

Call to the post: An analysis of Montgomery County equine operators' motivation  
for adoption of conservation practices

by

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## **Abstract**

The equine industry is an established part of Maryland Agriculture; the most recent equine census placed 79,100 equines valued at approximately \$714 million in the state, with approximately ten percent of those animals housed in Montgomery County. But, equine operators are a unique demographic in the agricultural realm. They are not managing their lands to produce food or fiber and often are employed in other professions unrelated to agriculture. Unlike other agricultural operators, they are often unaware of conservation terms or practices and programs available to help implement these practices on their land. The basic objective of this study was to explore the level of understanding equine operators in Montgomery County, Maryland have of conservation best management practices (BMPs), associated cost-share programs, industry regulations and the aspects and methods of communication that influence them in gaining awareness of and the adoption of these practices on their properties. The study applied the tenets of the decomposed theory of planned behavior (DTPB), which combines the theory of planned behavior (TPB), diffusion of innovation theory (DOI) and economic constraint theory gathered through semi-structured qualitative interviews with participants, selected using purposive and snowball sampling. Utilizing the grounded theory method to discover emerging patterns in the data resulting from these interviews aided in identifying the most effective means of educating equine operators regarding BMPs and increasing the adoption of these practices on equine properties within the County.

Equine operators in the study were found to use a variety of informational sources, had a high level of adaptation of the BMPs they used and overall saw their role as land stewards as an important aspect of their environmental actions.

**Keywords: equine, best management practices, decomposed theory of planned behavior, communication, conservation, cost-share**

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## **Dedication**

To all those who dedicate their time and effort to becoming better horsemen and stewards of the land.

## **Chapter 1 - Introduction**

Nonpoint source pollution from agriculture is widely recognized as a source of water quality impairment (U. S. Environmental Protection Agency, 2000). In Maryland, equine operations are a prevalent part of the agricultural sector and therefore the practices used on these operations have the potential to contribute to the water quality problem if managed incorrectly. The Montgomery County zoning code section 3. 2. 4. b states that any equestrian facility that keeps or boards more than 10 horses must meet all nutrient management, water quality, and soil conservation standards of the County and State. A nutrient management plan (NMP), prepared by a qualified professional and a soil and water quality conservation plan (SWQCP- generally referred to as a conservation plan), prepared by the Montgomery Soil Conservation District (MSCD) staff and approved by the MSCD's Board of Supervisors, must be submitted through a letter of certification by the landowner to Department of Permitting Services (DPS), or other relevant agency within one year (2014).

Despite this legislation and the potential for pollution from these properties, equine operators are often unaware of the existing regulations, the options available to them, the programs that could offer them financial assistance and/or the technical assistance available. This study explored the aspects influencing equine operators in Montgomery County in their knowledge of conservation best management practices (BMPs), related programs and use of these practices on their properties.

### **Statement of the Problem**

Informal surveys by MSCD staff and a review of existing program files in 2016 showed Montgomery County equine operators are not utilizing the available local, state and federal services that could help them prevent erosion on their land and promote soil health and water

quality. Although a conservation plan is required for any facility housing more than 10 horses, a record review conducted by MSCD staff in 2016 of the 106 Licensed Stables in the County revealed that only 29 had existing conservation plans on file. Informal surveys of equine operators and conversations between MSCD staff and operators indicates that many of the equine operators have little or no knowledge of the services offered by the NRCS, Extension or MSCD, BMPs in general or the use of these practices to insure sustainable soil and water health and good forage production.

The Montgomery County Horse Community offers a unique opportunity to implement and evaluate the effects of conservation BMPs. There are 15,100 acres identified as equine pastureland in the county (Maryland Horse Industry Board, 2009). However, overgrazed acreage in poor condition is visually evident. Whether this is due to ignorance, overstocking or lack of time and interest has not been determined.

Despite this unofficial visual assessment of pasture in poor condition it can be noted that 69% of the respondents in a 2009 survey of equestrians in the County (Camp) answered in the affirmative when asked if they have a conservation plan in place on their properties. But while awareness appears to be high, the implementation of conservation BMPs is extremely low. For example, only 8 percent of the respondents said they utilized rotational grazing or annual fertilization with just 15% listing annual mowing as part of their routine land management practices (Camp, 2009).

The 2009 study by Camp also recorded most of horses were kept on large boarding facilities. Thirty-six percent of respondents state they keep their own horses on their own acreage, with that number projected to increase in the future. Eighty-one percent of survey respondents said that their farms were not their primary source of income (Camp, 2009).

Although this demographic may not be familiar with traditional farming practices and soil dynamics; they may be more open to new techniques that can improve soil and water quality.

### **Purpose of the Study and Research Questions**

The purpose of the study was to understand what equine operators know about regulatory requirements, conservation BMPs and their process of choosing to adopt BMPs.

RQ1 What are Montgomery County equine operators' perception and awareness of regulatory requirements pertaining to their operations?

RQ2 What are Montgomery County equine operators' perceptions and awareness of conservation BMPs?

RQ3 How do operators gain and process information related to conservation BMPs and related programs?

RQ4 How do Montgomery County equine operators view their role as stewards of the land?

RQ5 What part does the adoption of conservation BMPs play in that role?

### **Assumptions**

The prevailing assumption is that equine operators have little knowledge of BMPs and are therefore not using them on their properties (Prokopy, Perry-Hill & Reimer, 2011). It is also assumed participants being taken from a list of people identified as being interested in equine activity established by the MSCD will offer a good cross section of the equine property owners' population. Another assumption is when people participate in semi-structured, in-depth interviews, they are willing to divulge information that would be beneficial for this study, a general assumption of qualitative research (Creswell, 2007).

## **Definition of Key Terms**

**Best Management Practices (BMPs)** –are established soil conservation practices that also provide water quality benefits (United States Department of Agriculture, [USDA], 2007).

**Composting Facility** - A facility to process raw manure or other raw organic by-products into biologically stable organic material (Natural Resources Conservation Service (NRCS), 2008b).

**Dragging** – Using a tractor or ATV to pull a harrow or piece of chain link fence around a field to break up and spread manure (University of Kentucky, 2017).

**Equine Operators** – Those renting or owning property on which horse, mules, donkeys are housed (MSCD, n. d.).

**Extension Agent** - Individual who provide access from land-grant universities to their assigned communities across the nation (Rasmussen, 1989).

**Fence** - A constructed barrier to animals or people used to control movement of animals and/or people, including vehicles (NRCS, 2016).

**Field Board** – Keeping a horse outside in a pasture with or without supplemental feed. (MSCD, n. d.)

**Heavy Use Area** - The stabilization of areas frequently and intensively used by people, animals or vehicles by establishing vegetative cover, surfacing with suitable materials, and/or installing needed structures. (NRCS,2008).

**Manure Storage Facility** - A waste storage impoundment made by constructing an embankment and/or excavating a pit or dugout, or by fabricating a structure (NRCS, 2008a).

**Pasture** –Lands that are used primarily to produce adapted, domesticated forage plants for livestock (United States Environmental Protection Agency. (U. S. EPA ), 2013).

**Prescribed/Rotational Grazing-** Managing the harvest of vegetation with grazing and/or browsing animals. Generally by using rotational systems (NRCS,2015).

**Roof Runoff Structure -** Structures that collect, control, and transport precipitation from roofs. (NRCS, 2011).

**United States Department of Agriculture -USDA** A government agency that provides leadership concerning agriculture, food and natural resources. (USDA, n. d.).

**Maryland Horse Industry Board- MHIB** The mission of the Maryland Horse Industry Board is to safeguard the health and well-being of Maryland’s horse industry as well as to provide for its future development (MHIB, 2017).

**Montgomery (Maryland) Soil Conservation District -MSCD** a local district established to assist farmers with soil conservation (MSCD, n. d.).

**Natural Resources Conservation Service – (NRCS)** the division of the USDA responsible for federal oversight of soil conservation (NRCS, n. d.).

**Nutrient Management Plan –(NMP)** a specific assessment of fertilizer and nutrient needs calculated based on soils tests. (Maryland Department of Agriculture, (MDA), n. d.)

**Soil and Water Quality Conservation plan – (SWQCP)** Generally referred to as a conservation plan, it identifies and addresses a range of natural resource concerns for an entire farming operation. (NRCS, n. d.)

## **Summary**

Equine operators in Montgomery County, Maryland, have access to information about BMPs and cost share programs to design and develop the practices that would allow them to pursue effective farm management, but the use of BMPs on equine farms is limited (personal interviews, 2016). Past research has examined the number of operators who adopted BMPs but the



motivations for doing so has yet to be determined. Through the use of decomposed theory of planned behavior (DTPB), which combines the theory of planned behavior, diffusion of innovation theory and economic constraint theory, a better insight into the motivations and deterrents identified by operators will be gained.

## **Chapter 2 - Literature Review**

The goal of this study was to discover equine operators' knowledge of regulatory requirements, BMPs and method of adoption of BMPs through addressing the research questions: 1) What were Montgomery County equine operators' perception and awareness of regulatory requirements pertaining to their operations? 2) What were Montgomery County equine operators' perceptions and awareness of conservation BMPs? 3) How did operators gain and process information related to conservation BMPs and related programs? 4) How did Montgomery County equine operators view their role as stewards of the land? 5) What part did the adoption of conservation BMPs play in that role?

The literature reviewed in this chapter includes an overview of the Montgomery County equine industry, the relevant BMPs for equine operations, and research about the adoption of BMPs. A theoretical framework will be introduced consisting of the decomposed theory of planned behavior (DTPB).

### **Industry Background**

As agricultural operators, equine operators are eligible to take advantage of the programs and assistance offered by the Natural Resources Conservation Service (NRCS), the Maryland Department of Agriculture (MDA) and the Montgomery Soil Conservation District (MSCD). These programs are all designed to protect and enhance the natural resources that support productive and profitable farming operations. Born out of the catastrophic destruction of the Dust Bowl and subsequent congressional testimony on the dangers of soil erosion by soil scientist, Hugh Bennett in 1935, Maryland's Association of Soil Conservation Districts was organized on March 29, 1945. (MSCD, n. d.)

Today NRCS, MDA and MSCD work together to promote soil health and water quality. The foundation of this assistance is two documents both prepared by government staff and provided at no charge to the operator:

1. Nutrient Management Plan (NMP) is a specific assessment of fertilizer and nutrient needs calculated based on soils tests.
2. Soil Conservation and Water Quality Plan (SCWQP-conservation plan) identifies and addresses a range of natural resource concerns for an entire farming operation.

Because the SCWQP is generally referred to as a conservation plan and occasionally as a “farm plan”, operators repeatedly get it confused with a NMP. The conservation plan contains an aerial photograph, map or diagram of the farm, an inventory of natural resources, a soils map, a list of BMPs discussed with and agreed upon by the farm operator, an operation and maintenance plan and other information as recommended.

Equine operators can benefit from a wide variety of BMPs endorsed by NRCS that can make a difference in soil and water quality. Of the 127 different practices identified in Maryland, approximately 24 could be said to apply to equine operators. These practices are listed in Table 2.1.

**Table 2-1** Applicable practices for equine operators

Access Roads	Grassed Waterway	Riparian Forest Buffer
Animal Trails/Walkways	Heavy Use Area Protection	Roof Runoff Structure
Composting Facilities	Integrated Pest Management	Roofs and Covers
Conservation Crop Rotation	Lined Waterway or Outlet	Silvopasture Establishment
Critical Area Planting	Livestock Pipeline	Spring Development
Fence	Mulching	Waste Storage Facility
Field Border	Nutrient Management	Watering facility
Forage /Biomass Planting	Prescribed Grazing	

### **Six commonly used BMPS for equine operators:**

File review, informal MSCD staff surveys of equine operators and conversations with extension professionals and operators themselves (2016) determined there were six BMPs commonly used by equine operators. These include fence, heavy use area protection, nutrient management, prescribed /rotational grazing, roof runoff structures and waste storage/composting. These six selected practices are described in detail below.

#### ***Fence***

Defined by the NRCS as a constructed barrier to animals or people used to control movement of animals and/or people, including vehicles (NRCS, 2016). Fence can serve a variety of purposes and can be constructed from a variety of materials. Perimeter fence can be used to prevent animals from leaving a property or a given area, temporary fencing can be used to create separate fields to be used in rotational grazing, while stream fencing is used to effectively prevent animals from polluting water sources. It is generally accepted that “safe, secure, durable and attractive fencing is a key component of horse farm management” (Lawrence, 1999, p. 1). Stream fencing is a required component of any nutrient management plan.

#### ***Heavy Use Area Protection***

Heavy use areas (HUAs) are defined by NRCS as the stabilization of areas frequently and intensively used by people, animals or vehicles by establishing vegetative cover, surfacing with suitable materials, and/or installing needed structures. This practice may be applied as a part of a conservation management system to support one or both of the following purposes: to provide a stable, non-eroding surface for areas frequently used by animals, people or vehicles and/or to improve water quality (NRCS, 2008).

HUAs are also called sacrifice areas, confinement areas or high traffic area pads. These areas are constructed using techniques such as crushed stone or geotextiles covered with sand, small gravel or blue stone dust to minimize mud. Horses are confined in HUAs to keep the animals from compacting soil, overgrazing pastures, or destroying wet pastures by tearing the soaked grasses with their hooves. High traffic areas usually include areas where horses are fed or come to water as well as gates and areas near shelters (Higgins, Koostra, Workman, Gallagher & Coleman, 2007).

### ***Nutrient Management***

In Maryland nutrient management is aimed at protecting water quality in Chesapeake Bay and its tributaries by ensuring that farmers and urban land managers apply fertilizers, animal manure and other nutrient sources in an effective and environmentally comprehensive manner. Equine operators with more than 10 horses are required to follow nutrient management plans when managing animal waste. These plans specify how much fertilizer, manure or other nutrient sources may be safely applied to pastures to prevent excess nutrients from impacting waterways (Maryland Department of Agriculture [MDA], 2017).

### ***Prescribed/Rotational Grazing***

Prescribed grazing is defined as managing the harvest of vegetation with grazing and/or browsing animals, generally by using rotational systems (NRCS, 2015). Equine operators use a wide range of rotational grazing practices which involve moving horses between pastures to allow for periods of pasture rest and regrowth. Rotational grazing can be simple and may involve as few as two pastures with the time on each pasture dependent upon the number of horses and pastures, type of grass planted and system of irrigation. Rotational grazing allows for better soil

health, pasture productivity and can also contribute to better manure management (Mowry & Pond, 2014).

### ***Roof Runoff Structures***

Roof runoff structures collect, control, and transport precipitation from roofs. This practice is used to improve water quality, it reduces soil erosion, increases infiltration, protects structures, and/or increases water quantity (NRCS, 2011). This practice involves installing specially designed high-capacity gutters, downspouts and outlets to collect rain and snowmelt from roofs and direct it away from barns, arenas, or other farming structures. Roof runoff management applies to any farm area where clean-water runoff can become polluted due to high concentrations of manure, feed or other nutrient-rich agricultural waste. Clean-water runoff from roofs or fields that enters a barnyard is generally considered polluted runoff. Redirecting large amounts of roof runoff also reduces soil erosion by dissipating the concentrated flow of water (Minnesota Department of Agriculture,2017).

### ***Waste Storage/Composting***

A manure storage facility is defined as an impound area made by constructing an embankment and/or excavating a pit or dugout, or by fabricating a structure (NRCS, 2008a). Such a structure can be used for raw manure or can house manure as it passes through a process into compost, a biologically stable organic material (NRCS, 2008b.) Accumulated manure can cause health, odor, and water quality problems.

The primary reason to store manure is to allow for land applications that are compatible with the climate and cropping systems on the land receiving the manure and to adhere to regulations limiting the timeframe for spreading manure on farmland in Maryland (MDA, 2017). Saturated, wet, frozen, or snow covered soil conditions are not suitable for land application of

manure. The nutrients in horse manure are best utilized by the crop when spread before or during the growing season of the crop. Smaller horse farms may not have sufficient fields on which to spread manure produced by the animals onsite. Manure storage facilities also allow the equine operator to store the manure until it can be removed and used by other farmers or landscapers (Pennsylvania State University Extension, 2009).

The treatment of raw manure through composting is gaining popularity (Kelly & Westendorf, 2014). The final product has little odor and resembles rich topsoil. It can be highly marketable. If done correctly, reduces the amount of available nutrients, kills pathogens, and reduces odor and manure volume. Composting is a managed process, resulting in accelerated decomposition of organic materials. Microorganisms, including bacteria, actinomycetes, and fungi will break down organic materials at elevated temperatures. Composting is a recommended management practice for horse manure management and, when done properly, will result in the destruction of internal parasites and weed seeds (Kelly & Westendorf, 2014).

### **Adoption of BMPs**

There have been several previous studies addressing equine operations and the adoption of conservation BMPs. Singer, Kluchinski, Branka, Bobsin, and Govindasamy (2002) addressed the effectiveness of Extension equine pasture management programs among New Jersey equine operators. A survey requesting details of the operation size; both in acres and numbers of horses, and the pasture maintenance techniques used was formulated and mailed to 806 potential respondents with 449 (72 percent) responding to the survey.

Results of this study showed that equine property owner's likelihood to obtain information from Extension increased as the size of their operations increased in both acres ( $\geq 8$ . 5 acres) and numbers of animals ( $\geq 21$ ) (Singer et al., 2002). The smaller property owners were

less likely to be aware of or utilize extension services and had little or no knowledge of pasture management techniques.

More detail was provided by a study utilizing media content analysis and in person interviews which showed that conservation issues are not widely addressed in horse trade magazines and that the majority of equine owners in the study area had little practical knowledge of the application of a variety of BMPs (Prokopy et al., 2011). This study also noted the majority of respondents were women, and therefore the educational opportunities available to them may be more gender centric and do not address “traditionally geared farm tasks” (Trauger, et al. p. 432, 2008). It was also concluded that equine farm operators viewed the environmental advantage of using BMPs to be the “immediate and localized benefits to their farm’s environment” instead of affecting a wider area and pertaining to overall stewardship of natural resource (Prokopy et al., 2011, p.454).

Further study of the subject was conducted in 2012 by Marriott, Shoher, Moaghan, and Wiese. The researchers used a survey to determine the knowledge and implementation of BMPs. The 260 respondents to the survey in this study provided information consistent with the study completed by Westendorf, Williams, and Kenny (2010b) finding that most respondents did not utilize BMPs relating to manure management. The findings were also consistent with Prokopy et al. ’s 2011 findings that the length of operator experience was more likely to have a negative effect on BMP adoption.

Several studies have quantified the numbers of practices used and types of practices with which equine farm operators are familiar. However, few have asked what motivates the



farm operators to adopt conservation BMPs, although Nadeau & Meader did research the effect of a public awards program on levels of adoption in 2003.

## **Theoretical Framework**

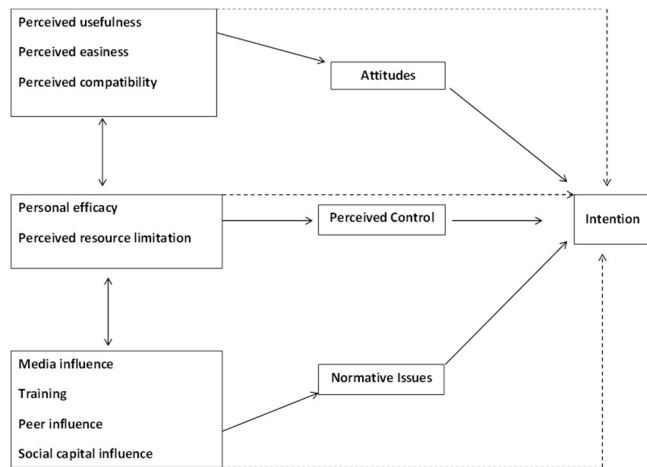
### **Decomposed Theory of Planned Behavior**

To fully understand the equine operator's motivation, the decomposed theory of planned behavior (DTPB), which combines the theory of planned behavior, diffusion of innovation theory and economic constraint theory was used to develop a conceptual outline of the motivations (or lack thereof) for equine operators to adopt BMPs. DTPB provides a more complete picture than each of the individual theories under its umbrella by initially recognizing behavioral intention becomes a function of several lower-level behavioral concepts.

The theory of planned behavior was developed to help address the deficiencies in the theory of reasoned action, specifically the behaviors that afforded people less than full control of the preferential choices they were making. Under this theory, intention becomes a weighted function of attitude, subjective norm, and perceived control. Perceived control and intention also explain the adoption and use of technologies (Ajzen, 1991).

Subsequently the theory of planned behavior was also criticized by Taylor and Todd (1995) for its one-dimensional aspects and slow adaptation of belief structures. A more multi-dimensional model was created with the emergence of the decomposed theory of planned behavior; which further divided the cognitive belief structure into perceived usefulness, perceived compatibility and perceived easiness, and the perceived control into self- efficacy and facilitating conditions (see Figure 1).

**Figure 1** Diagram of DTPB and resulting intention



*Figure 1.* Diagram of Decomposed Theory of Planned Behavior (DTPB) (Ingram, 2017, developed with information from Zeweld, Huylensbroeck, Tesfay & Speelman, 2016)

For this study DTPB was used to explain equine operators' intentions to adopt conservation best management practices. These intentions are explained by attitude (decomposed into perceived usefulness, perceived ease of operation and perceived compatibility) and perceived control (divided into personal efficacy and perceived resources) to provide comprehensive information and explanation about intention.

Communication channels and social systems also affect adoption decisions (Rogers, 1983) and adoption in a social context is dynamic and reciprocal interaction between an individual and his environment (Venkatesh et al., 2012). To understand the pressure of social groups and communication forces on behavior and decisions, normative issues are sectioned into media influence, training, peer influence and social capital/social influence, following the social cognitive and diffusion of innovation theories.

Media, friends, family, training, peers, and neighbors provide the knowledge that can make the users aware of BMPs and persuade them by influencing them to form attitudes to evaluate the attributes of the practices. This leads to a reduction of uncertainty about the

advantages and disadvantages of the practices formulating in a decision, to implement the practices and adopt and adapt the practices to their own equine operation, thereby reinforcing their decision and leading them to influence other groups (Rogers, 1983; Venkatesh et al., 2012). The normative issue is thus an important facilitator throughout all the stages of adoption of BMPs.

DTPB outlines Multidimensional beliefs which may have better forecasting power than solitary beliefs (Taylor & Todd, 1995). The multidimensional approach also allows the establishment of a crossover relational effect promoting interaction between the predictors and therefore helps to better comprehend and clarify operators' intentions towards the use of BMPs.

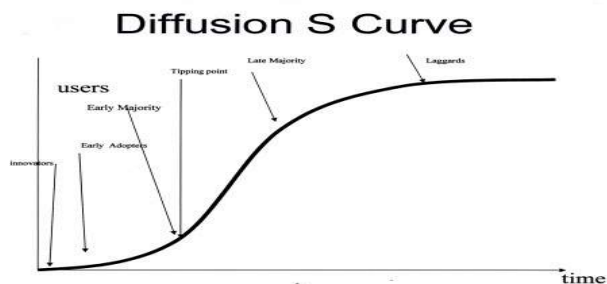
The theory of reasoned action, theory of planned behavior, and decomposed theory of planned behavior have often been applied in empirical studies relating to consumer behavior, manufacturing industries, advertising campaigns, information technologies and software sciences (Iqbal & El-Gohary, 2014; Sadaf et al., 2012; Velarde, 2012). The agricultural field has also utilized the theory of planned behavior and the decomposed theory of planned behavior to analyze small farmholders intentions toward the adoption of sustainable agricultural practices, conservation practices and production diversification (Lalani, Doward, Holloway & Wauters, 2016; Senger, Borges & Machado, 2016; Wauters et al, 2009; Zeweld, Van Huylenbroeck, Tesfay & Speelman, 2016).

### **Diffusion of Innovation Theory**

Diffusion of innovation theory (DOI) was developed by E. M. Rogers in 1962. It originated in communication to explain how, over time, an idea or product gains momentum and diffuses (or spreads) through a specific population or social system (Rogers, 1995). The original diffusion research was in 1903 by French sociologist, Gabriel Tarde. Tarde plotted

the original S-shaped diffusion curve (see Figure 2), which is still relevant today- "most innovations have an S-shaped rate of adoption" (Rogers, 1995, p 23).

**Figure 2** Diffusion S-Curve



*Figure 2. Diffusion S-Curve [Graphic]*

Diffusion is the “process by which an innovation is communicated through certain channels over a period of time among the members of a social system” (Rogers, 1995 p. 10). An innovation is “an idea, practice, or object that is perceived to be new by an individual or other unit of adoption” (Rogers,1995, p. 10). “Communication is a process in which participants create and share information with one another to reach a mutual understanding” (Rogers,1995, p.10).

Diffusion research centers on the conditions which increase or decrease the likelihood that a new idea, product, or practice will be adopted by members of a given culture. It analyzes how media and interpersonal contacts provide information and influence opinion and judgment. Rogers (1995) argued that it consists of four stages: 1) invention, 2) diffusion through the social system, 3) time and 4) consequences. The theory states that information flows through networks. The nature of networks and the roles opinion leaders play in them determine the likelihood that the innovation will be adopted.

Innovation diffusion research has attempted to explain the variables that influence how and why users adopt new ideas, such as conservation BMPs. Opinion leaders exert

influence on audience behavior via their personal contact, but additional intermediaries called change agents and gatekeepers are also included in the process of diffusion (Rogers,1995).

There are five adopter categories: (1) innovators, (2) early adopters, (3) early majority, (4) late majority, and (5) laggards (Rogers ,1995). These categories follow a standard deviation-curve; very few innovators adopt the innovation in the beginning (2.5 percent), early adopters making up for 13.5 % a short time later, the early majority 34 %, the late majority 34% and after some time finally the laggards make up for 16 %.

### **Economic Constraint Theory**

Economics is just one area addressed by the theory of constraints (TOC), a methodology widely used in manufacturing and retail sales developed by Dr. Eliyahu Goldratta (Leanproduction, 2011). TOC identifies the most important limiting factor (i. e. constraint) that stands in the way of achieving a goal and then systematically improving that constraint until it is no longer the limiting factor. The identified main constraint is often referred to as a bottleneck (LeanProduction, 2011).

Economics was one of the factors identified as affecting farmers' use of conservation practices in a 1982 study by Erwin and Erwin in which they discuss the variety of affects the presence of off farm employment has on farmers' actual use of BMPs on farms of different sizes and types. Shiferaw et. al., identified economics as one of the primary constraints to agricultural operators in their 2007 study exploring the constraints frequently found in the adoption of BMPs by small farmholders.

### **Summary**

It is clear there is a need for more focus on the direction further education and outreach to equine operators should take in the future. This study attempted to evaluate equine operation

owners' knowledge of and reasons for their current attitudes towards BMPs in order to closely analyze the stimuli that effected adopters' and non-adopters' choices. By using the tenets of DTHB a more multidimensional analysis can be achieved, the motivations of equine property owners can be better understood and methods to reach them improved.

## Chapter 3 - Methods

Available research suggested equine operators have little knowledge of BMPs and are therefore not using them on their properties (Prokopy et al., 2011). The objective of this study was to explore the level of knowledge of equine operators in Montgomery County, Maryland, relating to regulatory requirements and BMPs, related programs and use of these practices or programs on their properties. Semi-structured, in-depth interviews were used to better understand what equine operators knew about regulatory requirements, conservation best management practices and their process of choosing to adopt BMPs.

The increased adoption of BMPs could result in better stewardship of the land, healthier equine populations and closer adherence to nutrient management requirements. After the literature associated with this topic was reviewed, the following research questions were identified.

- RQ1 What are Montgomery County equine operators' perception and awareness of regulatory requirements pertaining to their operations?
- RQ2 What are Montgomery County equine operators' perceptions and awareness of conservation BMPs?
- RQ3 How do operators gain and process information related to conservation BMPs and related programs?
- RQ4 How do Montgomery County equine operators view their role as stewards of the land?
- RQ5 What part does the adoption of conservation BMPs play in that role?

In order to address these research questions a thorough understanding of each equine operator's level of knowledge and perceptions were necessary. Qualitative research tries to

understand multiple dimension and layers of reality within a social group (Johnson & Christensen, 2011). Qualitative research is a series of observations with the data being in words and numbers rather than numbers alone that can be divided into descriptive categories and general themes (Johnson & Christensen, 2011). In person, in-depth interviews provided a focus on the individual that allowed for a detailed investigation of each person's personal perspective and therefore a deeper understanding of the personal context within the research phenomenon, and for detailed subject coverage (Ritchie & Lewis, 2003).

### **Design of the Study**

A qualitative approach was appropriate for this study so the researcher could develop a wider comprehensive scope of equine operators' motivations and their reasons for adopting best management practices. Data was collected during semi-structured in-depth interviews. Semi-structured interviews allow a deeper understanding of the research question because variations in participants' account can be noted and explored (Miles & Gilbert, 2005). A survey format would not provide an opportunity to ask follow up questions and would not provide as much information (Flick, 2009; Rubin, 2005).

The history of qualitative study reaches back early to human observation predating the 17<sup>th</sup> century and moving through several reiterations and changes of emphasis (Denzin & Lincoln, 2008). Wilhelm Wundt, Sigmund Freud, and William James are among those who have conducted qualitative studies since the founding of psychology in 1879 (Wertz, 2014). The basic tenet of qualitative research that of seeking to explore motivations for actions is required for any type of empirical study (Wertz, 2014). Qualitative methods were appropriate for this study because they can be defined as "...a concern for the 'what' 'why' and how questions rather than 'how many', a focus on processes and the flexible nature [ of the research]" (Ritchie,



Lewis, McNaughton-Nicholls & Ormston, 2014, p. 3). Qualitative Research is concerned with exploring the perspectives of the participants and taking this perspective as a starting point (Ritchie et al., 2014).

A review of the literature showed a need for further understanding of the level of equine operators' knowledge of practices and programs, how they gained this knowledge and their motivations for using the practices. Qualitative research allows the researcher to conduct "Analysis that retains complexity and nuance and respects the uniqueness of each participant as well as recurrent cross-cutting themes" (Ritchie et al., 2014, p. 4). Understanding the different perspectives related to the regulations concerning land management and the reason for the adoption of BMPs by equine operators will help service agencies adapt their programs and services and improve land stewardship.

### **Interviewer**

The role of the interviewer was to establish trust and rapport with the interviewee, to listen carefully and record detailed information (Johnson & Christensen, 2014). It was also important to have pre-prepared probes or prompts in order to obtain better clarity from the person being interviewed (Johnson & Christensen, 2014).

The interviewer has many years of experience as a journalist and has completed college level coursework in the interview process. The interviewer also reviewed the question route to familiarize herself with the question content and sequence. The interviewer completed Kansas State University's Institutional Review Board training.

Subjectivity is an important aspect of qualitative research and provides important insight into an intimate understanding of the phenomenon being studied. While personal views may affect their research, acknowledging their subjectivity can also add strength to the depth of

understanding of data and provide a more nuanced account of the subject matter (Hay & Singh, 2011). In the name of academic honesty and integrity, the interviewer has detailed her subjectivities below.

### ***Interviewer Subjectivity Statement.***

I am an agricultural education and communications graduate student; this research was completed as a component of my thesis research. I am a mixed race, middle class female who grew up in an affluent county close to a major city, where my father trained horses for a variety of socio-economic classes of people. I worked as a horse training assistant for approximately seven years and supported the management of a variety of large equine facilities. I owned and operated my own training facility at a variety of locations for more than 25 years. I have practical knowledge of conservation and equine management and a respect for those who care for their animals and those belonging to others. I am currently employed as an equine resource conservationist for Montgomery Soil Conservation District in Montgomery County, Maryland.

### **Questioning Route**

Interviews began with open-ended questions, then as necessary probes were used to gather responses from participants concerning their equine operations, knowledge of regulations, management practices, attitudes, and beliefs toward BMPs. The interviewer's guide can be viewed in its entirety in Appendix A. A copy of the original consent form signed by interviewees prior to the start of interviews can be found in Appendix D. An opening question was used to introduce the subject of the interview and get basic information about the operator. By gaining the basic information about each operator the interviewer was able to guide the interview into the key questions that remove the superficial and allow a deeper understanding of the participants' perspective (Bhattacharya, 2017). In this study the interviewer began by asking

a simple question, “Tell me about your operation.” The transition question was more comprehensive, asking specifically about the operators understanding of state and local regulations relating to equine operations or their use of BMPs.

There were five key questions. The questioning route is included in Appendix A. The interview involved several stages designed to bring the interviewee to a level that allows them to focus on a specific topic (Ritchie et al., 2014). The key questions referred to the level of knowledge operators had regarding state regulations for equine properties, use of BMPs and the related conservation programs as well as the reasoning behind why these practices were chosen or modified. These questions were intended to provide the information sought in the research questions, but in more easily understood language. The questioning route took the broad research questions and helped each individual understand how the question related to them (Rubin, 2005). Probes, asking for examples, more information or amplification of an idea were used throughout the interview to clarify and keep conversation flowing (Rubin, 2005).

During the discussion and again at the end of the interview the interviewer summarized the participants’ responses and at the end of the discussion asked participants if there was any additional information they would like to include. An ending thank you statement was used to demonstrate respect for the time the interviewee spent taking part (Johnson & Christensen, 2011). Kansas State University’s Institutional Review Board approved the study and questioning route in proposal number 8765. The full application and approval letter is included in Appendix B.

### **Screening Process and Subject Selection**

Individual interviews were used to assess the research questions with participants selected from a mailing list compiled by the Montgomery Soil Conservation District from the Maryland Horse

Industry Board List of Licensed Stables (MHIB, 2017), a list of participants in a 2009 equine operations survey (Camp), Extension contacts and those familiar with equine information. This purposive sampling technique was used because participants needed to have certain unique characteristics that allowed them to understand the complexity of what is being studied and therefore also understand the level of the research questions (Creswell, 2007).

During the scheduling phase and at the close of interviews, participants were asked to identify anyone who also owned or operated an equine operation and might be willing to participate in the study. This enacted a snowball sampling method which is often used to locate members of hard-to-find populations. (Johnson & Christensen, 2011). After each interview participants were asked “Do you know any other horse people in the county who might take part in the study?”

A total of 31 interviews identifying 33 separate farms were conducted for this study. Interviews began on June 16, 2017 and concluded on July 24, 2017. Pseudonyms were assigned to participants based upon the number of horses contained on their operation (Appendix C). Pseudonyms that begin with A were assigned to participants with small farms (1 -3 horses), B for participants with medium farms (4-9 horses), C for participants with medium large farms (10-16 horses), D for participants with large farms (17-30) horses and E for participants with extra-large farms (31 +) horses. These classifications were based purely upon information provided by each operator.

The interviewer determined the level of BMP adoption of each operator. Factors used to establish BMP adoption levels included; the use of some type or level of each BMP: fencing, heavy use areas, manure storage, nutrient management, composting, rotational grazing, roof runoff systems. Also considered were the methods used to adapt practices to individual

operations such as dragging fields, mowing, reducing numbers of horses, resting fields or developing new technology. Table 2 shows the operators who participated in the study.

Section 1 of Table 2 displays the participants with small farms, Section 2 shows the participants with medium farms, Section 3 shows the participants with medium- large farms, Section 4 shows the participants with large farms and Section 5 shows the participants with extra-large farms.

Table 2 indicates the operation size based on number of horses divided into categories denoting: actual acreage of the farm, the actual number of horses, years they have been in operation, whether the farm is the operator’s primary source of income and assigned level of BMP adoption. Factors used to establish BMP adoption levels included; the use of some type or level of each BMP: fencing, heavy use areas, manure storage, nutrient management, composting rotational grazing, roof runoff systems. Also considered were the methods used to adapt practices to individual operations such as dragging fields, mowing, reducing numbers of horses, resting fields or developing new technology.

**Table 3-1** Participants classified by farm size, years of operation and BMP adoption level

<b><i>Small Farms 1- 3 Horses</i></b>					
Pseudonym	Actual acres	Horses	Years	Primary Income	BMP Adoption Level
Adam	3 acres	1	3	No	medium
Alan	3. 7 acres	2	22	No	low
Adrian	4. 5 acres	3	2	No	medium
Amelia	4. 97 acres	2	1	No	medium
Arthur	5 acres	0/4*	38	No	low
Adelaide	5 acres	2	17	No	medium
Alice	5 acres	3	5	No	high
Amy	8 acres	2 to 3	21	No	medium
Audrey	11 acres	3	20	No	medium
Aliza	16. 46 acres	2/18 *	2	No	medium

\* denotes current number of horses / former number of horses

<b><i>Medium Farms 4-9 Horses</i></b>					
Pseudonym	Actual Acres	Horses	Years	Primary Income	BMP Adoption Level
Barbara	5 acres	4	3	No	low

Betty	5 acres	7 to 10	32	No	medium
Blanche	5 acres	4/2-3*	28	No	medium
Becky	7.5 acres	4	2.5	No	high
Breanna	10 acres	4	6	No	high
Bridget	10 acres	4	13	No	medium
Beatrice	25 acres	4-16*	8	No	medium
Bert (M)	27 acres	4	14	Yes	high
Bert (M)	32 acres	6	14	Yes	high
Beth	90 acres	6	37	No	medium

(M) denotes manager \* denotes current number of horses / former number of horses

#### **Medium Large Farms 10-16 Horses**

Pseudonym	Actual acres	Horses	Years	Primary Income	BMP Adoption Level
Clyde	12 acres	15	21	Yes	medium
Curt(M)	31 acres	11	14	Yes	high
Constance	36 acres	12	14	No	medium
Camille	57 acres	16	1	No	high

(M) denotes manager

#### **Large Farms 17-30 Horses**

Pseudonym	Actual acres	Horses	Years	Primary Income	BMP Adoption Level
Dory	13 acres	20	37	No	medium
Danielle	26 acres	17-20	49	No	medium
Derick	77 acres	17	1	No	high
Diane(M)	100 acres	23-25	13	Yes	medium

(M) denotes manager

#### **Extra-Large Farms 31 or more Horses**

Pseudonym	Actual acres	Horses	Years	Primary Income	BMP Adoption Level
Eve (M)	40 acres	60/75*	36	Yes	medium
Erle (M)	90+ acres	58	34	Yes	low
Evita (M)	92 acres	67	13	Yes	high
Eleanor	101 acres	55	21	Yes	medium
Edward	200 acres / 100 pasture	38-42	42	No	high

(M) denotes manager \* denotes current number of horses / former number of horses

## **Procedure**

Initial contact with participants was made by letter. Participants willing to participate in the study responded by telephone or email. The researcher scheduled interviews by telephone,

during in person conversations and by email. Interviews were conducted at each participant's location of choice. These locations varied from barn offices, farm kitchens, and the MSCD offices.

Questions were asked to gain a description and interpretation of a specific social sphere (Ritchie, et al., 2014). The questioning route is available in Appendix A. By using an interview guide approach the researcher was able to cover the same general topics and subject matter with all participants while allowing enough latitude to explore individual answers and attitudes (Johnson & Christensen, 2011)

Internal consistency was established by comparing the interviewer's notes, and participants' recorded and transcribed responses. These elements were also used to establish validity. The interviewer maintained both field notes and handwritten notes on hardcopies of the interviewer's guide for each interview. All data were collected from interviews via audio recorders and from the interviewers' notes, creating an audit trail. This audit trail traced the route of the research from beginning to end establishing the dependability of the study (Flick, 2009). The level of detail obtained from this thick description of the field experience reinforced the transferability of the study (Holloway, 1997).

The data was transcribed by the professional transcription service, TranscriptionStar (Diamond Bar, CA). Each participant was given a pseudonym and any identifying information was removed for confidentiality purposes. Establishing validity is important so that the research will be accurate. By establishing validity, the researcher ensures accuracy of the interpretations and inferences made as the result of the study (Johnson & Christensen, 2011).

## **Data Analysis**

The researcher first reviewed the field notes, then listened to each interview to confirm the transcribing was done correctly by the professional transcription service. All identifying references were removed, additional edits made and pseudonyms assigned. Comparative coding was done with NVivo 11 software to code each interview using the constant comparative method. Coding is the process of marking segments of data with symbols, words or categories (Johnson & Christensen, 2011). The researcher compared the interview being coded with previously coded interviews. The comparison between interviews was based upon memory and did not require reviewing previous coding for every comparison (Glaser, 1965). A master list of inductive codes was generated as the researcher directly examined the data. The master list was then separated into categories sorted by word or concept similarities. (Johnson & Christensen, 2011). Those categories were then used to establish themes (Bhattacharya, 2007). If a theme was present within at least 16 interviews, it was considered a major theme, as done in previous work in this area (King, 2016).

## **Limitations**

The limitations of this study are those generally associated with any qualitative research. This data cannot be generalized to the general population (Johnson & Christensen, 2011), but may be transferable to other similar cases. Because research was directed at Montgomery County equine operators, a community with certain definite characteristics, the purposive and snowball sampling techniques are effective choices (Johnson & Christensen, 2011).

## **Summary**

Participants for this study were recruited using a purposive sampling method. Snowball sampling was used to gain more participants and ensure a range of opinions and situations. The interviewer conducted 31 qualitative in-depth interviews relating to 33 separate farms during the summer of



2017. An interview guide approach formulated around a standardized questioning route was used for each interview. The questions were used to investigate the research questions of the study. These interviews were conducted with equine operators in Montgomery County, Maryland. The audio from the interviews was transcribed, imported into NVivo 11, and analyzed using Glaser's constant comparative method to identify themes across the data set.

## Chapter 4 - Results

### Introduction

The purpose of the study was to understand what equine operators know about regulatory requirements, conservation BMPs and their process of choosing to adopt BMPs. The following research questions guided this study:

RQ1 What are Montgomery County equine operators' perception and awareness of regulatory requirements pertaining to their operations?

RQ2 What are Montgomery County equine operators' perceptions and awareness of conservation BMPs?

RQ3 How do operators gain and process information related to conservation BMPs and related programs?

RQ4 How do Montgomery County equine operators view their role as stewards of the land?

RQ5 What part does the adoption of conservation BMPs play in that role?

The results presented in this chapter are from in person in-depth interviews with equine operators in Montgomery County, Maryland. Interviews ranged from 20 to 45 minutes. The results are presented in the order of the five research questions. Results that arose naturally from the data that did not align with research questions are also presented. The interviews were analyzed with Glaser's (1965) constant comparative method. The interviews were coded in NVivo 11; then organized into themes. Any concept that had 16 or more participants in agreement was considered a major theme.

Participants were all assigned pseudonyms. Pseudonyms that begin with A were assigned to participants with small farms 1 -3 horses, B for participants with medium farms 4-9 horses, C

for participants with medium large farms 10-16 horses, D for participants with large farms 17-30 horses and E for participants with extra-large farms 31 and more horses. For a table containing a full list of participants see Appendix C. If half of the operators in a farm classification mentioned a concept, it was considered a theme for that classification. There was a total of 10 participants in the small farm classification; therefore, if five or more operators mentioned the same topic, it was considered a theme. There was a total of 10 participants interviewed in the medium farm classification. Therefore, if five or more operators mentioned something it was considered a theme. There was a total of four participants interviewed in the medium-large farm classification. Therefore, if two or more operators mentioned something it was considered a theme. There was a total of four participants interviewed in the large farm classification. Therefore, if two or more operators mentioned something it was considered a theme. There were a total of five participants interviewed in the extra-large farm classification. Therefore, if two or more operators mentioned something it was considered a theme.

## **Results**

### **RQ1 What are Montgomery County Equine operators' perception and awareness of regulatory requirements pertaining to their operations?**

To understand the level of equine operators' awareness or regulations pertaining to their operations, operators were first asked if they had any knowledge of state regulations for horse operations of certain size and then asked follow up questions about any regulations of which they were aware. Interview responses yielded the following, only seven operators said they were unaware of any regulations, while 10 operators identified a limit on horses per acre as a relevant regulation, slightly more, 12 operators had some awareness but knew the regulations did not apply to them, a near majority of 15 had knowledge of state stable licensing requirements. The

following themes were identified: a majority of 29 operators were aware of nutrient management regulations but only 17 operators could give a clear definition of a NMP, 25 operators were somewhat aware of conservation plans but only 8 operators could give a clear definition of the contents and purpose of a conservation plan.

*Existence of nutrient management regulations and the definition of a Nutrient Management Plan (NMP)*

When participants were asked if they were aware of the nutrient management requirements in Maryland, 29 of the participants said they had some knowledge of the regulations.

Camille, who has been operating her own medium sized boarding facility for just over one year gave a succinct response when asked about state regulations. “Well, my understanding is that state horse facilities of a certain size or commercial facilities have to be licensed and inspected through the state and then also required to have a nutrient management plan in place.”

The response from Bert, a manager of a medium size operation, was a short but concise summary of the program.

It is put in writing what you should be doing anyway. But in a nutrient management plan is just basically what you're doing with the manure, the best practices you're using. How many horses are on the property? What are you doing with the manure?

Several of the participants mentioned the connection with Chesapeake Bay. The comments from Edward, the owner/manager of an ex-large farm, was one example.

The plan as I understand it is – what generated the need for the plan is the cleaning up the Chesapeake Bay. And a lot of the streams and rivers that go into the Bay were carrying high amounts of

phosphorous and other pollutants. And this was put on the doorstep of the farmers that they were doing this. So, they setup guidelines where the streams are fenced off; where animal manure waste is composted and put on the fields as compost. Also, a requirement that you get soil testing every three years and follow recommendations for fertilization and liming as a result of these.

Alice, the owner of a small farm, also mentioned the Bay in her response.

I believe that's the plan to make sure that you are not fertilizing at the wrong time. It's to protect the Chesapeake Bay and the watershed from too much nitrogen I believe mainly, fertilizer, too much fertilizer.

The detailed knowledge of the purpose and content of, as well as the requirements for, a (NMP) seemed to directly increase as the size of the farm increased, which is logical because these farms were more likely to be subject to the regulations requiring a NMP and conservation plan for farms housing more than 10 animals.

Having a consistent local contact also appeared to be a factor in the level of detail expressed by operators. Because NMPs must be renewed every three years, operators have frequent contact with the nutrient management coordinator and receive constant reminders of what the program involves. Dory, an operator of a large facility, who has been in business for 34 years said “Well, you know, our nutrient manager, gal, Amanda Laudwein, comes out here periodically and we talk about that stuff.”

This was similar to a sentiment echoed by Danielle another long-time operator.

So, yeah, I've been on a nutrient plan for a long time. And every couple of years, Amanda Laudwein comes here, brings me up to date. We talk about how the farms are doing and what fields might need something.

*Existence of requirements for Soil and Water Quality Conservation Plans (SWQCP) and the definition of a SWQCP or "conservation plan"*

Although 25 participants were identified as having some idea of what a conservation plan was or what it contained, only eight of those participants could clearly define the plan's purpose and content.

One of the best encapsulations came from Betty, a medium sized farm operator who had extensive experience with 4-H and had been operating for 32 years.

It's to basically manage your fields and your property, so that you don't cause or add to erosion problems as part of that is pasture management. If you have a stream which we don't have, but if you have a stream you have you make sure that the animals are cordoned off from it so they don't have access to the whole stream and to contaminate the water source, that's roughly it.

Although another good description was provided by Becky, a medium farm operator whose boarding operation has been in existence for just over two years, she was also representative of the answers from several operators in that she is unaware that she does have a conservation plan in place.

I'm less familiar with that because I don't have one, but I would assume that they're similar to the Nutrient Management Plan, its practices designed for soil conservation, other resource conservation on a farm. The one element that I

assume is part of one is fencing off streams so that horses can't go in and use it as their facilities.

The general confusion over what did constitute a conservation plan was echoed by Breanna, who had previously operated a large commercial stable but had for the past six years owned and operated a medium sized farm where she kept only her own horses.

Well, I think there is actually two different kinds. There is the – as my understanding there is the – what I call the sort of regular or normal ordinary one which is somebody from the soil conservation district comes out and goes around your operations with you, and makes recommendations with regard to best management practices. Then I think there is another kind where if you are going to be doing something that's going to qualify for cost sharing. I think there is another sort of more formal complicated one that gets done as part of that process of getting cost sharing.

Edward, the owner operator of an extra-large farm, a high adopter of BMPs and an operator who has participated in cost sharing program currently and in the past, was also at a loss to explain the difference between the two plans required for his licensed operation, he said “As opposed to nutrient management, I can't you know.”

Participants also confused a conservation plan with the county agricultural reserve program and conservation easements in general.

### ***Dissent***

Nine operators said they had no knowledge of the regulations or felt they did not apply to them.

Adam, an operator of small farm where he has kept his own horse for 3 years, said he had just become aware of the regulations “At the pasture walk last week, that was my first awareness of

those requirements. But it looks like we're small enough that it doesn't – we're not required but maybe that's just my quick interpretation of it.”

Beth, an operator of a medium size facility who had been in business for 37 years, said she felt the nutrient management regulation requiring storage and a limited time frame for spreading manure didn't apply to her.

I don't have any storage. I spread it 12 months a year. I – probably, I'll make sure I spread it on heavy grass that's a long way from any water source and there's a lot of grass and a lot of woods between where I spread manure at any stream or pond. So, I object to that rule.

## **RQ2 What are Montgomery County equine operators' perceptions and awareness of conservation BMPs?**

Participants were asked about their knowledge and use of BMPs on their equine operations.

While many of the participants were unfamiliar with the definition of individual BMPs or what was considered a BMP, nearly all of the participants used some variation of one or more of the of the six practices identified for this study (fence, heavy use area protection, nutrient management, prescribed/rotational grazing, roof runoff systems, and waste storage/ composting). Interviews revealed the following themes: 28 participants stated they used fencing for either rotation grazing and/or fencing of livestock out of streams; 21 participants stated some knowledge of nutrient management and 18 had knowledge of or had done soil testing; 18 participants used some form of rotational grazing; 25 participants had created adaptations of the identified practices to better suit their operations and/or incorporated other practices into their day to day operations. Use of the remaining BMPs, heavy use area protection and roof runoff systems did not constitute a major theme because both were developed but at a lesser rate, with 11 participants using each



practice. These practices were used by operators who also used other practices but were not being used without other practices already on site either individually or in combination.

### *Use of fencing*

Participants mentioned their use of fencing to achieve two primary objectives: for use with rotational grazing and to fence horses out of streams. In general horse farms use fence to separate animals and operators often consider the streams and ponds when they are designing their facilities, laying out the pastures and turnout areas.

Eleanor, an operator of an extra-large facility who has been in business for 21 years, replied when asked if she used stream fencing “Yes. Well, we haven't had to, it [the stream] doesn't go through the paddocks. But we know that that is a rule.”

Operators large and small combined stream fencing with other practices to keep horses out of water sources.

As Alice, a small operator who has owned her farm for five years, said “We put in a berm, – just a grass berm to redirect the water back into the woods instead of into the sacrifice lot. We have lots of water issues there. We fence around our pond and our stream.”

Edward, the owner of an extra-large farm, tied his stream fencing to other practices as well as to the requirements of his NMP. “We protect the streams and ... We do have stream fencing, right... We do have stream crossings. And these were approved in the nutrient management plan.”

Edward also tied his use of fencing to his rotational grazing system “We rotationally graze the horses by dividing the large paddocks into multiple paddocks and usually this is done with wiring and electrical wiring and it's worked quite well in protecting the pastures.”

### *Use of nutrient management*

For most participants, nutrient management knowledge centered on a basic awareness of control and use of manure and fertilizer, the existing regulations and how they applied to the operator themselves. Practices included soil testing, liming, fertilizing and managing application of manure.

As Evita, a manager for an extra-large facility that has been in operation for 12 years, said

“Well, I know from the nutrient management's perspective and that you need to have a plan registered with the state where your waste goes and how it's processed, where it's kept, how you use it and if anyone else uses it.”

Soil sampling or testing and its role in the management of pasture nutrients was mentioned to a lesser degree by participants. Danielle the operator of a large facility who had been in operation for 49 years, said

We take soil samples from several areas on the farm and they – we send them away and have them, you know, check to see what needs we might have and if we need to fertilize or if we're doing too much of something.

For Clyde, and operator of a medium-large farm who had been in business for 21 years, nutrient management combined aspects of soil health and manure management –even if the goal had to be tempered by his situation of limited acreage.

Nutrient management plan from my understanding is how the ground is taken care of, what you do with your waste material and you know if possible you try to grow grass, but in our situation, that is not possible. So, you know we do the best we can.

### *Manure storage/composting*

Participants used a variety of manure management methods varying from having manure hauled off site, to piling and spreading the manure, storing and spreading the manure and/or composting.

Blanche, an operator of a small farm who had been operating for 28 years, had a simple procedure for composting that addressed horse health as well as soil health.

I do not have actual manure storage but the manure is piled as far away from the runoff area as possible. Also, allowing to keep it away from the barn for insect control. And once it is composted then I do use it and spread it on the field for fertilizer, and we pick up manure daily.

Amelia, a small operator who had been keeping her own horses for one year, also combined the processes.

We do, we will have our manure, I'm putting it in a pile right now and we're composting some of it. But I do have a company that's -- when it gets to the point where I need to move it, the company will take it away.

Camille, an operator with a medium sized farm who had been in business for just over a year, was presently having manure hauled offsite but was working toward making a change from one method to another. "Currently, we use a manure container that's hauled away. We're in the process of applying for a grant for a concrete bin to contain it rather than having it on the ground going into the soil."

### *Prescribed/rotational grazing*

Participants used various forms of rotational grazing dependent on the size of their operation, available acreage and management style. The degree of intensity of application varied based on

the management requirements – whether horses were kept primarily in stalls, stalled and turned out for periods of time or field boarded had bearing on their choices, as well as the number of horses relative to the number of acres on the farm.

Becky the operator of a medium sized farm with four horses onsite, who has owned her boarding facility for just over two years, uses rotational grazing as an integral part of her 7.5-acre farm “Yes, we do rotational grazing. As I said, I have seven pastures, we took our front pasture that was three acres and divided in half, so that we are able to rotate regularly through those pastures.”

The need for multiple fields and a correct ratio of horses to acreage is echoed by Bridget who operates a medium sized facility with four horses on 10 acres. “...luckily I have 10 [acres]. So, I can do very good rotations. I have six fields that I rotate through.”

Edward, a long-time owner of an extra-large facility where he usually keeps more than 40 horses with more than 30 on field board, has gradually moved toward using small fields as part of his rotational grazing.

So, we always rotated the pastures, but in large pasture area, anything from 10 to 30 acres; and it was in the past 10 years or so that I started to breaking it down into small paddocks inside these larger paddocks. But the concept was many years in coming.

### ***Adapting practices to suit individual operations***

The overwhelming theme of participants’ responses was the variety of ways in which they adapted the six BMPs identified for this study and incorporated other practices into their management styles. Several participants mentioned “dragging” and mowing as regular parts of their pasture maintenance.

Edward, the owner operator of an extra-large farm, talked about his regimen for healthy fields.

We also clip the pastures when weeds start growing and we also harrow (drag) that way after [horses are] moved off of one area of rotational grazing. We will go in with a chain type harrow and break up the manure that's there.

Many operators mentioned using "resting" fields and controlling turnout for other reasons as their most practical form of pasture rotation. Eve, a manager of an extra-large boarding facility talked of her methods for maintaining pastures for the 60 horses onsite.

We rest the fields. We let them rest for maybe a week, two weeks at a time, sometimes maybe up to a month where we rotate the horses to different fields.

We... also if it rains we don't put the horses out the next day to also let the fields rest and get firmer."

Eve also mentioned that in order to maintain the property at a sustainable level she had reduced the number of horses boarded at her facility from 75 to 60. Reducing the number of horses on site was a solution to an ongoing erosion problem for Erle, who has managed an extra-large boarding facility for 34 years said

We started getting together planning, how are we going to put the gutters on and where are we going to run it out? And in this one field behind the barn we had 24 horses in at the time. It was over grazed and there were some erosion problems. So, we started looking at everything. And then in effort to fix that and also address some horse behavior issues just ended up cutting that field in half. So, there were like 12 horses and that eliminated all the erosion. The barn not being overgrazed right behind it, [helped] the run off to avoid it, it became evident that

we really didn't need the gutters. And it just having enough grass to catch any – below it, catch any potential slow erosion, really.

Clyde, the owner of a medium-large facility who had been unsuccessful in his rotational grazing attempts combined the idea of a heavy use area and a specialized feeder to keep mud at a minimum, promote soil health and create a more attractive environment.

I am real happy with my hay feeders, 8[foot] x 8[foot] square and they have a slant roof on them and the horses can even be fed round bales, square bales whatever you feed them. And that is where we put two truckloads of wood chips and spread them out, I forget the exact dimensions of it but we had that down; and then I put my hay feeder on top of that so now all I do is we go out with the bobcat and are able to scrape a pattern that horses are not standing in the mud, in the rainy wet season is not mud out around the hay which used to be a huge problem.

Some participants did use heavy use protection and roof run off systems but these practices generally appeared to be used in conjunction with other practices by those already using one or a combination of several other practices and were not used as stand-alone practices.

### ***Dissent***

Clyde, an operator with a medium-large farm with 15 horses on 12 acres, found that the idea of rotational grazing was not practical for his operation.

...we have kind of tried that to some extent I had grass, had a beautiful grass out here in this front field one time to control to get it done, you know move the horses around and get them off of it, but you got a year you know to really get

good root system and all soon as you put them back on and they are happy for a while and then things do not change you just wasted a lot of money.

**RQ3 How do operators gain and process information related to conservation BMPs and related programs?**

Questions were asked to better understand the ways in which operators obtained information about BMPs and what factors affected their decisions regarding the acceptance or rejection of the information provided. Participants were initially asked how they learned about extension, soil conservation or best management practices.

Additional questions then defined the factors that made the information reliable and influenced them to adopt BMPs. The following themes were identified and outlined in Table 3: 17 participants said that the early information they received about the BMPs and the related services came from word of mouth from a neighbor or other peer; 17 participants said they first heard of the services and practices available through their job (4) or from government staff (Extension staff 3, MDA staff 6, MSCD staff 4). Although not a major theme it is important to observe that 13 participants said that university connections, association contacts (MHIB or 4-H) or that they grew up on a farm was the reason they were aware of the practices and services.

**Table 4-1** Information sources used by operators

information method	Small Farms 1-3 Horses (n=10)	Medium Farms 4-9 Horses (n=10)	Medium-Large 10-16 Horses (n=4)	Large Farms 17-30 Horses (n=4)	Extra-Large Farms 31+ Horses (n=5)	Total (n=33)
4-H	-	2	-	-	-	2
college connection	2	3	-	1	-	6
email	1	1	-	1	-	3
fair	1	-	-	-	-	1
flyers	1	1	-	1	1	4
grew up on a farm	-	-	3	1	-	4
word of mouth	4	4	3	2	2	15

newsletter	1	-	-	1	1	3
seminars	4	2	-	1	-	7
MSCD staff	1	1	1	1	-	4
MDA staff	-	2	1	2	1	6
Extension staff	2	1	-	-	-	-
through work	1	3	-	1	3	8
TV/radio/media	-	-	-	1	-	1
equine/farm association	-	2	-	1	1	4
internet research	3	2	2	2	2	11

***Peer to peer information – word of mouth***

Themes also developed as to what made the information they received credible and influenced them in the adoption of BMPs; 17 participants said they felt the information provided was good advice or was based on science and 19 participants said the availability of a local contact, credibility of staff and the dedication and ease of communication with staff were important influences on their decisions to implement BMPs. A further 21 participants felt that there were negative aspects specifically relating to the cost share process for the available programs particularly, practicality of information, projects being over engineered, lack of follow through by staff and misrepresentation of the actual cost-shared amounts. Operators also said they obtained information from seminars, newsletters, flyers, emails, TV/radio, county fair booth and Internet research.

Many of the participants said their first knowledge of BMPs and sources of information came from other equine operators and that they passed along what they had learned.

Adelaide, a small farm operator who has been keeping her own horses for 17 years said “So it was kind of word of mouth I guess that told me about the programs existing. And then I told all my friends.”

Amy, a small farm operator who has been keeping her own horses for 21 years, elaborated on the same theme.



Our neighbors whose – the people who used to live next door whom we bought the property from, they had horses. And in fact, the horses came to live with us after a bit. They were – they, you know, taught us a lot and they learned a lot from the county over the years that they had their farm. So we are aware that if we, you know, the questions and, you know, if we need – that usually if I think, “Oh, what’s this or what’s that,” you know, in terms of grass, pasture, whatever management, we would call.

Clyde, the operator of a medium-large farm where he has boarded horses for 21 years, said news of regulations further sparked his interest “Well, I am going to say word of mouth. As in pretty much word of mouth- what really gets you interested is when they say that you have to have this licensing.”

### ***Learning through work or from staff***

Becky, who has boarded horses on her medium sized farm for 2.5 years, learned about BMPs and the available programs through her work as an editor and a family affiliation with the University of Maryland.

Well, I knew about the extension service because my husband was affiliate at the University of Maryland, so that was my first source of information. I think a lot of my sources are the county extension service, and then I read a lot of things that the university[produces] that’s partly because I work for the university extension service editing their manuscripts. So, I – by no choice of my own I read a lot of their information.

Bert, who has managed a privately owned, medium sized farm for 14 years, learned about the available programs through his contact with the local nutrient management advisor

Yeah, and now Amanda had [the farm owner] setup with one nutrient management plan at [Farm1], hooked me up with JG and then Eddie and Paul and that's how it really started, and Eddie started bugging me about horse stuff because mainly we do lots of field and water ways.

***Learned through 4-H, university connection or other industry association***

Diane, the manager of a large farm for 14 years, had several connections that provided her with information

My grandfather was an Ag educator for umpteen billion years like 40 years or something, and on my mom's side there are people still involved in production agriculture. So, I've been exposed to the concept of crop rotation and pasture rotation and did make sense. I have a degree in ag business so I had coursework that talked about the basics of most of these things. And then frankly like it makes sense, it saves money.

Beth, the operator of a medium sized farm where she kept her own horses and also boarded some for friends for 37 years, also had farming connections

Well, when we bought this farm, my husband seemed to know to call the Soil Conservation Service. We grew up in Arkansas. We both did. And he seemed to know that. And so, he – that was the first thing he did, was he called either the Soil Conservation Service or the ag extension service. I'm not sure which, but we worked with both of them. Right off the bat, they came out advised us about things and it was very helpful.

Betty, a medium sized operator has owned her property for 32 years and had formerly boarded some horses but now just kept her own, sited both her club connection and by

way of that a university connection as her knowledge source “Well, after 4-H you know being [a leader] – I mean I ran horse riding club for 25 years, I’ve been connected with University of Maryland.”

Dory, the operator of a large boarding facility for 37 years said “I am a member the Maryland Horse Council as well, so, when the stable, inspectors come out, we’re always talking to them, you know, about things.”

Edward, owner/ manager for 42 years of an extra-large boarding stable, provided insight into the combination of ways he uses to gain information.

I belong to an organization called the Montgomery Farm Club, which meets on a monthly basis, and has been going on since 1877. And farming is discussed in this area. I am a horseman and I ride off the farm and with people who are knowledgeable about farm management. And I’ve gotten a lot of information from the Soil District people and the Conservation people.

### ***Science behind/ good advice***

Arthur, a small farm operator who currently had no horses on his property, but had kept his own horses for 30 years said “Well, the science behind something would be a compelling factor for me.”

This was echoed by Alan, another small farm operator who had kept his own horses for 22 years, had attended a land grant college in Ohio “I know it’s legitimate and well-informed.”

Eve, who had been manager of extra-large boarding farm for 36 years said she felt the value of the services was in the available expertise, that left her free to concentrate on her job.

Well, it's like what I do is I train horses, I ride them, I teach people how to ride. I would not say to you, you need to get on my horse and train it for me and then go get this person a lesson because you're not accredited there. I'm not accredited to what you do. This is why we need professionals to do this. It's totally a partnership, totally a partnership

***Local contact - staff dedication***

Erle, the manager of an extra-large facility for 34 years gained some extra insight when his tardiness during the reporting process necessitated a visit from a regulatory officer that he initially regarded with apprehension.

I've been late on that a few times and at one point they sent someone out to go over my nutrient management plan and make sure I know what's going on. That was really wonderful, that was the most I learned about this whole process. But he came out and sat down for what seemed like a couple of hours and went over all the paperwork, explained why this field needs lime and why this one needs this. And he also said, if your fields are this you're going to spend this much in hay in the winter, and if you get your fields growing better, it's better for your wallet. And he just he really made sense, but I guess kind of being forced to sit down and go through that I did learn a lot. That was very helpful.

Becky, who has boarded horses on her medium sized farm for 2.5 years, said I feel like I've gotten so much good advice and guidance that I wouldn't have been able to do myself. Even with all the reading there is just practical day-to-day things like having help putting up an electric fence. I knew I wanted to do it but how to do it was an issue, so that help from you was critical.

Amelia, owner of a small farm where she has kept her own horse for just under a year said knowing there was a safety net for her was important.

That was invaluable. That was invaluable not only with information but to also -- I think psychologically it was very helpful. Because I know that I have a net and I that I've got -- if I needed something or if I needed a point in the right direction for resources I could call you or I could email you. And just -- that was very important to understand that that resource exists for this county.

Breanna, who had previously operated a large commercial stable but for the past six years had operated a medium sized farm where she kept only her own horses, said “Yeah, I think the people that we have dealt with for the most part have been very good you know...no I think the people that I've dealt with and all seemed to be knowledgeable and sincere and dedicated. ”

### ***Dissent***

There were also 21 negative comments regarding the staff, process and programs

#### *No follow through/takes too long*

Bridget, who has operated a medium sized facility with four horses for 13 years, said

The county came out at one point – I did the soil testing and they came out and we – they said they would help me to build the manure pit, but that never materialized, unfortunately. Not from lack of trying on my part, but it just – for whatever reason, they didn't follow through. So, I ended up – we stopped – about three years ago, we stopped spreading as much as we have been doing and we had the big manure container out there and we just had it hauled out. The only negative is that sometimes they don't follow suit on their end. That's the negative I can see.

Constance, who for 14 years had operated a large private farm, had similar problems with follow through and although she approved of the idea of the programs thought they were unrealistic.

Well, theoretically, we were meant to get financial help with fencing our horses out of the watershed areas and we applied, put in all the paperwork, did the soil testing, all the rest of it, the funding never materialized. Same with the funding for the water that was meant to be piped out into area so I wouldn't fence my horses in around the creek and just let them muddy it up. But as I think I would have been as old as Methuselah before any of that money actually arrived into my pocket book. We just ended up doing it. I mean, I would like to win that tractor at the fair this year and the lottery would be good too. It's more like unicorns and leprechauns than reality. But that's lovely too. I still have faith in unicorns. I think it's a great program. We would love to see it implemented.

Breanna, who had previously operated a large commercial stable but for the past six years had operated a medium sized farm where she kept only her own horses, said the long wait for reimbursement was a real problem when pursuing cost share funding for a project

Well, the negative – just from my personal experience, the negative was that it really did take a long time to get it through the system. And actually, I have done this twice now. Once with our big farm we put in two gigantic storage facilities for that place per se were 60-65 horses. And it was an unfortunate confluence of the economy because you have to pay for it upfront. So, I had to take out a line of credit because I think the project cost us \$60,000 or \$65,000. And then somehow or other the state managed to lose the paperwork or something, so it

was well over a year after product completion before we got our money back – before we got our cost share money. And so in the meantime I'm sitting on that, paying off that line of credit.

*Too expensive over engineered*

Breanna continued that in addition to the expense, and projects were often over engineered and the cost share estimates were not accurate

So, that's – I think the major downside is that you know I can understand the reason why but – you have to come up with the cash up front. So for any kind of big project that's tough for a lot of people. And the second is that oftentimes they allow – even though theoretically it's a fairly generous thing, but the allowed amount of money is often – like if you get totaled owed you can get up to 87percent of the cost of the project. But a lot of the times because the projects are so extremely engineered the actual cost of the project ends up being so much that the money that you get back in the cost there is really only more like 50 percent. So that's – there is a little bit of bait-and-switch involved there sometimes.

Eleanor, an operator of an extra-large facility who has been in business for 21 years, agreed that the upfront cost of such a highly engineered project was prohibitive, she said

I know I mean we want to do it but we just – We're not rich. And you have to come up with it upfront so we really couldn't implement them. Yes absolutely, over engineered because they had to get like an – they did an engineer thing and got all these plans and it was like, 'Oh, well shoot.' You may pay 80 percent of that afterwards, after we fork out the \$50,000 or \$80 or whatever it was, but yeah

if I have that to spend it probably wouldn't be on a manure pit.

*Not practical*

Amy, a small farm operator who has been keeping her own horses for 21 years, expressed frustration because of the lack of simple local information online

But there's so much stuff available, you just don't even know. So I end up looking at stuff from, like, Ohio State or Penn State or Virginia Tech, I mean, whatever. But, again, you – there's so much information. I just wanted to answer a one question – just one thing, you know, here's my condition. Well, the best information was from, you know, like Kansas. But, like, I'm not in Kansas, so I don't know if that still work here. But this is the information that I understand.

Evita, a manager for an extra-large facility that has been in operation for 12 years, said

I don't question the credibility of the state or the information given. I actually think what I'm really looking for sometimes is not best practices but like realistic practices, because sometimes I continue to read things that say like, "You shouldn't graze your horses all the time. " And that's like really great. But I – there's nothing I can do about that here, right? Unless I close down half of the operation. So, it's like what do you do if you do have to graze them all the time? Like there's doesn't seem to be like there's a gap of knowledge out there in terms of when you can't do best practices. I totally get saying best practices, and knowing that. But sometimes I feel there's a lack of what to do if you don't have that. And that's a fairly common in all practices right? Like academics are always ... the best practice, so I don't know to what degree.



### *Others get preferential treatment*

Constance, who for 14 years had operated a large private farm, expressed an opinion that large well-known farm operators received vastly different service than the small or medium sized operator.

Anybody who is really prominent on Maryland Horse Council or gets an article in the [a statewide magazine] gets funding. And if you are a small farm and nobody, you get squat; At least that's my perspective. And if you have a big enough voice and a staff who can chase this stuff down, like if I submit my paperwork, I assume that something is going to happen, whereas I have a secretary who'll chase it five days a week and go to meetings and I just don't.

Becky the operator of a small farm who has owned her boarding facility for just over two years, agreed that the focus of cost sharing programs should shift to the small farm operator

I thought about it from their point of view and obviously doing a large farm has a whole lot more impact than my little seven acres would, so it makes sense, so that's what they would more want to focus on. But I think you have to – there is enough of us that have five acres... whatever... that again would want to do – try to do the right thing.... Give more for small[farms], I mean obviously, the big farms are important because they've got a whole lot more impact on the environment than I do, but I still do. I've got my four horses producing 50 pounds of poo a day and you know.

**RQ4 How do Montgomery County equine operators view their role as stewards of the land?**

The responsibility for stewardship of the land was something many of the participants were concerned with; only one participant said that land stewardship or environmental concerns were not important aspects of their farm management. For many it was a primary concern, for others it was part of a large combination of environmental practices. Two themes presented themselves; 19 participants mentioned stewardship as a high priority and 23 participants mentioned that they were concerned about the environment and made choices based on that concern.

### ***Doing the right thing***

Becky the operator of a small farm who has owned her boarding facility for just over two years said her desire was to leave a “small farming footprint”.

For me again it’s knowing that I'm contributing to preserving resources, doing the best that I can to practice farming and farm management the best way I can. You know not negatively affecting the environment is important to me, so those are the kinds of things that I'm looking at and I just want to do a good job... And I don’t want to do that sort of thing so try to be very careful in what I do, a small footprint I guess if you will, farming footprint.”

Breanna, had previously operated a large commercial stable but for the past six years had operated of a medium sized farm where she kept only her own horses said she felt the education level of the county residents played a part in their choices.

Well, I think that Montgomery County is you know a little bit atypical in that it tends to be – especially horse – not everybody but a lot of the horse property owners are fairly well educated. And so, I think environmental impact is a big driver.

Arthur, a small farm operator who currently had no horses on his property, but had kept

his own horses for 30 years said “I think that managing the property is a matter of doing what's right for the environment and we just love this piece of property so much that we'd likely do anything that we can to keep it going.”

***Part of other “green” practices***

Several operators mentioned that they combined BMPs with other environmentally sound practices. Alan, a small farm operator who had kept his own horses for 22 years, said

Well, I'm always in favor of – I'm, you know, I'd like to believe I'm environmentally conscious and I'm always in favor of doing the better thing for the environment. I've got solar panels on the roof and geothermal heating in the house. I would like to get an electric car if I could afford one.

Camille, an operator with a medium sized farm who had been in business for just over a year talked about her philosophy of benefitting the environment and her horses simultaneously when setting up her facility

I think a little bit it's becoming more aware environmentally of being more careful with some of these things. These facilities are pretty progressive on a variety of levels so that was something that appealed to us to really try and to approach those issues appropriately. And considering, you know, that was also been improving the land management which ultimately ends up benefitting the horses.

Edward, owner/ manager for 42 years of an extra-large boarding stable, talked about how his use of “green” practices complimented the use of BMPs on the farm

I want to protect the farm, the soil, the environment. I want to – One thing that we do here never mentioned both from farm and from household is recycling.

And we have recycled through the years and even before I bought the farm, we deeply were into recycling. But we recycle everything we possibly can and reasonably can. So as a result, the amount of weight of our recycled materials far exceeds any trash that we throw out and that's on a weekly basis and then if you throw into it, the metal recycling that I do with old farm implements. This farm has been here for going back centuries and you'll find old machinery, and things that have been dumped here that had been recycled there too. So a very high percentage of trash that's taken off here is recycled.

### ***Customer consideration***

Aliza, owner of a small farm that had recently downsized from a boarding facility to keeping her own horses said her peers' opinions were important to her "It was my conscience and it is being among people who could afford horses, it is usually a consideration that they want to know that you are not ruining the ground, that they are keeping the horses on. "

### ***Dissent***

#### *More concerned with financial aspects*

Diane, the manager of a large farm for 14 years said the bottom line was more important to her than environmental concerns.

The positive of using Best Management Practices is not applying things you don't need and throwing money down the toilet. And like in terms of soil conservation stuff keeping your top soil where it belongs is just good for the soil. So if the goal is to grow grass anyway you want the soil to stay in place. And we have really gravelly soil here so whatever actual soil we can keep in place is helpful. So for

me, and this is not what you'd want to hear probably like the environmental considerations are like way down my list.

### *Conflict between horse health and environment*

Erle, the manager of an extra-large facility for 34 years said he was often conflicted about using practices that were good for the soil but may be harmful to his horses.

I've had a little issue – well not an issue but at first when Eddy came out here he wanted me to sort of do a four-quadrant section of our fields and rotate them, and that just wasn't practical with this many horses. It would have been a lot of work [for] one thing, but also I don't think it would have been the best thing for the horses. Because you really don't want to take them – you want a steady diet throughout the year that you change when you have to, when need be. And there seems kind of a conflict between what's best for the horses and what's best for the pasture.

### **RQ5 What part does the adoption of conservation BMPs play in their role as stewards of the land?**

Many of the participants clearly saw a connection between the adoption of BMPs and their roles as good land stewards. The major theme that developed occurred because 24 participants recognized that BMPs play a part in their roles as stewards of their land and beyond.

#### ***Doing it right***

Adrian, the owner of a small private farm, said his role as a steward of the land was tied to his role as a caretaker for his horses and both were dependent on BMPs “Well, they're better for the horses, they're better for the environment, especially if there's water somewhere on the property, and they're better for grass quality, but that's the same as saying it's better for the horses.”

Becky, who has boarded horses on her medium sized farm for 2.5 years said I think for me it was this idea that I wanted to do it correctly. I had – I lived on a farm for a while, sort of because I did not – again because I didn't grow up on a farm I wanted to live on a farm, so I rented an apartment and what I saw were the not-best practices. I knew what I shouldn't do but I didn't know exactly what I needed to do, so that was sort of my starting point. My drive as it were - to find out about best management practices and to do the best that I could.

Beth, the operator of a medium sized farm where she kept her own horses and also boarded some for friends for 37 years.

Oh, my word, I consider farmland precious and when you ruin it, which I saw in the 30 acres that I bought, it was ruined. It was washed down the rocks. It's a sad thing and it's expensive and labor intensive to bring it back. I really – I have a – I just have a sense of high value for land.

Constance, who for 14 years has operated a large private farm, said stewardship was important to her for aesthetic and health reasons.

I do think that, these practices helped not only keep paddocks healthy for your horses but they help keep them looking beautiful and your farm looking beautiful. But it's also healthy for your own health. And it helps the planet. I have all kinds of wildlife and I'm happy that I have it.

Danielle, the operator of a large facility who had been in operation for 49 years, said the effect her choices had on the overall environment were important to her

I think learning, you know, you read the things and you think, "Well, that doesn't apply to me." And then you read something else and you go, "Well, that's a

really good idea.” I like the idea of the stream buffers and things like that because I feel like too we’ve had a lot more wild turkeys and birds that like the thickets, you know, so we’re getting a lot of those birds coming. Like, we have a ton of the eastern blue birds now, and that was from reading information about the little houses, you know, to put up and what type of stuff they like to have around them, you know. So, yeah, I think all of that kind of plays together. It’s kind of, like, the new thing of encouraging the honeybees, you know.

### ***Dissent***

Eleanor, an operator of an extra-large facility who has been in business for 21 years, felt learning how to apply the practices and use all the available programs was just too difficult.

My thing is, like my husband will say, "Well why don't we do this? Why don't we do this? I've heard these people do that. " I don't know where to go, I don't know what to do. I'm not that savvy in that department, like looking for that stuff because I have to freaking clean stalls now you know. ... all these aspects It was a little bit overwhelming with all of the information. But I thought it was good. And there are people there to help you it's just you – I don't know where to go, and I don't know what to ask for....

### **Summary**

Participants had a good level of understanding of the state nutrient management regulations but are less well informed when it comes to requirements for and the content of conservation plans. Participants in the study had varying degrees of awareness of the six BMPs identified for this study as those commonly by equine operators, (fence, heavy use area protection, nutrient management, prescribed/rotational grazing, roof runoff

systems, and waste storage/ composting). Participants used BMPs along with other environmentally friendly practices. Participants expressed a high level of concern for the environment and their stewardship of the land and appreciated the benefits of using BMPs and the associated programs while recognizing the role economic constraints play in their application. But many also adapted practices when it conflicted with horse health or sound economic practice. Those who have used the available programs found staff helpful but some felt that the process was unrealistic because of over engineering, method of payment or lack of follow through.

Participants demonstrated that attitude and perceived control affected their decision-making process. Operators used a variety of sources including word of mouth, industry associations, university connections, government staff, and their own work environment to learn about BMPs and related programs. Participants demonstrated all of the five adopter categories identified in DOI theory by not only creating new practices but adapting recognized practices and communicating the information to their peers.



## **Chapter 5 - Conclusions, Recommendations, and Discussion**

### **Introduction**

The objective of this study was to understand the level of knowledge equine operators in Montgomery County, Maryland have about regulatory requirements, conservation BMPs and to understand the aspects that influence them in gaining awareness of and the adoption of these practices on their properties. To assist the reader, the final chapter of this thesis will restate the problem and include an outline of the methodology used to conduct this study. This chapter will include conclusions, discussions, and the implications this study developed for theory and practice. Lastly, the chapter will conclude with recommendations for future research and outreach

This study sought to discover the depth of knowledge equine operators had regarding BMPs, state and local regulations pertaining to equine properties and the level of adoption they incorporated into their farm management. Previous research had shown that equine operators had little practical knowledge of a variety of BMPs (Prokopy, et al. , 2011). This study found that in Montgomery County equine operators had a good general understanding of BMPs but were often unfamiliar with the term itself. Many of the participants had adopted recognized practices as well as adapted practices for their own use, however, they had limited knowledge of some regulations and available local, state and federal programs.

To establish the level of understanding of regulations, programs and BMPs and to better understand how and why Montgomery County equine operators learned about then adopted and/or adapted BMPs the following research questions were identified:

RQ1 What are Montgomery County equine operators' perception and awareness of regulatory requirements pertaining to their operations?

RQ2 What are Montgomery County equine operators' perceptions and awareness of conservation BMPs?

RQ3 How do operators gain and process information related to conservation BMPs and related programs?

RQ4 How do Montgomery County equine operators view their role as stewards of the land?

RQ5 What part does the adoption of conservation BMPs play in that role?

To explore these research questions, 31 qualitative, in-depth interviews identifying 33 separate farms were conducted with equine operators from a list compiled by the MSCD and classified by farm size: small 1-3 horses, medium 4-9 horses, medium-large 10-16 horses, large 17-30 horses and extra-large 31+ horses farms. Operators were further identified by number of years they had been operating, whether they were owners or managers and whether the farm was their primary source of income. (Appendix C). Interviews lasted between 10 and 45 minutes. During and at the end of each interview participants were asked if there were other operators in the area he or she might suggest be contacted, resulting in a snowball sampling method. Interviews were conducted began on June 16, 2017 and concluded on July 24, 2017, at the time and location preferred by participants. Interviews were audio recorded and transcribed by a professional transcription service. Transcripts were analyzed using Glaser's constant comparative method (1965) via NVivo 11.

## **Conclusions**

To determine operators' level of knowledge of BMPs, regulations applicable to equine operations, and available programs and also to understand how they obtained information and then utilized BMPs in their roles as stewards of the land, operators were asked a series of questions related to these topics. Operators' responses to these questions were used to develop themes. This section will summarize those themes by research questions. If 16 participants

agreed on a subject, this established a major theme for the entire study. Conclusions and themes are presented with each research question in the following sections.

**RQ1 What are Montgomery County equine operators' perception and awareness of regulatory requirements pertaining to their operations?**

When asked to describe their awareness of state regulations pertaining to horse operations of a certain size, operators were generally aware of the following regulations: licensing, requirements for a nutrient management plan, requirements for a specified number of acres for each horse kept on agriculturally zoned properties (a county not state regulation). Only seven operators said they were unaware of any regulations, while 10 said they were aware of regulations but that the regulations did not apply to them because their operations either had too few horses or were private non-commercial facilities.

Two major themes were identified: operators were aware of nutrient management regulations but had difficulty giving a clear definition of a NMP. This may be because nutrient management in Maryland is addressed through a wide variety of programs and outreach platforms while NMPs are required only from facilities housing a specified number of animals (for equine operators this means 10 or more horses). Operators were less aware of the content and purpose of a SWQCP / conservation plan and very few, only eight operators, could give a clear definition of the contents and purpose of a conservation plan. Even though both a NMP and a conservation plan are required as part of the stable licensing process in Maryland operators had little or no knowledge of what constituted this type of plan.

The licensing process is based on the commercial considerations attached to an equine operation (boarding, lessons, horses for hire) not on the number of horses; while the nutrient management regulations are applied to any facility housing more than 10 horses regardless of the

commercial aspect involved. A conservation plan is also required for any operation with 10 or more horses in Montgomery County (Montgomery County code 3. 2. 4b)

However, even those operators who had conservation plans in place and/or had participated in cost-share programs available through local, state and federal agencies that also require conservation plans could not define the content or function of a conservation plan; with several saying they did not know the definition because they did not have one. Most operators had a basic knowledge of the purpose of the nutrient management program and many mentioned the affect contaminated runoff would have on Chesapeake Bay. Many operators spoke of the long-term relationship they had with the county nutrient management advisor which resulted from required annual reports and a mandatory three-year renewal of the complete plan.

Study response indicated four reasons contributed to the knowledge gap:

1. Nutrient management has been a well-promoted idea in urban and rural communities in the state for several decades, the idea that people must work to preserve the Chesapeake Bay is constantly reinforced through a variety of ways;
2. There has been consistency of staff handling the nutrient management program, several staff members have remained in the same positions for more than 20 years. Conversely, soil conservation staff has seen numerous changes and frequent gaps when there was no equine specialist have occurred over the same time period;
3. The nutrient management staff has some enforcement ability while soil conservation staff serve in a purely advisory capacity

4. The names of the plans are too similar; most people associate nutrient management with conservation and therefore when they hear they need a “plan” they assume they have already fulfilled that requirement if they have a NMP.

**RQ2 What are Montgomery County equine operators’ perceptions and awareness of conservation BMPs?**

The themes for this research question were: used fencing for either rotation grazing and/or fencing of livestock out of streams; some knowledge of nutrient management and had knowledge of or had done soil testing; used some form of rotational grazing; created adaptations of the identified practices to better suit their operations and/or incorporated other practices into their day to day operations. Use of the remaining BMPs, heavy use protection and roof runoff systems did not constitute a theme as both were developed but at a lesser rate. Generally, these practices were used by operators who used other practices but were not used as stand-alone practices.

The overwhelming theme of participants’ responses was the variety of ways in which they adapted the six BMPs identified for this study and incorporated other practices into their management styles. Several participants mentioned liming, fertilizing, “dragging” and mowing as regular parts of their pasture maintenance. Many operators mentioned using “resting” fields and limiting turnout for other reasons (such as rain) as their most practical form of pasture rotation. While some operators mentioned the need for more flexible practices that could be adapted to a variety of horse housing styles and situations, several had already adapted the practices to suit the acreage limitations and number of horses they managed.

**RQ3 How do operators gain and process information related to conservation BMPs and related programs?**

The major themes associated with this research question were: early information received about BMPs and the related services came from word of mouth from a neighbor or other peer; or participants said they first heard of the services and practices available through their job or from government staff. Although not a major theme, it is important to note several participants said university connections, association contacts (equine or farming organizations, MHIB, or 4-H) or that they grew up on a farm were the reason they were aware of the practices and services.

Themes also developed as to what made the information they received credible and how that credibility influenced them in the adoption of BMPs; participants said they felt the information provided was good advice or was based on science and that the availability of a local contact, credibility of staff and the dedication and ease of communication with staff were important influences on their decisions to implement BMPs. Operators also said they obtained information from seminars, newsletters, flyers, emails, TV/radio, county fair booth, and Internet research.

An important theme was participants alluding to the negative aspects specifically relating to the cost share process for the available programs, practicality of information, projects being over engineered, lack of follow through by staff and misrepresentation of the actual cost-shared amounts.

#### **RQ4 How do Montgomery County equine operators view their role as stewards of the land?**

The responsibility for stewardship of the land was an important concern for most of the participants, for many it was a primary concern for others it was part of a large combination of environmental practices. Only one participant, who operates a commercial stable, said that land stewardship or environmental concerns were not important aspects of their farm management.

The major themes associated with the research question were: participants mentioned stewardship as a high priority, were concerned about the environment and made choices based on that concern.

Despite seeing the value of best management practices in their role as stewards of the land some participants stated they also saw conflicts between what was good for the soil and what was good for the horses and felt that economic constraints (lack of funds and increased labor costs) keep them from always doing what the “best” practice may have called for.

**RQ5 What part does the adoption of conservation BMPs play in their role as stewards of the land?**

Many of the participants clearly saw a connection between the adoption of BMPs and their roles as good land stewards. The major theme that developed occurred because participants recognized that BMPs play an integral part in their roles as stewards of the land and the environment.

Operators spoke of the precious nature of farmland and the ways best management practices can have a larger reaching effect on the environment in general. And although they still were concerned about doing the right thing some operators found the process for getting information time consuming and confusing.

**Discussion**

This section details the application of this study to previous literature. There are many instances of this data supporting past research but contradicting others. This study presented new information about equine operators’ adoption and adaptation of BMPs.

**RQ1 What are Montgomery County Equine operators’ perception and awareness of regulatory requirements pertaining to their operations?**

Montgomery County equine operators seem to continue to follow the pattern identified in the 2009 Maryland Horse Industry Board survey that identified 81 percent of respondents said their farms were not their primary source of income(Camp) in the present study only eight of the 31 participants claimed their equine operation as their primary source of income and five of those respondents were managers for owners for whom the farms were not the primary income source. This may be a contributing factor to the participants' lack of detailed knowledge of the conservation regulations directly aimed at a traditional farming community that does claim the farm as the primary income source.

The levels of disparity operators had between their knowledge of nutrient management regulations and content and purpose of NMPs and conservation plans supported previous findings from Swinker (2011) demonstrating more educational programming and cost share funding is needed in the equine industry in regards to nutrient management and conservation practices. The findings of this study contradicted Prokopy et al.'s 2011 findings that the length of operator experience was more likely to have a negative effect on BMP adoption, because participants with a wide range of operating experience length exhibited similar levels of knowledge related to the details of conservation regulations.

This study supports the decomposed theory of planned behavior in that operators had a higher degree of knowledge of nutrient management regulations directly affecting their intentions. This can be explained by attitude (decomposed into perceived usefulness, perceived ease of operation and perceived compatibility) and perceived control (divided into personal efficacy and perceived resources limitations) to provide comprehensive information and explanation about the operators' intention. Participants received further



influence from of media, training, peers, and neighbors that can be attributed to communication channels and social systems (Rogers, 1983). Reinforcing that adoption in a social context is a dynamic and reciprocal interaction between individual and his environment (Venkatesh et al., 2012). All these aspects are related to the varying levels of importance equine operators associate with regulations applicable to their facilities.

Participants actions can be directly related to the four stages of adoption identified by Rogers (1995) as the core of DOI Theory 1) invention, 2) diffusion (or communication) through the social system, 3) time and 4) consequences. The nutrient management regulations having been introduced then diffused throughout the equine community recognized as normal overtime and then being reinforced by the consequence of social disapproval and state enforcement.

### **RQ2 What are Montgomery County Equine operators' perceptions and awareness of conservation BMPs?**

This study generally supported the finding that awareness of Extension and pasture management increased as the size of the farm increased (Singer et al., 2002). In general, the operators of medium sized and larger farms did have more awareness of the services available to them through extension and the conservation district. However, it could also be seen to contradict that same study which found operators were not using BMPs, because operators of all farm sizes were using some form of one of the six practices identified for this study (fence, heavy use area protection, nutrient management, prescribed rotational grazing, roof runoff systems and waste storage/composting).

This study contradicted some findings by Prokopy et al. (2011), the majority of equine owners in that study area had little practical knowledge of the application of a variety of BMPs,

a study conducted in 2012 by Marriott et al. and a study by Westendorf et al. (2010b) finding that most respondents did not utilize BMPs relating to manure management. Participants in this study showed a high level of adoption for a variety of manure/waste management methods including composting, storing and spreading and hauling off site. The findings were also inconsistent with Prokopy et al.'s 2010 study that the length of operator experience was more likely to have a negative effect on BMP adoption (Marriott et al. , 2012). Participants in this study showed a varied level of adoption seemingly unrelated to the length of operator experience or time in operation. (see Table 2.2)

This study did support the DOI theory in that the four stages of adoption are shown: 1) invention, 2) diffusion through the social system, 3) time and 4) consequences (Rogers, 1995). The progression can be seen in the way that participants took the information about available BMPs adapted them to their own operations and then spread that information through their social network, overtime finally having the adoption reinforced by continued information about the value of BMPs in helping the environment and Chesapeake Bay.

Participants also conformed to the five adopter categories identified by Rogers, (1) innovators, (2) early adopters, (3) early majority, (4) late majority, and (5) laggards. As a particular example; Clyde and his feeding areas showed an innovative approach to the use of the heavy use area. Many other participants adopted and adapted the use of rotational grazing to best fit their own operations.

Economic constraint also played a part in the choices to use BMPs for Montgomery County Equine Operators and supported the findings of a 1982 study by Erwin and Erwin in which they discuss the variety of affects the presence of off farm employment has on farmers' actual use of BMPs on farms of different sizes and types. This study also

supported the findings of Shiferaw et al. (2007), that identified economics as one of the primary constraints to agricultural operators in their study exploring the constraints frequently found in the adoption of BMPs by small farmholders.

### **RQ3 How do operators gain and process information related to conservation BMPs and related programs?**

A major theme of this study was that operators received the majority of their information about BMPs and the associated programs through word of mouth from peers and/or affiliation with industry associations or educational groups. This somewhat contradicts a 2013 study which identified industry publications and the internet as the sources of information for the majority of equine operators (79percent), however that same study did identify “knowledgeable acquaintances” as the information source for 65 percent of participants (Swinker et al., 2013 p. 4).

This directly reinforces the tenets of DTPB that communication channels and social systems also affect adoption decisions (Rogers, 1983) and adoption in a social context is dynamic and reciprocal interaction between individual and his environment (Venkatesh et al., 2012). Media, friends, family, training, peers, and neighbors can make the users aware of BMPs (knowledge), to form attitudes to evaluate the attributes of the practices (persuasion), to reduce uncertainty about the advantages and disadvantages of the practices (decision), to adapt the practices to their own equine operation (implementation) and to reinforce their decision and influence other groups (confirmation) (Rogers, 1983; Venkatesh et al., 2012).

This study also contradicted a previous study that identified unfamiliarity and non-applicability of the practice as the most cited reason for non-adoption (Gillespie et al., 2007) While some of the Montgomery County operators did say the BMPs did not directly translate to

their operations many of them adapted the practices and used them in some form. Several of the participants said that they had not used the available cost share programs for a variety of other reasons including lack of follow through from staff, over-engineering of structural practices or impracticality due to design/ease of work or most commonly, expense.

The limiting effect of the financial aspect of BMP usage directly aligns with the Theory of Constraints (TOC), and the findings of Shiferaw et al. (2007). It should also be noted that many of the participants said they could not afford to complete a project involving a recognized BMP but that they then adapted the practice to their operation using a more economically viable solution for example: one strand of electric wire as opposed to the three strands required for reimbursement through a cost share program, limiting the number of horses in a field instead of installing a roof runoff system, piling manure on compacted earth instead of installing a cement sided manure storage facility.

#### **RQ4 How do Montgomery County equine operators view their role as stewards of the land?**

This study supported the finding of a 2013 study that showed many horse farms are utilizing BMPs to reduce environmental impact (Swinker, 2013). The overwhelming number of participants said their roles as stewards of the land are an important factor in their selection of management practices. Many said that the BMPs they used were incorporated as a part of a larger plan based on environmental awareness, this contradicted a previous study that concluded that equine farm operators viewed the environmental advantage of using BMPs to be the “immediate and localized benefits to their farm’s environment” (Prokopy et al., 2010, p. 454) instead of affecting a wider area and pertaining to overall stewardship of natural resource.

Montgomery County has been identified as an area of high educational attainment (91.2 % are high school graduates or higher) while more than 50 % of the population between the ages of 25-64 years has a bachelor's degree or higher. This may allow for a higher rate of exposure to a greater number of informational sources. Many of the participants cited their concern not only for the esthetics and sustainability of their own property but also the effect their actions would have on Chesapeake Bay. This could be attributed to the long standing and extensive outreach in the area associating gardening and agricultural practices with the levels of pollution in the state's most famous estuary.

This directly relates to the DOI theory by explaining how, over time, an idea or product gains momentum and diffuses (or spreads) through a specific population or social system. Diffusion is the “process by which an innovation is communicated through certain channels over a period of time among the members of a social system”. An innovation is “an idea, practice, or object that is perceived to be new by an individual or other unit of adoption”. “Communication is a process in which participants create and share information with one another to reach a mutual understanding” (Rogers, 1995, p. 10).

Equine operators have become more aware of conservation practices and the environmental benefits of using BMPs because the information has been diffused over several decades by peers and equine and farming associations.

**RQ5 What part does the adoption of conservation BMPs play in their role as stewards of the land?**

Participants in this study clearly recognize the connection between their concern over being good stewards of their land and the role that using BMPs can play in helping them to achieve of their goal of good stewardship. This contradicted a previous study that concluded equine operators are generally unaware of the environmental benefits of BMPs (Prokopy et al. , 2011).

This area is perhaps the one area of this study where the tenets of the (DTPB) were most easily recognized. Under this theory, intention becomes a weighted function of attitude, subjective norm, and perceived control. Perceived control and intention also explain the adoption and use of technologies (Ajzen, 1991).

Through the comments of participants, it was easy to see how the attitudes or the perceived usefulness, easiness and compatibility of BMPs were tempered by the results operators were able to produce with variable financial ability and the ways in which those efforts were perceived among peers and/ or reflected in the media.

Media, friends, family, training, peers, and neighbors can make the users aware of BMPs to form attitudes to evaluate the attributes of the practices, to reduce uncertainty about the advantages and disadvantages of the practices to adapt the practices to their own equine operation and to reinforce their decision and influence other groups (Rogers, 1983; Venkatesh et al., 2012).

Because the equine community in Montgomery County has increased its awareness and concern about environmental issues through education and regulatory requirements this “normative issue” has become a strong influence on equine operators’ adoption and adaptive nature of BMPs.

## **Implications**

The implications of this study were both for the development of theory and the practice of educational outreach focused on equine owners and facility operators by traditional agriculturally centered organizations such as Extension, NRCS and Soil Conservation Districts.

## **Theory**

This study contributed significantly to the theoretical field. This study utilized the premise of DTHB in a new context: equine operations BMPs. This context established a more profound understanding of the motivations that influence equine operators to adopt and adapt BMPs. This understanding opens the door for the increased use of DTHB in other agricultural contexts.

The multidimensional approach also allows the establishment of a crossover relational effect (interaction) between the predictors and therefore helps to better comprehend and clarify operators' intentions towards the use of BMPs. The existing premise of DTHB establishes four stages of adoption 1) invention, 2) diffusion (or communication) through the social system, 3) time and 4) consequences as well as five adopter categories (1) innovators, (2) early adopters, (3) early majority, (4) late majority, and (5) laggards. These stages and adopter categories are identifiable in the levels of adoption by the participants in this study.

### **Outreach**

This study found that operator networks and peer to peer information are a major source for information about BMPs for many equine operators. While there is a wealth of information about BMPs available through Extension, MHIB, NRCS and SCDs there are areas of communication that currently require more focus to reach the target audience of equine operators. This study identified the need for better dialogue. Conservation District and Extension staff need to provide a better translation of the meaning of terms generally unfamiliar to those outside of traditional agriculture, such as equine operators, particularly those who may be managing land for the first time and those with smaller farms.

Extension is rightly recognized for producing written agriculturally related materials that are science based and credible but the equine community may not know how to gain access to these materials, may find the content confusing and/or overwhelming and may not know the degree to which they can apply the practices to their own farms without special guidance. A move needs to be made to providing a deeper understanding of how each practice works so that it can be realistically be adapted to equine farms.

## **Recommendations**

### **Research**

This qualitative research represented the operators interviewed in Montgomery County, Maryland but similar research should be continued in other areas with varying demographics. Understanding the motivations behind the decisions operators make is the best way to understand the choices themselves (Pannell et al., 2006). By understanding adoption in a social context is dynamic and reciprocal interaction between individual and his environment what shapes the attitudes of operators, the methods of communicating information can be improved (Venkatesh et al., 2012). This research could also be expanded to different sectors of agriculture comprised of those not involved in traditional agricultural production such as specialty crop production or niche market production.

Developing a wider range of BMP adoption would benefit the field. It is clear that while some operators have adopted practices and are seeing positive results from these practices, many have also adapted the practices to better fit their own use. Limiting the categories of operators to those who adopt the “Best” management practices and those who don’t without consideration for the range of adaption is neither accurate or helpful. Operators should be offered a wider range of practical solutions not one absolute, this confirms previous research in the adoption of



agricultural BMPs (King, 2016). Perhaps it would be more appropriate to develop different levels of practical information ‘good’, “improved” and “best” management practices instead of excluding those who cannot reach an ideal. This study also suggests that a consistent local contact who can offer practical localized solutions would be of assistance to equine operators.

Perhaps the most important research that should take place is to examine how BMPs are currently being communicated and by whom. Practical experience in the horse industry differs from that in any other agricultural field. The lack of qualified staff is currently a limiting factor in the development and communication of BMPs and alternatives for equine operators.

### **Outreach**

This study suggests that operators gain a large amount of their information from peer to peer contact and government staff. These areas should receive a great deal of focus in future outreach efforts. Social media can offer a valuable tool in the area of outreach by using “eblasts” to provide information to an interested audience. In this same vein, participating in online webinars and posting blogs to informational sites geared to equine enthusiasts will allow development a much wider audience for practical information. Of vital importance is the creation of locally relevant and easy to use agency websites that offer educational information and videos geared toward equine operators.

The value of face to face interaction should not be ignored and the conservation agencies should also concentrate on developing a more consistent one on one presence by maintaining booths at county fairs and trade expos that are staffed by knowledgeable people who understand the challenges of soil and water conservation but also know how to communicate with horse owners. To gain these well-rounded staff members it is vitally important that we take part in educational programs for 4-H and Pony Club groups, offer information about careers in

conservation in equine related career programs and offer internships to those wishing to pursue a career that is related to the equine industry.

### **Practice**

Conservation agencies need to recognize that the equine industry has different challenges and approaches than those found in traditional agriculture. Instead of trying to make equine operations conform to existing requirements they should embrace diversity and educate their staff not only in appropriate use of conservation practices for these operators but also in the best methods of communication. To this end, a short course or webinar should be developed for resource conservationists that details the challenges faced by equine operators and suggestions of how to use existing programs and practices to assist them.

There is confusion among the equine community as to what constitutes a Best Management Practice (BMP). There is also confusion over the definition of and difference between the Nutrient Management Plan (NMP) and the Soil and Water Quality Conservation Plan (SWQCP? Conservation Plan). These terms should be adapted so they are more easily understood by those who are not traditional farmers.

The term BMP is too broad because it is used to represent different things in different industries and at the same time too limiting for operators who are used to frequent small adjustments in feeding and training regimens for their horses. A better reference term may be conservation technique or system both of which are easily understood concepts for equine owners and provide a much less rigid sounding criteria for application.

Since it is improbable that the NRCS will change the name of the established SWQCP nationwide; therefore, a more practical approach would be to create a prefix for the name such as Conservation Technique Outline (with accompanying SWQCP). This gives a more precise idea

of what is contained in the SWQCP/Conservation Plan and is much easier to distinguish from the NMP. Another option may be to combine the two documents by making the NMP a required element of the SWQCP and not a separate entity.

Enforcement has played a role in the adoption and acceptance of the NMP. Currently Soil Conservation Districts have no enforcement power but enforcement could come from other areas. In Maryland, it is already a requirement for Licensed Stables to have a current SWQCP but this requirement is rarely enforced. If the MHIB would delay the issuance of a stable license until the owners could prove they had a current conservation plan it would go a long way to creating knowledge of acceptance for the use for conservation planning. Also if the required and enforceable NMP were one only one section of the larger plan and could not be accepted unless it were part of the more comprehensive plan it would provide some basis for enforcement.

### **Summary**

The purpose of the study was to understand what equine operators know about regulatory requirements, conservation BMPs and their process of choosing to adopt BMPs.

- RQ1 What are Montgomery County equine operators' perception and awareness of regulatory requirements pertaining to their operations?
- RQ2 What are Montgomery County equine operators' perceptions and awareness of conservation BMPs?
- RQ3 How do operators gain and process information related to conservation BMPs and related programs?
- RQ4 How do Montgomery County equine operators view their role as stewards of the land?
- RQ5 What part does the adoption of conservation BMPs play in that role?

In order to assess these research questions 31 qualitative in-depth interviews encompassing 33 farms were conducted in Montgomery County, Maryland.

Results from this study indicated that participants, while occasionally unaware of what constituted a BMP, were aware of practices such as fence, heavy use area protection, nutrient management, prescribed grazing/rotational grazing, roof runoff structures, waste storage/composting and had adapted these practices to suit their needs. Operators also used soil testing, liming, fertilizing, dragging, mowing, restricting access to fields, hauling manure offsite and reduction of numbers of animals to help maintain their properties. Equine operators used one another and equine based associations as their major information source. Extension, university, NRCS, MDA and soil conservation staff were also sources for operators.

Operators found the process of gaining information about BMPs and related programs difficult and disappointing with a lack of follow through, over engineering and expense being identified as reasons they did not use programs or adopt BMPs. A need to recognize and offer alternate practices or levels of adoption that are more practical for all types of equine operators in a consistent manner by credible staff is needed. Improved terminology, including augmenting the names of mandatory or suggested plans for conservation measures and the recommended practices included in them should be adopted to better address the requirements of the equine community.

This research should be continued in other regions, in other areas of nontraditional agriculture and with other agricultural BMPs. A range of adoption/adaptation should be developed. The way that BMPs are currently being communicated should be revised to have better practical adaptation. Social media and one on one information sessions are important

aspects to consider in the future for equine operators. Providing better education to staff and some opportunity for enforcement would also improve the range of service and adoption.

The DTPB could help researchers better understand what shapes the attitudes of the equine community by closely analyzing the motivations behind their intentions to adopt BMPs. These intentions are explained by attitude (decomposed into perceived usefulness, perceived ease of operation and perceived compatibility) and perceived control (divided into personal efficacy and perceived resources). Closely analyzing these factors would help provide comprehensive information and explanation about intention and eventual adoption of BMPs.

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# Appendix A - Interviewer's Guide

File number:

Date:

## Interviewer's Guide

Hi, my name is \_\_\_\_\_, and I received your information from a mailing list maintained by the Montgomery Soil Conservation District. I'm working on a study being conducted through Kansas State University's Department of Communications and Agricultural Education regarding best management practices for equine operators.

Your identity and responses will be kept confidential.

There aren't any expected risks to participate in this study, and there will be no cost to you to participate in this study.

Do you have any questions?

Do you agree to participate in this study?

## Non-geographic specific questions

1. Tell me a little about your operation?

- **Probes:**

- Type, size, pasture, turn out?
- How long have you been operating your facility?
- Is it your primary source of income?

2. Are you aware of the state regulations for horse operations of a certain size?

- **Probes:**

- Can you explain those requirements to me?
- Explain to me what a Nutrient Management Plan is?
- Explain to me what a Conservation plan is?

3. Do you currently use conservation practices/programs?

- **Probes:**

- What BMPs do you use?
- How long have you used them?

- **Probes:**

- Are you aware of programs and assistance available through local, state and federal sources?



- What programs/assistance have you used?
4. How did you learn about these programs?
- **Probes:**
    - What first brought the programs to your attention?
    - What methods do you find (or believe might be) most effective in communicating information about conservation BMPs?
    - What/ who would influence you to use BMPs?
5. What do you regard as the positive aspects of using BMPs and the related programs?
- **Probes:**
    - Financial gain?
    - Greener approach?
    - Better land stewardship ?
    - Ease of operation?
6. What do you see as the negative aspects of BMPs and the related programs?
- **Probes:**
    - Too expensive?
    - Process takes too long?
    - Advisors cannot relate to my situation?
    - I don't want the government involved?

#### Conclusion

Is there anything else you would like to add?

Is there anyone else you recommend I speak with that may have similar or different views?

Do you feel we have accurately recorded your feelings?

Thank you!

# Appendix B - IRB Application

FOR OFFICE USE ONLY: IRB Protocol # \_\_\_\_\_ Application Received \_\_\_\_\_ Routed \_\_\_\_\_ Training Complete \_\_\_\_\_



## Committee for Research Involving Human Subjects (IRB) Application for Approval Form

Please send your completed application to [comply@k-state.edu](mailto:comply@k-state.edu)

Last Revised: 10/17/2016

**ADMINISTRATIVE INFORMATION:**

Title of Project/Course: Call to The Post: An Analysis of Montgomery County Equine Property Owners' Motivation for Adoption of Conservation Practices

Type of Application:  New / Renewal       Revision (to a pending new application)  
(check one box)       Modification to an existing approved application #:  

Principal Investigator Details: (must be a KSU faculty member):

Name: Lauri M. Baker      Degree/Title: PhD

Department: Communications and Agricultural Education      Campus Phone: (785) 532-1140

Campus Address: 307 Umberger Hall

E-mail: lmbaker@ksu.edu      Fax #: (785) 532-5633

Responsible Graduate Student: (Person to contact for questions/problems with the form):

Name: Shelly Ingram      Campus Phone: (628) 888-4012

E-mail: ingram1018@ksu.edu

Does this project involve any collaborators not part of the faculty/staff at KSU? (projects with non-KSU collaborators may require additional coordination and approvals):

No     Yes

Project Classification (Is this project part of one of the following?):

Thesis     Dissertation     Faculty Research  
 Other:  

*Note: Class Projects should use the short form application for class projects.*

Copy of the Consent Form:  Copy will be submitted to [comply@ksu.edu](mailto:comply@ksu.edu) with this application     Consent form not used

Funding Source:  Internal     External (Identify source. You will also need to provide a copy of the sponsor's grant application or contract as submitted to the funding agency. This should be submitted to [comply@ksu.edu](mailto:comply@ksu.edu) with your application.)

MSCD board proposal /minutes attached

Based upon criteria found in 45 CFR 46 -- and the overview of projects that may qualify for exemption explained at <http://www.hhs.gov/ohrp/policy/checklists/decisioncharts.html>, I believe that my project using human subjects should be determined by the IRB to be exempt from IRB review:

No     Yes (If yes, please provide the category of "Exemption" in the space below)

**Exempt Projects:** 45 CFR 46 identifies six categories of research involving human subjects that may be exempt from IRB review. The categories for exemption are listed here: <http://www.hhs.gov/ohrp/policy/checklists/decisioncharts.html#e2> If you believe that your project qualifies for exemption, please indicate which exemption category applies (1-6). Please remember that only the IRB can make the final determination whether a project is exempt from IRB review, or not.

Exemption Category: 45 CFR 46.101(b)(2)

**MODIFICATION:**

Is this a modification of an approved protocol?  No  Yes If yes, please comply with the following:

If you are requesting a modification or a change to an IRB approved protocol, please provide a concise description of all of the changes that you are proposing in the following block. Additionally, please highlight or bold the proposed changes in the body of the protocol where appropriate, so that it is clearly discernible to the IRB reviewers what and where the proposed changes are. This will greatly help the committee and facilitate the review.

- I. **NON-TECHNICAL SYNOPSIS** (Please provide a brief narrative description of proposal. This should typically be less than 75 words and be easily understood by nonscientists):

The basic objective of this study is to explore the aspects that influence equine producers in Montgomery County, Maryland to gain awareness of conservation best management practices (BMPs) and the adoption of these practices on their properties.

- II. **BACKGROUND** (concise narrative review of the literature and basis for the study):

The equine industry is an established part of Maryland Agriculture; the 2010 equine census placed 79,100 equines valued at approximately \$714 million in the state, approximately ten percent of those animals are housed in Montgomery County (Maryland Horse Industry Board, 2010). But, equine operators are a unique demographic in the agricultural realm. They are not managing their lands for the production of food or fiber and often are employed in other professions unrelated to agriculture. Unlike other agricultural producers, they are often unaware of conservation practices and programs available to help implement these practices on their land.

- III. **PROJECT/STUDY DESCRIPTION**

(Please provide a concise narrative description of the proposed activity in terms that will allow the IRB or other interested parties to clearly understand what it is that you propose to do that involves human subjects. This description must be in enough detail so that IRB members can make an informed decision about the proposal).

Up to 100 Montgomery County equine property owners will be interviewed to understand their current knowledge and use of conservation best management practices (BMPs). Each interview will last between 30-60 minutes at take place at their farm, an equine event or a meeting of several producers at a designated farm. The researcher will be the only interviewer. Interviews will be recorded and transcribed by a professional service.

- IV. **OBJECTIVE**

(Briefly state the objective of the research – what you hope to learn from the study).

The purpose of this study is to establish the level of knowledge possessed by Montgomery County Equine property owners in relation to conservation BMPs and to determine the best way to increase their knowledge and use of these types of practices on their land.

- V. **DESIGN AND PROCEDURES** (succinctly outline formal plan for study)

A. List all sites where this research will be conducted:

Each owner's farm. Equine events. Centralized meeting at a designated farm.

- B. Variables to be studied:
- C. Data collection methods: (surveys, instruments, etc - copies must be submitted to [comply@k-state.edu](mailto:comply@k-state.edu)).
- D. List any factors that might lead to a subject dropping out or withdrawing from a study. These might include, but are not limited to emotional or physical stress, pain, inconvenience, etc.
- E. List all biological samples taken: (if any)
- F. Debriefing procedures for participants:

## VI. RESEARCH SUBJECTS:

- A. Source:
- B. Number: (provide a brief rationale for your sample size)
- C. Inclusion criteria: (List any unique qualifiers desirable for research subject participation)
- D. Exclusion criteria: (list any unique disqualifiers for research subject participation)
- E. Recruitment procedures:  
How will subjects be identified?  
  
How will subjects be recruited (advertisement, associates, etc.) ?  
  
How will subjects be enrolled?  
  
Describe any follow-up recruitment procedures: (reminder emails, mailings, etc.)

**VII. RISK - PROTECTION - BENEFITS:** The answers for the three questions below are central to human subjects research. You must demonstrate a reasonable balance between anticipated risks to research participants, protection strategies, and anticipated benefits to participants or others.

**A. Risk for Subjects:** (check all that apply)

- Exposure to infectious diseases
- Use of confidential records
- Exposure to radiation
- Manipulation of psychological or social variables such as sensory deprivation, social isolation, psychological stressors
- Examining for personal or sensitive information in surveys or interviews
- Presentation of materials which subjects might consider sensitive, offensive, threatening, or degrading
- Invasion of privacy of subject or family
- Social or economic risk
- Risk associated with exercise or physical exertion
- Legal risk
- Review of medical records
- Review of criminal records
- HIV/AIDS or other STD's
- Employment/occupational risk
- Others – Please explain below (Indirect risks, risk to individuals who are not the primary subjects):

No known risks

**B. Minimizing Risk:** (Describe specific measures used to minimize or protect subjects from anticipated risks.)

**C. Benefits:** (Describe any reasonably expected benefits for research participants, a class of participants, or to society as a whole.)

The operators will have an opportunity to share their experiences and opinions with the researcher. The responses will be confidential but the findings will be used to help the Montgomery Soil Conservation District to improve outreach and associated programs.

**D. More than Minimal Risk?** In your opinion, does the research involve more than minimal risk to subjects? ("Minimal risk" means that "the risks of harm anticipated in the proposed research are not greater, considering probability and magnitude, than those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests.")

- Yes       No

**VIII. CONFIDENTIALITY:** Confidentiality is the formal treatment of information that an individual has disclosed to you in a relationship of trust and with the expectation that it will not be divulged to others without permission in ways that are inconsistent with the understanding of the original disclosure. Consequently, it is your responsibility to protect information that you gather from human research subjects in a way that is consistent with your agreement with the volunteer and with their expectations.

Explain how you are going to protect confidentiality of research subjects and/or data or records. Include plans for maintaining records after completion.

All interviews will be kept confidential and all recordings will be destroyed at the conclusion of the study. Interviews will contain gender-neutral pseudonyms and transcripts will remove any identifying information such as blog name and other specific details

that could jeopardize the participant confidentiality. The computer with the recording will be kept in a file cabinet inside a locked room.

**IX. INFORMED CONSENT:** Informed consent is a critical component of human subjects research - it is your responsibility to make sure that any potential subject knows exactly what the project that you are planning is about, and what his/her potential role is. (There may be projects where some forms of "deception" of the subject is necessary for the execution of the study, but it must be carefully justified to and approved by the IRB). A schematic for determining when a waiver or alteration of informed consent may be considered by the IRB is found at <http://www.hhs.gov/ohrp/policy/checklists/decisioncharts.htm#c10>

Even if your proposed activity does qualify for a waiver of informed consent, you must still provide potential participants with basic information that informs them of their rights as subjects, i.e. explanation that the project is research and the purpose of the research, length of study, study procedures, debriefing issues to include anticipated benefits, study and administrative contact information, confidentiality strategy, and the fact that participation is entirely voluntary and can be terminated at any time without penalty, etc. Even if your potential subjects are completely anonymous, you are obliged to provide them (and the IRB) with basic information about your project. See informed consent example on the URCO website. It is a federal requirement to maintain informed consent forms for 3 years after the study completion.

**Answer the following questions about the informed consent procedures.**

Yes     No    **A.** Are you using a written informed consent form? If "yes," include a copy with this application. If "no" see B.

Yes     No    **B.** In accordance with guidance in 45 CFR 46, I am requesting a waiver or alteration of informed consent elements (see section VIII above). If "yes," provide a basis and/or justification for your request.

Yes     No    **C.** Are you using the online Consent Form Template provided by the URCO? If "no," does your Informed Consent document have all the minimum required elements of informed consent found in the Consent Form Template? (Please explain)

Yes     No    **D.** Are your research subjects anonymous? If they are anonymous, you will not have access to any information that will allow you to determine the identity of the research subjects in your study, or to link research data to a specific individual in any way. Anonymity is a powerful protection for potential research subjects. (An anonymous subject is one whose identity is unknown even to the researcher, or the data or information collected cannot be linked in any way to a specific person).

Yes     No    **E.** Are subjects debriefed about the purposes, consequences, and benefits of the research? Debriefing refers to a mechanism for informing the research subjects of the results or conclusions, after the data is collected and analyzed, and the study is over. (If "no" explain why.) **Copy of debriefing statement to be utilized should be submitted to [comply@k-state.edu](mailto:comply@k-state.edu) with your application.**

F. **Describe the Informed Consent Process:**

Who is obtaining the consent? (i.e. Principle Investigator, Graduate Student, etc.)

Graduate student

When and where will consent be obtained?

At the time of the interview

If assent (for minors) is required, please describe who will obtain the assent? (Assent means a child's affirmative agreement to participate in research)

N/A

If assent (for minors) is required, when and where will assent be obtained?

N/A

How will consent be obtained from non-English speaking participants? (a translated written form, orally, identify the name and qualifications of the individual providing the translation)

A translated written form

**Informed Consent Checklist**

Items	YES	NO	N/A
Does the title appear at the top of the consent/assent form?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is the consent/assent form written toward the subject?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is there a statement that explains that the study is <i>research</i> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is there a statement that explains the <i>purpose</i> of the research?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are the procedures to be followed explained clearly and adequately?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does the consent document describe <i>risks or discomforts</i> to subjects as a result of participating in the research?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is the consent/assent form written in the <i>native language</i> of the potential subject?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are participants compensated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
If the subjects' identity is known to the PI, does the form detail how confidentiality of records will be maintained?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Is contact information for both the PI and the URCO/IRB office included?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Does the consent document indicate to the participant that he/she can withdraw at any time from the project without penalty or loss of benefit?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are there probable circumstances which would require the PI to terminate a subject's participation regardless of his or her consent?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is the consent document written in lay language (Recommended 8th grade level)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

X. **PROJECT INFORMATION:** (If you answer Yes to any of the questions below, you should explain them in one of the paragraphs above)

- Yes  No A. Deception of subjects? If "YES" explain why this is necessary.

- Yes  No B. Shock or other forms of punishment

- Yes  No C. Sexually explicit materials or sexual experience

- Yes  No D. Sexual orientation
- Yes  No E. Sexual abuse
- Yes  No F. Handling of money or other valuable commodities
- Yes  No G. Extraction or use of blood, other bodily fluids, or tissues (if "yes", you must comply with facility and handling protections detailed in the 5th Edition of the Biosafety in Biomedical Laboratories (BMBL))
- Yes  No H. Questions about any kind of illegal or illicit activity
- Yes  No I. Questions about protected health information as defined by HIPAA
- Yes  No J. Purposeful creation of anxiety
- Yes  No K. Any procedure that might be viewed as invasion of privacy
- Yes  No L. Physical exercise or stress
- Yes  No M. Administration of substances (food, drugs, etc.) to subjects
- Yes  No N. Any procedure that might place subjects at risk
- Yes  No O. Will there be any use of Radioactive materials and/or use of Radioactive producing machines
- Yes  No P. Any form of potential abuse; i.e., psychological, physical, sexual
- Yes  No Q. Is there potential for the data from this project to be published in a journal, presented at a conference, etc?
- Yes  No R. Use of surveys or questionnaires for data collection. Copies should be submitted to [comply@k-state.edu](mailto:comply@k-state.edu) with your application.

**XI. SUBJECT INFORMATION:** (If you answer yes to any of the questions below, you should explain them in one of the paragraphs above)

- Yes  No a. Under 18 years of age (these subjects require parental or guardian consent)
- Yes  No b. Over 65 years of age
- Yes  No c. Minorities as target population
- Yes  No d. Physically or mentally disabled
- Yes  No e. Economically or educationally disadvantaged
- Yes  No f. Unable to provide their own legal informed consent
- Yes  No g. Pregnant females as target population
- Yes  No h. Victims
- Yes  No i. Subjects in institutions (e.g., prisons, nursing homes, halfway houses)
- Yes  No j. Are subjects likely to be vulnerable to coercion or undue influence
- Yes  No k. Is this international research? If yes, provide details as to if OHRP regulations apply in or near the area you intend to conduct research or if you have contacted individuals for applicable regulations to human subject research.
- Yes  No l. Are research subjects in this activity students recruited from university classes or volunteer pools? If so, do you have a reasonable alternative(s) to participation as a research subject in your project, i.e., another activity such as writing or reading that would serve to protect students from unfair pressure or coercion to participate in this project? If you answered this question "Yes," explain any alternatives options for class credit for potential human subject volunteers in your study. (It is also important to remember that: Students must be free to choose not to participate in research that they have signed up for at any time without penalty. Communication of their decision can be conveyed in any manner, to include simply not showing up for the research.)
- 
- Yes  No m. Is audio from the subjects recorded? If yes, how do you plan to protect the recorded information and mitigate any additional risks?
- The computer with the recording will be kept in a file cabinet inside a locked room.
- Yes  No n. Are research subjects' images being recorded (video taped, digitally recorded, photographed)? If yes, how do you plan to protect the recorded information and mitigate any additional risks?



**XII. FDA ACTIVITIES:** Answer the following questions about potential FDA regulated activities:

- Yes  No a. Is this a Clinical Trial?
- Yes  No b. Are you using an FDA approved drug/device/diagnostic test?
- Yes  No c. Does this activity involve the use of FDA-Regulated products? (biological products, color additives, food additives, human drugs, etc.)
- Yes  No d. Has the protocol been submitted to the FDA, or are there plans to submit it to the FDA?
- Yes  No e. Have you submitted an FDA form 3454 or 3455 (conflict of interest)?

**XIII. CONFLICT OF INTEREST:** Concerns have been growing that financial interests in research may threaten the safety and rights of human research subjects. Financial interests are not in themselves prohibited and may well be appropriate and legitimate. Not all financial interests cause Conflict of Interest (COI) or harm to human subjects. However, to the extent that financial interests may affect the welfare of human subjects in research, IRB's, institutions, and investigators must consider what actions regarding financial interests may be necessary to protect human subjects. Please answer the following questions:

- Yes  No a. Do you or the institution have any proprietary interest in a potential product of this research, including patents, trademarks, copyrights, or licensing agreements?
- Yes  No b. Do you have an equity interest in the research sponsor (publicly held or a non-publicly held company)?
- Yes  No c. Do you receive significant payments of other sorts, eg., grants, equipment, retainers for consultation and/or honoraria from the sponsor of this research?
- Yes  No d. Do you receive payment per participant or incentive payments?
- e. If you answered yes to any of the above questions, please provide adequate explanatory information so the IRB can assess any potential COI indicated above.

**XIV. PROJECT COLLABORATORS:**

**A. KSU Collaborators:** List anyone affiliated with KSU who is collecting or analyzing data: (list all collaborators on the project, including co-principal investigators, undergraduate and graduate students).

Name:	Department:	Campus Phone:	Campus E-mail:
<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>
<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>
<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>
<input type="button" value="Add Row"/>		<input type="button" value="Delete Row"/>	

**B. Non-KSU Collaborators:** List all collaborators on your human subjects research project not affiliated with KSU in the spaces below. KSU has negotiated an Assurance with the Office for Human Research Protections (OHRP), the federal office responsible for oversight of research involving human subjects.

Name:	Organization:	Phone:	Institutional E-mail:
<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>
<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>
<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>

C. **Does your non-KSU collaborator's organization have an Assurance with OHRP?** (for Federalwide Assurance listings of other institutions, please reference the OHRP website under Assurance Information at: <http://ohrp.cit.nih.gov/search>).

Yes  No If yes, Collaborator's FWA #

**Is your non-KSU collaborator's IRB reviewing this proposal?**

Yes  No If yes, IRB approval #

**XV. IRB Training:**

A. **The URCO must have a copy of the Unaffiliated Investigator Agreement on file for each non-KSU collaborator who is not covered by their own IRB and assurance with OHRP.** When research involving human subjects includes collaborators who are not employees or agents of KSU the activities of those unaffiliated individuals may be covered under the KSU Assurance only in accordance with a formal, written agreement of commitment to relevant human subject protection policies and IRB oversight. The Unaffiliated Investigators Agreement can be found and downloaded at <http://www.k-state.edu/research/comply/irb/forms>

**Online Training**

**\*TRAINING REQUIREMENTS HAVE RECENTLY CHANGED\***

The IRB has mandatory training requirements prior to protocol approval. Training is now offered through the Collaborative Institutional Training Initiative (CITI) Program. Instructions for registration and access to training are on the URCO website <http://www.k-state.edu/research/comply/>.

Use the check boxes below to select the training courses that apply to this application. If you have any questions about training, contact URCO at [comply@ksu.edu](mailto:comply@ksu.edu), or (785) 532-3224.

**Mandatory Training**

**Required for all Principal Investigators, research staff and students**

- Responsible Conduct of Research
- IRB core modules

**Required (Provost-mandated) for all full-time K-State employees**

- Export Compliance

**Required procedure-specific training (check all that apply to this protocol):**

- International Research
- Research in Public Elementary and Secondary Schools
- Research with Children
- Research with Prisoners
- Internet Research
- Vulnerable Subjects - Research Involving Workers/Employees
- Research with Subjects with Physical Disabilities and Impairments
- Illegal Activities or Undocument Status in Human Research
- Gender and Sexuality Diversity in Human Research
- Research with human blood, body fluids, or tissues
- Research with Older Adults

**All new personnel or personnel with expired training are required to register for CITI and take the new training requirements. If you previously completed online IRB modules, your training status will remain current until it expires. URCO will verify training from the previous system as well as the new system prior to approval of any protocol.**

**INVESTIGATOR ASSURANCE FOR RESEARCH INVOLVING HUMAN SUBJECTS**

(Print this page separately because it requires a signature by the PI)

P.I. Name:

Title of Project:

**XVI. ASSURANCES:** As the Principal Investigator on this protocol, I provide assurances for the following:

- A. **Research Involving Human Subjects:** This project will be performed in the manner described in this proposal, and in accordance with the Federalwide Assurance FWA00000865 approved for Kansas State University available at <http://www.hhs.gov/ohrp/assurances/forms/filasurl.html>, applicable laws, regulations, and guidelines. Any proposed deviation or modification from the procedures detailed herein must be submitted to the IRB, and be approved by the Committee for Research Involving Human Subjects (IRB) prior to implementation.
- B. **Training:** I assure that all personnel working with human subjects described in this protocol are technically competent for the role described for them, and have completed the required IRB training accessed via the URCO website at: <http://www.k-state.edu/research/comply/irb/training>. I understand that no proposals will receive final IRB approval until the URCO has documentation of completion of training by all appropriate personnel.
- C. **Extramural Funding:** If funded by an extramural source, I assure that this application accurately reflects all procedures involving human subjects as described in the grant/contract proposal to the funding agency. I also assure that I will notify the IRB/URCO, the KSU PreAward Services, and the funding/contract entity if there are modifications or changes made to the protocol after the initial submission to the funding agency.
- D. **Study Duration:** I understand that it is the responsibility of the Committee for Research Involving Human Subjects (IRB) to perform continuing reviews of human subjects research as necessary. I also understand that as continuing reviews are conducted, it is my responsibility to provide timely and accurate review or update information when requested, to include notification of the IRB/URCO when my study is changed or completed.
- E. **Conflict of Interest:** I assure that I have accurately described (in this application) any potential Conflict of Interest that my collaborators, the University, or I may have in association with this proposed research activity.
- F. **Adverse Event Reporting:** I assure that I will promptly report to the IRB / URCO any unanticipated problems involving risks to subjects or others that involve the protocol as approved. Unanticipated or Adverse Event Form is located on the URCO website at: <http://www.k-state.edu/research/comply/irb/forms>. In the case of a serious event, the Unanticipated or Adverse Events Form may follow a phone call or email contact with the URCO.
- G. **Accuracy:** I assure that the information herein provided to the Committee for Human Subjects Research is to the best of my knowledge complete and accurate.

You may sign this form using a digital signature. DO NOT sign the form until it has been completed.

You cannot edit the form entries once the form has been digitally signed. If you are making revisions to a previously signed form, right-click the digital signature and select Clear to remove the signature (this can only be done by the person who originally digitally signed the form). Forms that have not been signed will not be accepted.

P.I. Signature:

Date:

TO: Dr. Lauri Baker  
Communications and Agricultural Education  
307 Umberger Hall

Proposal Number: 8765

FROM: Rick Scheidt, Chair   
Committee on Research Involving Human Subjects

DATE: 04/12/2017

RE: Proposal Entitled, "Call to The Post: An Analysis of Montgomery County Equine Property Owners' Motivation for Adoption of Conservation Practices"

The Committee on Research Involving Human Subjects / Institutional Review Board (IRB) for Kansas State University has reviewed the proposal identified above and has determined that it is EXEMPT from further IRB review. This exemption applies only to the proposal - as written - and currently on file with the IRB. Any change potentially affecting human subjects must be approved by the IRB prior to implementation and may disqualify the proposal from exemption.

Based upon information provided to the IRB, this activity is exempt under the criteria set forth in the Federal Policy for the Protection of Human Subjects, 45 CFR §46.101, paragraph b, category: 2, subsection: ii.

Certain research is exempt from the requirements of HHS/OHRP regulations. A determination that research is exempt does not imply that investigators have no ethical responsibilities to subjects in such research; it means only that the regulatory requirements related to IRB review, informed consent, and assurance of compliance do not apply to the research.

Any unanticipated problems involving risk to subjects or to others must be reported immediately to the Chair of the Committee on Research Involving Human Subjects, the University Research Compliance Office, and if the subjects are KSU students, to the Director of the Student Health Center.

## Appendix C - Participants List

Pseudonym	Date; File	Classification
Becky	6/16/17; 1	Medium 5-8 acres
Breanna	6/16/17; 2	Medium 10-32 acres
Audrey	6/16/17; 3	Small 8-17 acres
Beatrice	6/19/17; 1	Medium 10-32 acres
Betty	6/19/17; 2	Medium 5-8 acres
Adelaide	6/19/17; 3	Small 5 acres or fewer
Bridget	6/19/17; 4&5	Medium 10-32 acres
Constance	6/19/17; 6	Medium-Large 31-57 acres
Beth	6/19/17; 7	Medium 90+ acres
Adam	6/20/17; 1	Small 5 acres or fewer
Adrian	6/20/17; 2	Small 5 acres or fewer
Eleanor	6/21/17; 1	Extra Large 100+ acres
Diane	6/23/17; 1	Large 77-100 acres
Arthur	6/23/17; 2	Small 5 acres or fewer
Alice	6/26/17; 1	Small 5 acres or fewer
Alan	6/26/17; 2	Small 5 acres or fewer
Derick	6/27/17; 3	Large 77-100 acres
Danielle	6/28/17; 1	Large 26 acres
Dory	6/28/17; 2	Large 13 acres
Amy	6/28/17; 3	Small 8-17 acres
Barbara	6/30/17; 1	Medium 5-8 acres
Amelia	6/30/17; 2	Small 5 acres or fewer
Erle (M)	6/30/17; 3	Extra Large 92 acres or fewer
Clyde	7/03/17; 1	Medium-Large 12 acres
Aliza	7/03/17; 2	Small 8-17 acres
Bert (M)	7/07/17; 1& 2	Medium 10-32 acres
Bert (M)	7/07/17; 1& 2	Medium 10-32 acres
Curt(M)	7/07/17; 1& 2	Medium-Large 31-57 acres
Camille	7/12/17; 1	Medium-Large 31-57 acres
Edward	7/17/17; 1	Extra Large 100+ acres
Blanche	7/20/17; 1	Medium 5-8 acres
Evita (M)	7/20/17; 2	Extra Large 92 acres or fewer
Eve (M)	7/24/17; 1	Extra Large 92 acres or fewer

(M) denotes manager