



Natural Resources and
Environmental Protection Cabinet

Improving Equine Waste Management through a Best Management Practice (BMP) Demonstration Project

Kentucky Division of Water, Water Quality Branch, Nonpoint Source Section

Abstract

A multimillion-dollar-a-year industry, horse farming is an integral part of the Kentucky's Bluegrass's economy and identity. Every day, close to 1,000 tons of equine waste are produced on the horse farms in Bourbon, Fayette, eastern Franklin, southern Scott and Woodford counties. Ongoing USDA inventory efforts estimate that the majority (about 75 percent) of the farms in the area dispose of stable muck in unmanaged piles on remote parts of the farm, often in sinkholes or adjacent to streams. Runoff from stable muck has the potential to have high nitrate levels, as well as elevated levels of fecal coliform bacteria and other pathogens.

The Thoroughbred RC&D Council, in cooperation with numerous organizations and individuals, showcased several new management practices that were practical, effective and affordable. Four demonstration farms were established for onsite composting, and two farms were established for offsite disposal. Both options were met with a favorable response, and adoption of the onsite composting practice is occurring more rapidly than anticipated.

Introduction

Kentucky is both nationally and world-renowned for the production of thoroughbred horses. The image many have of Kentucky's Bluegrass Region is of rolling green fields, stately horse farms and, most importantly, the horses themselves. Every year, visitors flock to central Kentucky to enjoy its unique atmosphere. This industry provides employment for more than 80,000 people in the state and generates a significant part of Kentucky's farm income. The industry is concentrated in the project area and is vital to the economy of the region. Proper disposal of the waste produced by this industry, however, presents a formidable challenge.

The project area was the 11,462-acre Houston Creek Watershed, associated with the Inner Bluegrass Karst Aquifers. Houston Creek Watershed is listed on the State Nonpoint Source Priority List of Waterbodies Impacted by Agriculture and the state's list of impaired waterbodies (the 2002 303[d] List of Kentucky Waters). This karst area has been identified by the Kentucky Division of



Water Groundwater Branch as being particularly sensitive and vulnerable to groundwater contamination. There are numerous springs within the watershed, including Royal Spring, which is the primary domestic water supply for the city of Georgetown.

The project area includes Bourbon, Fayette, eastern Franklin, southern Scott and Woodford counties. Within this project area, there were approximately 28,473 horses on 1,288 farms. Approximately 996 tons of animal waste were produced in the project area daily. An estimated 75 percent of the operations disposed of equine waste in unmanaged piles on the back of the farm, sometimes near sinkholes and waterways. Leachate from stable muck has the potential to have high nitrate levels, as well as elevated levels of fecal coliform bacteria and other pathogens.

The project, entitled "Equine Waste BMP Demonstration Project - Demonstrating New Technologies for Composting Stable Muck Onsite and for Handling Stable Muck to Offsite Facilities," operated from 1996 through 2001 and was initiated by the Thoroughbred RC&D Council. Funding for the project was provided by an FFY 1995 Nonpoint Source Section 319(h) Grant (provided by the U.S.-Environmental Protection Agency) and by contributions of the project cooperators. The Council and its partners saw the opportunity to address the need for practical, affordable options for disposal of stable muck that would not result in a detriment to water quality. The thoroughbred industry (both organizations and individual farms) was very cooperative in implementing this project and encouraged a proactive approach to the issues and the desire to find positive solutions for equine waste management in the region. The Thoroughbred RC&D Council provided general oversight of the project

and, with the oversight committee members, guided the project.

Onsite composting of stable muck has the potential to meet the waste treatment needs of many farms in the region, transforming waste into a valued soil amendment. The majority of farm operators in this region had not considered this option, in part from lack of financial assistance and technology transfer. Also, equipment designed to facilitate management of compost windrows has, in past years, been suited only to large, commercial operations. Smaller windrowers have recently become available which are relatively affordable, are of appropriate size for windrows made by manure spreaders in use and do not exceed the horsepower requirements of tractors generally used in the region.

Recent improvements in hay baling equipment provide an opportunity for improved handling alternatives, making it easier to move stable muck to offsite locations. New roll balers less sensitive to moisture content can bale haylage (approximately 60 percent moisture content). The compact, baled rolls of stable muck can be handled by conventional farm equipment, thereby improving the logistics of handling loose material on a daily basis. Such bales by design are weather resistant and pose limited environmental risk if stored for short periods outdoors. Hauling to facilities that accept stable muck could, therefore, be scheduled within the constraints of the farm workload and would eliminate the necessity for partial loads. A limited demand exists for the bales by out-of-state mushroom producers or cattle producers in the region for winter forage.

Methods

Although the project included other components such as water quality monitoring and identification of springs, this document deals only with the technology demonstration and educational outreach aspects of the project. The project's plan of work included the demonstration of composting technology on two farms, demonstration of roll baling technology on two farms, and an education and outreach component. Two additional composting demonstration sites were added as the project progressed.

On the four composting demonstration farms, horse muck (a mixture of used bedding, feces and urine) was daily cleaned out of the stalls and hauled from the barns in a manure spreader to the composting site. Windrows were established and grew into rows ranging from 600 feet to 1,500 feet in length. The rows, on the average, were six feet tall and ten feet wide. Farm owners/managers used a thermometer to measure the temperature of the windrow at the centermost point. Temperature, odor and moisture were evaluated by project assistants and farm staff to help

determine the proper turning time of the composting horse muck. Thoroughbred RC&D Council purchased a used Wildcat composting turner and leased two compost turners from Midwest Bio-Systems.

Two farms were used for the roll baling of muck demonstration. The typical baler on these farms was the same type machine used for roll baling hay. Newer models of roll balers have been designed to roll materials with higher moisture content and, therefore, can more effectively bale horse muck. On a daily basis, farm employees cleaned stalls and placed the muck in a row down the hallway of the barn. The roll baler was pulled through the material rolling up the muck. Roll bales would then be hauled to a designated area on the farm for pickup. Both demonstration sites developed agreements with local beef producers to pick up the bales. It is important to note that many of the larger farms in the area strip clean the bedding material in stalls on a daily basis. This material may include large amounts of uneaten hay. Some farms actually use grass hay to bed down stalls, typically Bluegrass; this is very appealing to cattle farmers.

The project's plan of work called for an education and outreach component that was to include the production of a project brochure, a video, two field days and three news articles.



Results and Discussion

Two additional composting demonstration sites and an extra field day were completed during the project, providing a more even spatial distribution of the demonstrations and outreach across the five-county project area. This spatial distribution enabled the project to better reach the intended audience and contributed to the success of the project.

The project received publicity from outside sources that were in addition to the outreach component of the project. Reporters for publications specializing in the horse industry wrote several articles on the project. Therefore, the project was publicized to the target

audience in a manner unavailable to the implementers of the project.

More than 500 copies of the video promoting the composting and alternative handling technologies were distributed to horse industry operations in the area. Although the project has officially been completed, requests for the video are still being received.

As a result of this project, both of the horse operations involved in the roll-baling demonstrations have made significant investments in equipment and have made long-term plans to continue roll-baling muck. Three of the four on-farm composting demonstration sites plan to continue composting.



During the course of this project, Keeneland Race Course made a significant financial investment in their horse muck handling systems by installing a biofermentation facility. Keeneland Race Course has conducted public demonstrations of its biofermentation facility and allowed the opportunity for additional public outreach by including information on this equine waste project in several of its field days.

The company from which the composting equipment was leased, Midwest Bio-Systems (MBS), relocated a technical specialist to the area as a result of interest in composting generated by this project. Their continued presence in the area is expected to result in further implementation of equine waste BMPs by additional farms.

During this project, a cooperator, Creech Services, started a new business in a separate location to conduct large-scale composting. The facility processes stable muck from a number of local horse farms. Once processed into compost, it is returned for use on the horse farms or sold to local landscape suppliers.

Since the completion of the project, the Kentucky Horse Park, a state park devoted to horses, has initiated a composting operation and has hosted a workshop attended by representatives from five states.

The results of this project have spurred research by the University of Kentucky into the benefits of applying compost to horse pastures. Positive results from this research will help turn the attitude of the horse industry from viewing horse muck as a waste to viewing it as a valuable nutrient source. This attitude change, in addition to increased emphasis in the state on proper nutrient management, should result in the beneficial reuse of horse muck in a manner that will reduce even further the potential of water pollution from muck disposal practices.

Literature Cited

Oldfield, Carolyn. March 2002. Equine Waste BMP Demonstration Project - Demonstrating New Technologies for Composting Stable Muck Onsite and for Handling Stable Muck to Offsite Facilities. Kentucky Division of Water Nonpoint Source Project Final Report; project number 95-08; Memorandum of Agreement Number M-99004156. 27 pp.

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