problem. In the winter, it is cold, and the carcasses are often partially or completely frozen.

The MDT approached the DEQ with the idea of reducing the cost of roadkill disposal through composting. Since the DEQ is the regulatory agency that licenses waste management operations, the DEQ began a literature search to determine if this was possible. Based on this research, a preliminary plan of operations was developed in cooperation with MDT and a test site selected near Victor, MT with the object of extending the process to other MDT sites around Montana.

Victor is in the Bitterroot Valley about 35 miles south of Missoula, MT. US Highway 93 extends down the valley from Missoula to the Idaho border following the river, typical of much of Montana. Trade routes followed the rivers, and population followed. The site sits at about 3500 feet and the mountains on the west reach elevations of 10,000 feet. On the east side of the valley, the mountains are lower, about 8,000 feet in elevation. The Bitterroot River flows north to Missoula and the Clarks Fork River of the Columbia. The valley is about 10 miles wide at Victor. Roadkill on the 50 mile long Victor section is from 500 to 700 animals per year. The cost of carcass management was about \$275 per week just for hauling the carcasses to Missoula and the costs of disposal were rising with the closure of the local rendering plant. Victor is not in the grizzly bear recovery area, but the Bitterroot Mountains are.

PROCESS

At Victor, the deer are composted in bins made out of surplus Jersey rail road barriers placed on a pad of compacted asphalt road millings. The size of the bins is about 10 by 30 feet and the area contains 8 bins. Feed stocks of woodchips, sawdust and compost are stored off of the lined active area. The sites are bermed to control runoff. Since deer are the most common roadkill, the term is used thorough the article, but other roadkill are treated the same.

In the real world, sites operate according to the equipment available. At remote sites like Victor, the machine available is the front end loader used to load sand trucks in the winter. It has a bucket of about 3 cubic yards capacity. A good operator can precisely place partial loads on the piles, given the time to do it, but often the piles are overloaded with cover materials for convenience and insurance against odors. Workers are instructed in the “hand test method” for the proper determination of sufficient saturation of feedstocks. They are also required to monitor temperature with four foot long compost thermometers.

Water supply can be problematic. Most sites do not have wells, and portable storage tanks, periodically supplied by water trucks, are used by the crews doing road construction. or maintenance During fire season, these tanks may be commandeered by local fire fighting operations. Of course, the dry season is the worst time to lose your water supply, so water is sometimes applied directly to the top of the pile by whatever means available.

Deer are normally gathered in a pickup truck sent on patrol to look for road safety problems. When deer arrive at the facility, they are placed in a bin, on a bed of sawdust layered on top with wood chips. They are then covered with compost, either commercial or derived on site, and another layer of woodchips. Multiple layers of deer are contained in the bin. Uniform layers in the bin are preferred, but handling the carcasses can be difficult. Often the carcasses are unloaded from the pickup truck to the bucket of the front end loader, dropped on the pile, and roughly spread. The workers have developed what they call the “whack’em” technique where they use the bucket of the loader to even out the pile. The composting deer are allowed to remain undisturbed for about 45 days based on pile temperature. Time starts at the end of the week when the bin is filled. If the temperature of the pile does not rise to 130 degrees F during the first week, water is added (during the summer). When the pile temperature has dropped below 100 degrees F and at least 45 days have passed, the bins are then emptied and the compost turned and placed in a pile for further composting. This is called the first turn pile. Water addition may be needed. The first turn pile reheats, often up to 140 degrees F or more, and composting proceeds. After another 45 to 60 days the first turn piles then go in one of two directions, either to a curing pile or as bedding for new carcasses.

In the late fall, the new first turn pile is reserved for winter bedding and is covered with additional wood chips for insulation. This pile is regenerated during the winter by the newly finished original compost piles. The use of this “hot compost” enables successful winter composting, even of frozen animals. The high C:N ratio of the first turn pile makes it an ideal feedstock to compost more animals. The ratio of compost to deer is significantly increased in the winter to warm the cold carcasses and the amount of insulating woodchips is also increased..

Feedstocks vary seasonally, but not coincidentally. The production of wood chips from power line clearing and sawdust usually occurs in the summer, while deer kills peak during the late fall rut. Sites must have sufficient storage to handle the feed stocks and compost, but are still small. The average site is less than two acres. The compost produced is still carbon-rich, as it includes a large number of coarser wood chips and some large bones. This material is suitable for use in highly erodible areas as the coarseness helps control erosion. Prior to use, the bones would be screened out over a bar screen to increase public acceptance. If a finer product is desired, the material can be screened. The compost is restricted to use by the MDT in non-public contact sites by the license conditions of the DEQ. Even given this restriction, the use of locally generated material for road reclamation could have a positive impact on the highway maintenance budgets.

ISSUES

The DEQ and MDT are cooperating with the Montana Department of Fish, Wildlife, and Parks (FWP) on issues such as grizzly bear attraction and chronic wasting disease. FWP has raised concerns about attracting bears to the compost piles and the MDT has agreed to fence the sites if necessary or curtail operations if fencing is unsuccessful in keeping the carnivores out. To date, there has been very little interest in the composting piles at the Victor site by birds and small mammals. On the few occasions that birds or foxes have been attracted, the problems is solved with the addition of more feedstock. FWP is also concerned about compost used as reclamation material on the roadsides being an attractant that would lure grizzly bears and increase their opportunity to become compost.

A sample of the Victor compost was taken to the Grizzly Bear and Wolf Recovery Center in West Yellowstone, MT, and placed in the enclosures to see if either species was profoundly attracted to the material. Based on a verbal report from Mr. Tim Feldner, FWP, the animals were interested in the strange material placed in the enclosure (as is common with the introduction of new materials), but did not eat it. Further testing is in progress.

FWP is also concerned about the possible spread of CWD by using the compost to reclaim eroded slopes on the highways. The Department of Livestock (DOL) shares similar concerns about the use near game (elk) farms. A license condition placed on the MDT by the DEQ requires that all parties reach an agreement before the material can be used on roadsides. If nothing else, composting can reduce the number of trips the MDT needs to make to the landfill and provide a management method that does not leave roadkill in the roadside environment, possibly promoting the spread of CWD.

The DEQ operates on a general philosophy of regulating known risks (i.e., the use of EPA established Maximum Contaminant Levels, etc); however FWP and the DOL seem to be using the precautionary principle of zero risk, more common in the European approach to the regulation of any contaminant that might pose a risk. These two contrasting principles need to be resolved in the use of roadkill compost

Local opposition to facility siting can be strong; One proposed site near Billings was withdrawn by the MDT after local opposition. TV cameras and politicians can affect regulatory decisions. Normally state agencies like to be good neighbors, and if the neighbors cannot be won over, the project dies.

RESEARCH NEEDS

Further research needs to be done concerning the effectiveness of the composting process to consume CWD proteins. Some studies indicate that enteric intestinal bacteria suppress prions, and the temperature obtained in the piles in addition to the length of time may also have an effect on the degradation of prions. This may indicate that composting is the most efficient and cost effective method of dealing with CWD. FWP is continuing research on grizzly bears, wolves, and compost as bait/attractant. The MDT needs to determine if the compost is suitable for reclaiming cut slopes and eroded areas as proposed.

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