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Bradley F. Blackwell

USDA/APHIS/WS National Wildlife Research Center, bradley.f.blackwell@aphis.usda.gov

Thomas W. Seamans

USDA/APHIS/WS National Wildlife Research Center, thomas.w.seamans@aphis.usda.gov

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COMMUNICATION AND COLLABORATION

FOOD SCRAPS COMPOSTING AND VECTOR CONTROL

NONTRADITIONAL waste management facilities, particularly new projects to compost food scraps, are becoming more common because of national and state initiatives to promote recycling and extend landfill capacities. In fact, food waste is the third largest component of generated waste by weight, following yard trimmings and corrugated boxes. The U.S. Department of Agriculture (USDA) estimates that each American disposes of 1.3 pounds of food waste daily or nearly 474 pounds annually. While there is a clear need to recycle food waste, the location of waste management facilities and national initiatives on waste management are increasingly controversial, partly because of potential wildlife related impacts. Responsible development of the industry must include management of facilities to minimize waste material serving as attractants to vectors such as birds and mammals that pose hazards to human health and safety.

For example, traditional putrescible waste landfills often attract large numbers of gulls and other bird species that can pose a significant risk to air traffic, if the facility is located near an airport. In response to the concern over bird-aircraft collisions, the Federal Aviation Administration (FAA) issued Order 5200.5A in 1990 to recommend that putrescible waste landfills and other waste management facilities not be located within one mile of runways used by piston powered aircraft or within two miles of runways used by turbine-powered aircraft.

Order 5200.5A also recommends against locating any waste management facility within two to five miles of an airport if the facility "attracts or sustains hazardous bird movements from feeding, water or roosting areas into, or across the runways and/or approach and departure patterns of aircraft." In August 2007, the FAA published Advisory Circular No: 150/5200—33B, *Hazardous wildlife attractants on or near airports*, which includes the recommendations from Order 5200.5A.

In addition to potential bird-aircraft collisions, bird use of waste management facilities can also pose other problems for the surrounding community. Specifically, foraging opportunities at these facilities can enhance survival and productivity of problem bird species that adapt readily to human-based resources. For example, several species of gulls are known to nest on flat roofs in proximity to putrescible waste landfills. Roof-nesting gulls are often considered a nuisance and economic liability because they damage roofs, attack pedestrians and defecate on cars and buildings. Further, feathers, nest material and food remains can plug drains on buildings. Gulls also carry bacteria (e.g., *Escherichia coli*, *Salmonella*, *Campylobacter* and *Listeria*) that cause enteric disease in humans.

In a USDA study, it appeared that immediate bulking and grinding of food waste with shredded wood was a deterrent in attracting birds and mammals.

*Bradley F. Blackwell
and Thomas W. Seamans*

In addition, there is evidence that the water quality of reservoirs can be degraded by large numbers of roosting gulls that are benefiting from both roof-top nesting areas and waste facilities. Other nuisance birds often associated with landfills (rock pigeons [*Columba livia*], European starlings [*Sturnus vulgaris*] and house sparrows [*Passer domesticus*]) are reported to carry more than 60 diseases transmissible to humans and domestic animals.

Finally, there is the factor of attraction of rodents at waste management facilities. Small mammals are prey to many bird species, particularly raptors, which can be a threat to air traffic because of their large size and soaring behavior. Also, the presence of commensal rodents such as Norway rats (*Rattus norvegicus*) and house mice (*Mus musculus*) is an issue because of the possibility of transmitting disease to humans (e.g., hantavirus pulmonary syndrome, the bacterial diseases, leptospirosis and plague), causing structural damage to buildings, and strong public aversion to these species.

COMMUNICATION AND COLLABORATION

A key component in developing food waste composting operations in a manner that is environmentally safe is communication and collaboration with local, state and federal agencies responsible for human health and safety, and management of wildlife. As little data exist on bird and rodent use of the various types of nontraditional waste management facilities, particularly those processing food waste, a



Figure 1



Figure 2

collaborative approach to assess wildlife hazards provides information critical not only to the business and management agencies, but also to the surrounding community. In some cases, funding agencies involved in the development of this industry will request that businesses work with consultants on wildlife issues.

For example, Barnes Nursery, Inc. in Huron, Ohio, received a grant in 2007 from the Ohio Department of Natural Resources and logistic support from the Ohio Environmental Protection Agency (EPA) and the U.S. EPA to pursue new methodologies in food waste composting and energy recovery. These agencies encouraged the owners to document potential wildlife hazards at this initial phase in the development of their food waste composting business. In April 2007, Barnes initiated a cooperative service agreement with the USDA Animal and Plant Health Inspection Service (APHIS), Wildlife Services, National Wildlife Research Center's Ohio Field Station to design and conduct a wildlife hazard assessment.

FACILITY BACKGROUND

The Barnes composting facility opened in May 1991 on a 25-acre property less than one mile south of Lake Erie and two miles west of Huron, in Erie County. The facility is in a rural area surrounded by farmland, a tree nursery, a four-lane highway and a general aviation airport within one mile. Although yard waste (i.e., grass, leaves and woody debris) is the primary type of material received at the site, Barnes also accepts soils, manure, sludges, woodchips and, recently, food waste.

For the purposes of this article, food waste is defined as including, but not restricted to, fruit and vegetable trimmings, outdated bakery goods and dough, dairy products, seafood (including shells), plate scraps (including meat) and leftover prepared foods, coffee grounds and filters, tea bags, floral waste, egg shells, slurry from pulpers, beverages and liquids such as vinegar. In addition, food waste might contain soiled napkins, tissues, compostable bags, plates, cups and packaging. At the Barnes facility, the food feedstock area and the other waste areas (hereafter, yard waste) are contiguous, but proportionate areas are not constant because of intake of material, processing and storage changes.

From June through October 2007, the

Barnes Nursery initiated a cooperative service agreement to design and conduct a wildlife hazard assessment of its food waste composting project.

Barnes facility received a monthly average of 821 tons of yard trimmings and 50 tons of food waste. Food waste was tipped and placed next to a shredded woodpile (Figure 1). Upon delivery, the food waste was immediately bulked with shredded wood, a process intended to control odors and the emission of free water from the waste. The mixture was then ground in a Fecon 250 Wood Hog Shredder (Figure 2), and distributed in windrows (15 feet wide by 8 feet high by 150 feet long) in an area between other yard trimmings collection points (Figure 3). The windrowed material (Figure 4) remains in thermophilic decomposition (105°F to 155°F) until packaging material is broken down and the mixture is stable (i.e., heating due to the decomposition processes ceases). Each windrow was turned on a 7- to 10-day interval (via KW Straddle Type Windrow Turner) to add porosity to the material, thereby maintaining maximum oxygen levels for aerobic decomposition and moisture levels at approximately 50 percent by weight. When the mixture was stable, it was screened to remove noncompostables, cured and tested relative to the U.S. Composting Council Seal of Testing Assurance Program standards.

THE WILDLIFE HAZARD ASSESSMENT

The USDA objective was to quantify relative use of food and yard waste operation areas at the Barnes facility by bird and mammal species from June through October 2007. Biologists used snap traps for small mammals, placed systematically during two consecutive trapping nights per month, and conducted point counts twice weekly of birds using the facility. Notably, the biologists captured no small mammals in the food waste area, nor observed mammals using the material. Further, only 17 individuals, representing 5 small mammal species, were captured in the yard trimmings area (predominantly deer mice or white footed mice; *Peromyscus* sp.). In addition, there was no indication, based on observations of predators, tracks, carcasses of prey items and absence of predator fecal material, that population levels of small mammals using the facility were sufficient to attract larger mammalian carnivores (e.g., coyotes, *Canis latrans*) or raptors.

In contrast, the biologists observed 27 bird species on or aerial foraging over the



Figure 3



Figure 4

yard waste area, predominated by mourning doves (*Zenaida macroura*), killdeer (*Charadrius vociferous*) and bank swallows (*Riparia riparia*). However, only 6 of the 27 bird species, primarily mourning doves and killdeer, were observed landing on, foraging on, or aerial foraging over the food waste. Notably, bank swallows nested in the face of a large soil pile on the facility and were frequently observed over the site through the second week of July. Barnes Nursery, Inc. personnel were aware of the nesting cavities and, in deference to the Migratory Bird Treaty Act, did not disturb the soil pile. Also, gulls, European starlings and turkey vultures (*Cathartes aura*) were rarely observed, and observations of species foraging on the yard waste materials were uncommon. Large flocks of gulls, mixed flocks of blackbirds and European starlings (during late summer and fall) and flocks of Canada geese (*Branta canadensis*) were observed flying over the facility on routes from Lake Erie to nearby agricultural fields and back. These flock movements were, however, unrelated to the yard or food waste at the Barnes facility.

Ultimately, weekly counts of individual birds across all species yielded only 9 to 13 birds/acre of the facility. Biologically, there was no differential use of food waste and yard waste areas by birds, and captures of small mammals using the yard waste were few.

Though specific data on relative availability of food resources between food and yard waste areas were not collected, nor were data on odor emissions, the inference from the USDA study is that the immediate bulking of food waste with shredded wood upon delivery, and subsequent grinding of the mixture, was effective in reducing the attractiveness of the material to birds and mammals. Further, indices of bird and mammal use of the processed food waste windrowed on site indicated that the material did not serve as a significant attractant to wildlife. However, the USDA assessment was based solely on the tonnage of waste delivered and processing methods used during the 21 weeks of observation. Subsequently, the biologists encouraged Barnes Nursery, Inc. to consider additional site assessment by USDA/APHIS Wildlife Services personnel as operational capacity changes and new processing protocols are developed.

SUMMARY

The communication by Barnes Nursery, Inc. with local, state and federal officials about potential wildlife hazards posed by the development of their food waste composting business created an atmosphere of collaboration. We suggest a similar approach for others considering food waste composting operations. However, for those operations proposed within FAA siting criteria for certificated airports under Part 139 of the Code of Federal Regulations, or other airports receiving FAA funding, a Wildlife Hazard Assessment might be deemed mandatory. As noted earlier, good communication with the public and government agencies charged with the safety of the public will benefit your business. ■

Bradley F. Blackwell And Thomas W. Seamans are with the National Wildlife Research Center in Sandusky, Ohio.

Indices of bird and mammal use of the processed food waste windrowed showed the material did not serve as a significant attractant to wildlife.

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