

GOATS IN URBAN SETTINGS: THEIR USE IN SCHOOL PROGRAMS, COMMUNITIES,
AND RESTORATION PROJECTS

by

DESTINY D. LOYD

(Under the Direction of Elizabeth G. King)

ABSTRACT

Using participant observations, surveys, and interviews, we characterized student interactions with goats in a farm to school program; quantified parent attitudes toward the use of goats in school and community settings and their perceptions of goats' influence on their child's educational and environmental experiences; and determined the values of volunteers and organizers participating in goat-assisted restoration projects and the perceived outcomes of these projects in urban settings. Participant observations of student interactions with goats revealed that intimate or sentimental interactions with the goats were most frequently occurring, and that this potentially led to more interactions with other aspects of students' outdoor environment. Surveys of parent attitudes showed that parents have an overwhelmingly positive attitude toward goats and believe they positively influence their child's educational experience. Surveys and interviews discovered that participants in goat-assisted restoration projects tend to be motivated by personal values, led to transitions in participants' values after experience, and revealed that community engagement and interest was a pivotal perceived outcome of goat-assisted restoration projects.

INDEX WORDS: Goats; Farm to School; Environmental Education; Parent Attitudes;
Prescribed Grazing; Urban Ecological Restoration

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DESTINY D. LOYD

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DESTINY D. LOYD

Major Professor:	Elizabeth G. King
Committee:	Jennifer J. Thompson
	Eric A. MacDonald
	Laurie A. Fowler

Electronic Version Approved:

Suzanne Barbour
Dean of the Graduate School
The University of Georgia
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DEDICATION

To the current and coming youth and their communities: may you have the opportunity to explore the outdoors and engage your curiosity in nature so that it will sustain and shape your fundamental growth for years to come. To the four-legged, charismatic creatures who provide joy and opportunities for ecological and community development. And to kind strangers who offer free coffee on late nights.

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CHAPTER 1

INTRODUCTION

THESIS OUTLINE

This thesis contains three separate studies that explore goats' impacts within urban settings. This thesis describes children's interactions with goats in a farm to school summer program, parents' attitudes toward goats at school and within their community, and parents' view of the impacts goats have on their child's educational and outdoor experiences. This thesis also investigates the values of volunteers and organizers participating in goat-assisted ecological restoration projects, value changes determined after a participant's reflection on their experience, and participants' perceived outcomes of the goat-assisted restoration projects with which they were involved.

Chapter 1 provides a brief history of human use of goats in society and how goats are being utilized today in the U.S. In Chapter 2, we characterize the interactions of students with goats by first addressing the consequences of children's experiences with the environment, how animals are used in schools and their impact on children, and the differences of experience with nature between children living in rural versus urban areas. Chapter 3 looks at the impacts goats have on students' educational and environmental experiences through parent perceptions of goats' impacts. Chapter 3 also evaluates parents' attitudes toward the use of goats in schools and the community where they are used as a landscape management tool. Chapter 4 explores the motivating values of participants of goat-assisted urban restoration projects, how those values may have changed over the course of their experience and presents the participants' perceived

outcomes of goat-assisted restoration projects occurring on a university campus and urban community. Finally, Chapter 5 provides a summary of the major findings and presents the implications of this work for farm to school education practices, parents' attitudes toward the use and presence of goats within school and community settings, and value changes of participants involved in goat-assisted restoration projects as well as the perceived outcomes that occur due to the use of goats in urban restoration projects.

GOATS IN SOCIETY

Goats have been domesticated for several thousands of years (Zeder & Hesse, 2000). Traditionally used for their milk, meat, and fiber, goat production and farming have been increasing since the late 20th century (Morand-Fehr et al., 2004). This rise in goat production and farming has mostly been due to the intensified use and production of goats for meat and dairy. However, goats have also increasingly begun to be used in other practices and areas of our lives apart from food production. Particularly, urban communities have witnessed their use for landscaping, restoration, and even within schools.

Goats Across the World

The use of goats for various practices tends to differ between low income countries and intermediate to higher earning nations. In developing countries, goats are used as a steady and sustainable source of income for low income residents. A number of reports and studies have examined goat farming within developing nations and their ability to serve as an aid in transitioning people out of poverty (De Vries 2008; Peacock, 2005). For example, in a study assessing goats' potential to reduce poverty in Africa, researchers have found that goats versatile uses as a source of capital provided farmers a source of cash income, security, and gifts, among other benefits (Peacock, 2005).

While developing countries more frequently use goats for meat, dairy, or fiber production, post-industrialized countries have seen a rise in their use for landscape management and educational programs since the beginning of the 21st century. Interestingly, goats have often been viewed negatively in relation to their impacts on land-use in several regions of the world due to past assumptions of their contributions to desertification and deforestation (Morand-Fehr et al., 2004). However, today they are increasingly being used as ecological tools.

Prescribed Goat Browsing

Unlike farmers or organizations managing the production and use of goats in developing countries, goat farmers and even businesses in places like the United States are increasingly using the ruminant animals for their browsing powers to control for invasive species and other landscape management uses (Bounds, 2010; Brown, 2001; Foderaro, 2012; Friedman, 2013; Jolly, 2015). One result of these practices has been the emergence of goats-for-hire (GFH) businesses among urban and semi-urban areas. These businesses rent goats to residents, businesses, and public entities for landscaping purposes. The growing presence of these businesses across the country presents a new opportunity for both rural and urban areas to manage landscapes and address problems such as overgrown vegetation and the presence of invasive plant species.

Goats and Education

Though goats are becoming an increasingly popular prescribed grazing tool for land management and restoration work, few reports have highlighted their presence within schools. For most urban children, their only opportunity to interact with or observe goats would typically occur by traveling to zoos or attending farm tours. Yet, for several Japanese elementary students this is not the case. Researchers have examined these cases in Japan (Koda, Hirose, & Watanabe,

2013; Koda, Kutsumi, Hirose, & Watanabe, 2016), but none have studied goat use in urban schools within the United States. Animals have been found to provide benefits to children and the schools that incorporate them (Rud & Beck, 2003; Zasloff, Hart, & DeArmond, 1999). Goats may also be beneficial for students and a unique educational tool for schools, especially for agriculture-related programming.

Since the use of goats in rural villages and farms, people have realized their potentials to be used in other landscapes. Today, goats can be observed in urban communities where they are being used in landscape management, restoration projects, and school settings. As their presence becomes more prevalent, what does this mean for our communities and the projects for which they are used? Scholars have yet to explore the impacts of goats' contemporary uses in urban communities within the U.S., specifically their presence at schools, their use as a landscape management tool within communities, and their use in urban restoration projects.

CHAPTER 2

MIDDLE SCHOOL STUDENTS' INTERACTIONS WITH GOATS DURING A FARM TO SCHOOL SUMMER PROGRAM: AN ETHNOGRAPHIC CASE STUDY

ABSTRACT

The use of goats within school settings and children's interactions with them have remained largely unstudied. Research that has explored how children interact with goats within schools have been conducted in Japan, leaving a gap of knowledge unfilled within the U.S. This chapter addresses these gaps by conducting participant observations of children interacting with farm animals, with a focus on goats, during a summer farm to school program. A thematic coding analysis of participant observations recorded through field notes revealed that children's interactions with the goats were predominately engagements exemplifying children's care, concern, or interest in the animal. Participant observations also revealed that students frequently interacted with the goats more than the other farm animals present. This preliminary study of child interactions with farm animals, particularly goats, used in a farm to school summer program suggests the ability of these animals to engage children's interest, support their personal growth and psychological well-being, as well as prompt children's interest in their natural surroundings.

INTRODUCTION

Most people share a lineage of ancestors who hunted, developed agriculture, and domesticated animals (Bettinger, Garvey, & Tushingham, 2015; Reed, 1977)—serving as the

foundational affiliations between humans and their environment. These practices suggest that humans possess an innate relationship with nature (Wilson, 1984). Throughout history, human developments created from modifications of the environment have propelled humanity toward modern civilization. However, for modern societies and particularly within the United States, people may be gradually losing their connection to nature. And for those generations marked by an era of abundant internet and electronic use, they are perhaps experiencing a consequential drift further away from nature at a considerable magnitude (Barton, 2012).

Studies have shown today's children spend more time indoors and on electronics (Juster, Ono, & Stafford, 2004; Rideout, Foehr, & Roberts, 2010). In a report by the Institute for Social Research at the University of Michigan, researchers revealed a 30% decrease in the time that groups of children between the ages 6 and 17 spent pursuing active sports and outdoor activities between 1981/82 and 2002/03 (Juster et al., 2004). Studies highlighting the diminishing frequency at which children engage with and explore their natural environment, also allude to a desperate need to rehabilitate relationships between children and nature (Charles & Louv, 2009; Driessnack, 2009; S. Kellert, 2004; Louv, 2010).

One way in which society has taken steps to address this issue has been to focus on nature studies and the continued development of environmental education (Palmer, 2002), which has led to the creation of modern courses commonly found in the K-12 curriculum (e.g., Environmental Science). Because of the expansion and the increased integration of environmental education into schools' curriculums through classes such as Environmental Science, children are provided the opportunity to learn about the intricacies of their natural surroundings.

However, some have been critical of the courses focused on environmental education declaring that they do not go far enough to engage students with the outdoors. Environmental education traditionally has been taught abstractly to students, rather than using discovery and exploratory learning techniques (White, 2004). Despite this evaluation, in recent decades, programs have been developed that provide communities and schools with opportunities for outdoor experiences. These experiences include schools that are integrating hands-on activities such as planting and harvesting fruits and vegetables as part of their environmental education curriculum. Commonly, outdoor experiences at school are extensions of courses such as Agricultural Science, Family and Consumer Science, and Farm to School initiatives that utilize school gardens to demonstrate processes in food systems and farming (Skelly & Bradley, 2007; Wake & Birdsall, 2015; Wells et al., 2015). Farm to school programs have arguably spearheaded these practices by providing a unique channel for students to spend time learning not only about food systems and agriculture, but also allowing students to develop a physical relationship with the natural environment, often facilitated with school or community gardens.

Schools not only have a distinct opportunity to encourage students to understand and think about the environment, but they also have the chance to support children's engagement with it. The incorporation of outdoor activities provides children an opportunity to engage with nature, especially in the absence or scarcity of these experiences at home. Farm to school programs, in particular, have the capacity to address the growing issue that children at home often do not engage with their natural surroundings in a meaningful way (Juster et al., 2004; Rideout et al., 2010). Farm to school programs are defined as initiatives between schools and local and regional farmers to provide students with locally-grown, nutritious options in school cafeterias in addition to providing support for farmers (Joshi, Azuma, & Feenstra, 2008;

Winston, 2011). These programs often are supplemented with the creation of school gardens, composting, educational visits from farmers, and opportunities for students to learn about nutrition, health, and sustainability (Izumi, Alaimo, & Hamm, 2010; Joshi et al., 2008). Schools that are beginning to recognize the role they play in promoting environmental experiences for children have also begun to incorporate meaningful educational tools that aid in children's relationships with nature that extend beyond the use of gardens to include livestock and animal husbandry. Though farm to school programs are acknowledged for providing beneficial services to schools and local farms, the integration of both gardens and livestock on school campuses has not been widely studied. While these experiences may be significant in teaching students about farm to school topics, they can also serve to promote children's general interest and knowledge about nature while contributing to the development of their cognitive (Wells, 2000) and personal abilities.

This chapter concentrates on a public middle school that broadens the farm to school experience with not only a school garden, but the addition of livestock as well. This chapter focuses on student interactions and relationships with the farm animals at the school, specifically concentrating on the use of goats within a farm to school (FTS) summer program.

Goats can play an integral and engaging part in farm to school programs and may even engage students who are disinterested in garden-based FTS activities. In this chapter, we explore literature that addresses the growing disconnect between children and nature, children's perspectives and attitudes toward nature, how those factors differ between rural and urban locations, and children's relationships with animals. Next, we present and analyze a case study of student experiences with farm animals during a summer farm to school program at an urban middle school. These insights will begin to serve as a foundation for further study into the

integration of livestock or wildlife into curriculum and educational programs at school in an effort to expand students' involvement in environmental learning while building their relationships to nature.

LITERATURE REVIEW

Children and Nature

In the process of characterizing students' interactions with goats in our case study, we first reflected on studies that illustrate the ideas and attitudes that children have toward their natural environments. Throughout history, children have popularly chosen to play in outdoor spaces (Pyle, 2002); however, today, in many places, this option is becoming less desirable due to increasing parental safety concerns (Kytta, Kaaja, & Horelli, 2004). Chawla (1994) reported that by the end of the twentieth century many children's environments were becoming urbanized, which contributed to a drastic alteration in children's outdoor recreation habits within the past half-century. Today, the way children recreate and spend their time continues to change, as do our views of the outdoors, which have drastically affected how children interact with their natural environment.

Continued urbanization of our landscapes and shifting views about the safety of the environments we live in have shrunk our physical boundaries and diminished the time children spend outdoors (Kytta, 2004; Clements, 2004). As children have begun to shift indoors (Hart 1979, Moore 2004), their opportunities to directly interact and engage in spontaneous contact with nature are leading to concerns of loss of an integral part of the human experience during childhood (Chawla, 1994; Kahn & Kellert, 2002; Kuo, 2003; Malone & Tranter, 2003; Pyle, 2002; Rivkin, 1995; Wilson, 1996). This concern has been called "nature deficit disorder" by author and reporter, Richard Louv (2008). Nature deficit disorder describes a condition of

increasing disconnect between humans and their surrounding natural environment and its implications on human health and well-being (Louv 2005; Louv 2010). Although nature deficit disorder has implications for all ages of people, studies suggest that this deficit has an especially profound effect on the development of youth (Louv 2005; Louv 2010).

Studies have begun to appear in medical journals on the effects that nature deficit disorder can have on children's cognitive and emotional development (Driessnack, 2009). According to a study published in 2000, Wells, an environmental psychologist, found that exposure and proximity to natural settings enhanced children's cognitive abilities. However, children today are spending less time outdoors and more time using electronics (Juster et al., 2004; Rideout et al., 2010). Outside of the home, the incorporation of technology in educational settings has also increased children's use of electronics, though not necessarily at the detriment of a child's learning or education. Despite the creation of more modern systems of learning through the integration of technology, children's increased use of electronic devices is beginning to be viewed as potential sources of stress, anxiety, and even depression in children (Driessnack, 2009; Ginsburg, 2017; Twenge, Joiner, Rogers, & Martin, 2018). It would appear that the solutions to these rising issues of routine and prolonged use of technology could be found outdoors. In addition to the findings from Wells (2000), there is growing evidence that direct exposure to nature has a wide range of benefits on the development of children's physical and emotional health, specifically in areas of reducing negative stress, depression, and symptoms of attention-deficit or hyperactivity disorder (Driessnack, 2009; Kuo & Taylor, 2004; Taylor, Kuo, & Sullivan, 2002).

Further concerns regarding the diminished time children spend outdoors is framed by Robert M. Pyle (1993) as the 'extinction of experience'. Pyle (1993), an ecologist studying the

psychological, sociocultural, and evolutionary relationships between children and nature, explains the extinction of experience as humanity's growing isolation from nature, even from less conventional ideas of what nature includes, such as ditches. White (2004) expands upon these notions by pointing out that people's decreasing experience with nature may also trigger an attitude of apathy towards environmental concerns. Peter H. Kahn and Stephen R. Kellert (2002, p. 118) have also presented concerns of ways in which our society has failed "to recognize our species' basic dependence on nature as a condition of growth and development," that has in turn decreased our experiences outdoors and augmented our unfamiliarity with nature. Farm to school programs used in educational settings may be one way to address these concerns, as we will explore in this study.

Children's Attitudes Toward Nature

While keeping in mind the fears regarding younger generations' loss of meaningful interactions with and in nature, how do children today feel about their environment, what knowledge do they have about it, and what are their attitudes toward it?

In several studies, researchers have characterized and identified ideas and attitudes that children have toward the environment. Bonnett and Williams (1998) identified the perceptions and attitudes of children toward nature and the environment to determine how primary school students develop understandings about the environment and the factors that influence those understandings. They asked children to respond to photos of varying environmental themes that provoked discussions on defining nature and the environment. In their discussions with groups of children they found that most students defined nature as including both plants and animals, although some referred to nature as only including plants. They also found that children characterized spaces by certain "degrees of naturalness," (p. 163) recognizing certain locations

such as cities and roads as being less natural than other places such as fields that have been cultivated. Students from this study also exhibited emotional connections to nature, which highlights the influence nature has on children's emotional health and development. Several of the children associated quietness, privacy, and relaxation with natural settings and stated that these places often served as an escape from their troubles or everyday life. Some children responded to the images of the natural settings with feelings of boredom or caution related to worries about danger or isolation—a likely reflection of an urban setting's influence on a child's perception of nature. Bonnett and Williams (1998) concluded that children most often defined their attitudes toward natural settings based on their moods or by the actions or activities they carried out in these settings. These results suggest that certain positive activities pursued outdoor can beneficially shape children's attitudes toward nature—a key component of most farm to school programs.

A study conducted by Jaus (1984) sought to assess whether awareness and discussion about the environment influenced children's attitudes about it. The study found that after two-hour, discussion-based lessons, positive effects on children's attitudes toward the environment not only were evident but remained apparent two years later, unlike the control group who did not have environmental education instruction (Jaus, 1984). Although discussions about the environment can have positive results for children's attitudes, Jaus (1984) concluded that children fully develop their attitudes toward nature through their interactions with it. Research has consistently found that children develop their attitudes toward nature through the connections they make and experiences they have with their environment (Bunting & Cousins, 1985; Harvey, 1989; Millar & Millar, 1996; White, 2004; Chawla, 2002; Horwitz, 1996; Kahn & Kellert, 2002). Positive environmental attitudes have been shown to be correlated with a person's sense of

connectedness to nature (Shultz et al., 2004). Furthermore, studies reveal that increased exposure and engagement with the environment increases a child's appreciation of it (White, 2004; Chawla, 2007). These studies justify a feeling of urgency and a call to schools to prioritize formulating children's experiences with nature. Because young children develop attachments to things with which they are familiar and comfortable (Wilson, 1996), they will become more environmentally active as they are given more opportunities to engage and create personal experiences with nature (Bunting & Cousins, 1985; Harvey, 1989; White, 2004).

A child's concern for the environment is a determining factor of their attitudes toward nature. In a study of children ages four and six that investigated their development of environmental knowledge and concern within both the U.S. and U.K., 4-year-olds exhibited a considerable amount of knowledge about their environment, while 6-year-olds showed some understanding of environmental problems (Palmer, 1995). The knowledge children exhibit about their environment appears to be inseparable from their awareness of the issues occurring within it. Regarding knowledge and concern about environmental issues, Hicks and Holden (1995) found that environmental concerns were very prominent among 6 to 18-year-olds when asked to express their hopes and fears for the future. When children were asked more broadly about their feelings toward the world around them, Cade (1990) also discovered the environment was of concern to a majority of those asked. The results of these studies suggest that children view the natural world as an important aspect of their lives, and through continued exposure to nature and environmental education, students can develop not only a concern for the environmental issues of our day, but additionally, create connections and tools to try to solve these problems.

However, despite children's knowledge and concern for the environment, Bonnett and Williams (1998) found that children assess the severity of environmental problems based on how

far away these issues seem to be—equating those problems seemingly farther away as more severe. Other studies have also found that more distant global problems are rated higher in severity than local issues, indicating children do not consider how local actions are connected to global effects (Mori, 1993; Uzzell et al., 1995). These findings have resulted in researchers (Bonnett and Williams, 1998; Mori, 1993; Uzzell et al., 1995) expressing concerns about the disconnect that children have between more global issues with local ones and how these views can diminish a child’s interest in environmental problems. Bonnett and Williams (1998) note in particular that this could “result in a sense of individual powerlessness, which in turn can lead to a wane in interest in environmental issues” (p. 160).

It appears children have varying attitudes and knowledge of nature dependent on their exposure to the environment. For children, the frequency at which they go outdoors and the level of engagement within it is particularly important: without regular and intentional contact with nature, children are unable to form meaningful bonds with their natural surroundings which promote positive values toward the environment (Chawla, 2002; Horwitz, 1996; Kahn & Kellert, 2002). Kellert and other researchers (Chawla, 2002; Horwitz, 1996; S. Kellert, 2004) are chiefly concerned by the absence of children’s exploration of the environment during their childhood, which not only impacts their attitudes towards nature but also their cognitive and psychological development. However, through environmental education programs, such as farm to school initiatives, there is hope that schools can close the gap in children’s educational development and in the development of their relationships with the natural environment.

Rural and Urban Divide in Children’s Attitudes toward the Environment

Research has found children’s diminished time in the outdoors is in part due to the transformation of their surroundings from forests, meadows, streams, and ponds to sidewalks,

concrete buildings, and parking lots. Cohen and Horm-Wingerd (1993) note that children growing up in agricultural societies, as opposed to industrial societies, are able to derive their knowledge of the environment from their direct interactions and experiences with it, unlike children in industrial societies who develop an environmental concern based on “abstract learnings derived from other distant sources of information” (p. 104).

Research indicates mixed results on whether children from rural upbringings have a greater connection to and more empathy toward nature than compared to children raised in urbanized areas. Nonetheless, it appears rural children are better positioned to gain significantly stronger bonds with their environments. For example, Pomerantz (1977) found that rural children spend more time participating in animal-related activities that are local or present in regional areas. Another study reported that inner city children had the least concern for animal welfare, while adolescents that lived farther from the city expressed the greatest concern (Sanders, 1974). Despite this, Kellert (1997) has found that attitudes towards animals from people raised in cities were more likely to be moralistic, while those in rural areas had stronger utilitarian sentiments toward animals.

Studies investigating whether environmental concerns are more prominent among children in rural or urban areas have also been inconclusive. Bonnett and Williams (1998) found a high degree of consensus among the general attitudes of children in rural and urban schools regarding their concern about the environment. However, Williams and McCorrie’s (1990) research with 11-year-olds found that children living in rural areas have a higher degree of “environmental consciousness” (157-162).

Further drawing urban children’s consciousness away from their natural environment is their exposure to continuous stimuli of architectural and technological development, which has

contributed to their greater advocacy of using technology to “modify and dominate the natural environment” (Bunting and Cousins, 1985). Immersion into human-made environments has also proved to impact urban children’s apprehension of the natural world. Kaplan (1976) and Hart (1979) discovered that urban children were more fearful and anxious when encountering the natural environment compared to rural children, who exhibited greater calmness in pastoral settings.

As the world around us becomes more urbanized, children lose the ability to connect with natural settings and in turn are deprived of naturally facilitated positive experiences with the outdoors. Children raised in urban areas are more at risk of losing these experiences. Having school gardens and on-campus livestock may be a pivotal addition to forming the foundations that shape children’s experiences and access to the limited opportunities to experience nature in urban areas. This process can begin to bridge the gap between urban and rural children’s outdoor experiences.

Children and Animals

An integral part of children’s experience with nature are their discoveries of animals and interactions with them. Research suggests that animals are a primary interest to children (Bonnett & Williams, 1998; LaHart, 1978), and other studies point to children’s innate attraction and interest in animals which often occurs before their interest in other aspects of nature. In fact, across all age groups, children, as well as adults, have been found to be more interested in animals than in plants (Flannery, 1991; Wandersee, 1986; Wandersee and Schussler, 1999). Although this often leads to children being better informed about animals than plants (Hershey, 1996; Lindermann-Matthies, 2002a; Ryman, 1974), the strong association that children make

between nature and animals may provide a positive and effective pathway for children's awareness of other aspects of the natural environment.

In Bonnett and Williams' (1998) study on children's attitudes toward nature, they found that children encompassed a "strong biocentric element to their thinking," which was revealed when they recognized animals share central elements of life common to their own, and when most students in the study agreed that "animals have a right to live for their own sake" (p. 166). Students in this study also applied an attitude of intrinsic value to plants on occasion (Bonnett & Williams, 1998). However, there are several factors that influence how children view and consider the importance of animals.

Gender plays a crucial role in children's ideas and placement of importance on animals. Bonnett & Williams' (1998) study found that animals made it onto just less than half of the girls' lists of things which are important to them, while 'animals' was not an emergent theme on boys' lists. Gender also plays a role in the preference and tolerance children have toward animals. In a study on the effects of having pets at home on the attitudes of popular and unpopular animals, the report found that girls favored more popular and less dangerous animals, and showed more positive attitudes toward smaller animals (Prokop & Tunnicliffe, 2010). Although there are studies that demonstrate females' empathetic attitudes towards animals (Taylor & Signal, 2005), care of animals and empathy for them does not equate to increased knowledge about them.

Findings have shown that a students' knowledge of animals can be dependent on the demographic background of the child and parent. White children with parents who attended college had more knowledge about animals (LaHart, 1978). Furthermore, students who are able to experience pets in their home life are more likely to make the pivotal connections that allow humans to facilitate understanding and interest in animals and wildlife (Prokop & Tunnicliffe,

2010). Prokop and Tunnicliffe (2010) found that previous research demonstrates that homes with pets may be linked with more positive attitudes toward animals.

Children's enthusiasm for animals is an opportunity to engage students in learning more about the environment and help facilitate greater identification and stronger relationships with nature. By schools having pets or livestock, it gives those students who are unable to experience living with pets within their own homes the opportunity to interact with animals in a steady and familiar environment. As farm to school programs continue to take shape and develop within environmental education curriculums throughout the United States, animals may have a powerful impact in shaping the attitudes, ideas, and behavior of children, especially those students who are not afforded animal-interactions at home.

CASE STUDY CONTEXT & DESCRIPTION

The use of goats in public, private, and residential locations appears to be a rising trend throughout the United States. A number of reports have highlighted goat usage in public parks, college institutions, and even public schools (Brown, 2001; Burgess, 2015; Foderaro, 2012; Friedman, 2013; Putnam, 2016; Siddiqui, 2014). Although less common, goats housed on school properties to supplement farm to school programs are taking hold in the Athens Clarke County School District, Georgia. Currently, three public middle schools in Athens-Clarke County offer additional learning experiences with farm animals. This study focuses solely on one of those schools due to the maturity of its farm to school program relative to the other FTS programs in the school district. For the confidentiality of participants, we have used pseudonyms for the name of the school and the names of students involved.

Case Study Context

The Goats

The middle school's small herd of goats provide unique educational and aesthetic opportunities. The school acquired its first goat in the spring of 2015 from their Curriculum Instructor as a donation to the Agricultural Science and Family and Consumer Science courses. In the same year, the school purchased three female goats from a local goat farmer, two of which survived. In the following year, the two females each gave birth, bringing the school's small herd to a total of five. Initially bought to aid in the Agricultural Science and Family and Consumer Science programs at the school, the ruminants have also assisted in landscaping projects there. As overgrown areas of invasive species around the school are cleared, the plants have been given to the goats as a free and nutritious source of food. Throughout the regular school-year, the goats give students enrolled in the Agricultural Science and Family and Consumer Science courses hands-on opportunities to learn about and interact with farm animals in an urban setting. During summers at the school, goats continue to engage students who participate in the Kitchen Garden Corps program through animal-care activities.

Kitchen Garden Corps Program

The Kitchen Garden Corps (KGC) Program is the farm to school summer program located at Woodland Middle School (WMS). It is a part of the school's year-long "Grow It Know It" (GIKI) initiative, a partnership between the local school district and UGA, the local land grant university and the Athens-Clarke County Extension Service. During the school year the GIKI program supports garden- and food-based education, and opportunities for students to contribute and increase accessibility to healthy, local foods for their community. Since the formation of the summer program, it has been directed and operated by the school district's

garden coordinator with assistance from a number of volunteers that include AmeriCorps Volunteers in Service to America (VISTA), educators and staff from the middle school, students from the nearby university, and other community members. Throughout the summer, the program allows middle school students from across the district to work in the school garden harvesting fresh fruits and vegetables, develop cooking skills using produce grown in the school garden, and take on responsibilities of caring for the animals on site.

Case Study Description

Timeline and Participants

Athens is a city located in Clarke County, Georgia. It has a population of over 120,000 people, with nearly 39% of its residents living below the national poverty level (U.S. Census Bureau). The county has a racial makeup consisting of 65.4% White, 27.5% Black, 10.6% Hispanic or Latino, 4.5% Asian, and 1.3% other.

During the summer of 2016, students from 6th through 12th grade from several Athens-Clarke County schools joined together at Woodland Middle School to participate in the second annual Kitchen Garden Corps (KGC) summer camp program. Each week a mix of new and returning students arrived at Woodland Middle School to spend Monday through Thursday at the KGC camp. Since the program allowed students to return each week, several students spent multiple weeks at the camp and sometimes consecutively. Each day, students arrived at 8:00am and departed from the camp after lunch.

Program Objectives and Activities

For eight weeks, students provided care for the animals housed at the school, constructed and repaired enclosures for the animals, harvested fresh fruit and vegetables from the school's garden, and used garden produce along with store-bought products to prepare and create meals

for the community. Each Monday, which designated the start of a new week of KGC camp, began with the introduction of a theme or topic. Themes were created by the volunteers or program director and were incorporated into the type of food that would be prepared and cooked throughout the week for the pop-up community restaurant. Most weeks were distinguished by a certain culture of food such as Mediterranean cuisine, Asian cuisine, Italian cuisine, etc. Other weeks focused on natural processes or important roles nature plays in the food process such as the role pollinators play in food production. Students were given a lesson regarding the topic and its relation to sustainability and agriculture.

Throughout the week, students had a variety of projects to work on and complete. The camp provided a daily structured agenda that allowed flexibility of activities within the schedule. Mornings started with a group activity that allowed students to become acquainted with one another and increase energy among the participants. Following the group activity, AmeriCorps VISTAs divided the students into groups to help with three separate activities: animal-care, gardening, or construction. After the completion of the morning chores, the entire group participated in meal preparation for the pop-up community restaurant that occurred on the final day of the camp each week. Objectives for students were to learn throughout the week about different cultures and meal preparation skills and participate in hands-on chores that demonstrate work done throughout the farm to table process. At the end of each week, students produced a full functioning pop-up restaurant where participants cooked meals, prepared plates, and served community members a three-course meal, and occasionally provided entertainment for guests. The restaurant was sustained on a donation-based system, in which funds gathered from each week's meal were returned to the program to fund future meal preparation items.

Case Study Development

This case study was developed while I was assisting a graduate student in the Crop and Soil Sciences department at the University of Georgia, who is studying the impact of the integrated sustainability program within the middle school. I was interested in goats and their use in farm to school programs, but new to qualitative research, so this environment provided an opportunity to learn methods and assist in established research with the program. While the Agricultural Science, Family and Consumer Science, as well as the Kitchen Garden Corps (KGC) programs, employ the school's small herd of goats in its lesson plans, the school's goats may offer more than a learning opportunity about animal behavior and their use on farms. This study focuses on students' interactions with the animals, and specifically interactions between students and the goats, to examine how the goats impact student's engagement with the school's garden and other farm to school initiatives practiced by the school. This study seeks to uncover whether goats influence students' interest in FTS activities beyond school programs, and in addition, serve as a doorway for students to explore their surrounding outdoor environment and become more interested and familiar with environmental aspects.

STUDY DESIGN AND METHODS

Under the supervision of Elizabeth King, joint faculty of the Odum School of Ecology and the Warnell School of Forestry and Natural Resources, and Jennifer Jo Thompson, an anthropologist in the College of Agriculture, this preliminary study was formed using interdisciplinary ideas and methods to characterize student interactions with farm animals during a summer farm to school program for sixth to twelfth grade students.

An ethnographic case study design was used (Willis & Jost, 2007), combining both case study and ethnographic qualitative research methods to investigate the research questions of this

study (Baxter & Jack, 2008; Stake 1995; Yin, 2003). Using these methods, I observed phenomena in the natural settings in which they occurred, recorded observations in field notes, and limited my interaction with subjects. The primary goal of the research is to observe and characterize student interactions with farm animals, particularly goats, during the Kitchen Garden Corps summer program. Observations and characterizations were focused on the interaction between goats and children to determine if these relationships encouraged or facilitated experience and engagement among students and the environment.

During the summer of 2016, throughout the months of June and July, I attended four weeks of the Kitchen Garden Corps program to collect a total of 60 hours of field notes (field note protocol included in Appendix A), while assisting a graduate student studying the sustainability programs at Woodland Middle School. Students in the KGC program spent the second half of the program each day at the multipurpose campus to prepare for the week's Pop-up kitchen lunch meal, served to Athens community members on the last day of the weekly camp. As a research assistant, I used participant observations and recorded field notes by hand in real time throughout the program using procedures described by Emerson, Fretz, and Shaw (1995), Glesne (2006), and Spradley (1980). These notes were then expanded into detailed field notes providing reflections and connections on the day-to-day activities. Participant observation notes were primarily focused on student's interactions with the goats during the designated time for animal care although for comparison, notes were also recorded on students' interactions with the other farm animals present. Participant observations were also recorded during other parts of the program to document potential mention or reflection from children about their experience with the goats. Each day after the conclusion of activities, participant observations were transcribed into expanded detailed field notes. Brief reflections on the interactions and

connections the children made between the animals and other ideas of farm to school were also recorded. All data about children was recorded anonymously.

Data Analysis Methods

Field notes were organized and analyzed according to a number of factors. First, students' interactions were grouped into categories based on the animal (goats, hens/chickens, or rooster). Distinctions were made if interactions with animals could not be distinguished between one or more of the animals, especially within larger groups of students. Interactions with and responses to animals were further categorized as occurring either among a group of students or by an individual. Once observations were identified as group or individual, they were further categorized by the types of interactions or responses made. Each account of a single child or group of children's experiences with the animals was labeled as being either a verbal or physical interaction (i.e., verbal (observational or responsive) and physical (responsive) engagements in response to the animals). The category of verbal experiences was broken into two subcategories: verbal observations or verbal interactions, which were either students' reactions or responses to the animals (Figure 2.1).

Physical experiences were divided between two subcategories as well: physical reactions/responses, such as petting an animal, while the second subcategory included how students made observations based on proximity of the student(s) to the animal(s). The subcategory of proximity was used to indicate a degree of interest and hesitancy of students toward the animals by unconsciously positioning their bodies at comfortable or safe distances nearer or farther away from the animals. I also noted whether interactions and responses occurred during the time of the participant observations or were a student's account of a past

interaction. Broad themes emerged under the filter of interactions and responses occurring in groups or by individuals.

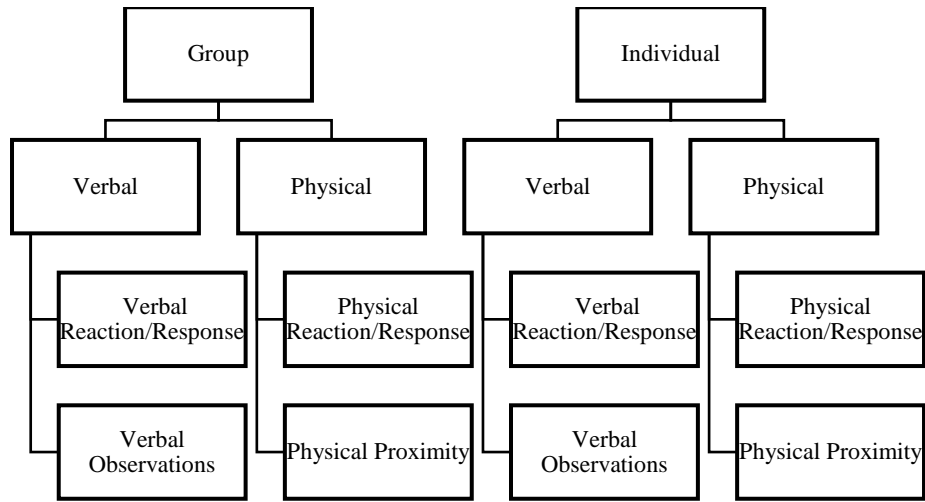


Figure 2.1 Hierarchy of interaction identifiers and groupings.

Figure 2.1 shows the hierarchy of the types of interactions and their sub-groups. I also defined criteria to classify which were group and individual student involvement. Definitions for each of these sub-groups can be found in Table 2.1.

Table 2.1. Defining types of interactions within groups or by individuals.

<i>Theme/Subgroup</i>	<i>Definition</i>	<i>Example</i>
<i>GROUP</i>	Two or more students working on or participating in the same activity within the same area or site	Students carrying buckets of water to the goats
Group Verbal	Includes responses to other students or to animals while other students are listening	Student remarking to others, “Look, the goat is head-butting the other goat!”
<i>Group Verbal Interaction</i>	Two or more students reacting or responding to the animals through commentary to one another or direct talk to the animals	Student exclaiming, “Stop! Don’t eat the chicken’s food!”
<i>Group Verbal Observation</i>	Students speaking out-loud about any aspect of the animals to one or more students	Student remarking, “Look, the goat is head-butting the other goat!”
Group Physical	Two or more students physically making contact with the animals within the same area or site	Two male students begin to pet the same goat
<i>Group Physical Interaction</i>	Two or more students during the same period of time and vicinity coming into physical contact with the animals	Two students petting a goat

<i>Group Physical Proximity</i>	Considers the distance at which two or more students are positioned away from the animals	Students standing outside of the pen gate versus students inside the animal pen
<i>INDIVIDUAL</i>	Single student that is away from other students while interacting, observing, or verbalizing with the animals	Student standing alone by the animal pen observing
Individual Verbal	Single student talking about or to the animals	A student comments, "I think Boots [the goat] is lonely!"
<i>Individual Verbal Interaction</i>	A single student reacting or responding to the animals through commentary to oneself or direct talk to the animals	Student speaks to a goat saying, "Good girl!"
<i>Individual Verbal Observation</i>	A single student speaking out-loud about any aspect of the animals to themselves	Student comments to oneself while others are not nearby that a certain goat is soft
Individual-physical	Single student physically encountering an animal	A student feeding an animal without others around to witness
<i>Individual Physical Interaction</i>	A single student coming into physical contact with the animals	A student feeding an animal without others around to witness
<i>Individual Physical Proximity</i>	Considers the distance at which a single student is positioned away from the animals	Student positions his or herself by the fence of the animal pen instead of going inside of the fenced in area

Furthermore, interactions of students with the animals were categorized depending on the type or quality of interaction. The quality or degree to which students interacted with the animals were characterized into one of three groups: task-oriented interactions, interest/disinterest, and emotional/sentimental interactions (Table 2.2).

Table 2.2. Degrees of interactions.

<i>Degree</i>	<i>Definition</i>	<i>Example</i>
<i>Task-oriented Interactions</i>	Physical interactions with animals to complete a responsibility or task	Bringing water to the goats
<i>Interest/Disinterest and Observational Interactions</i>	Interactions limited to observations or responses of general interest/disinterest	Student remarking on the appearance or behavior of an animal
<i>Emotional/Sentimental Interactions</i>	Interactions that express concern, care, consideration, or negative emotions	Students humanizing the animals

Data for this study were the participant observation field notes and reflections recorded during the Kitchen Garden Corps summer program. The notes were analyzed three times

according to separate criteria. First, observations from the field notes were categorized by their association to certain animals with which the children were interacting. This allowed me to identify how often students interacted with certain animals at the school, and to determine the frequency of observed interactions children had with particular animals. The second analysis of the notes included identifying whether students' interactions and observations of the animals occurred in a group setting or individually. Also, the second round of analysis interactions were determined to be either verbal or physical interactions occurring within a group or on a student's own separate from the group. Finally, the experiences children had with the animals were categorized into three separate degrees of interactions with which they were associating with the animals.

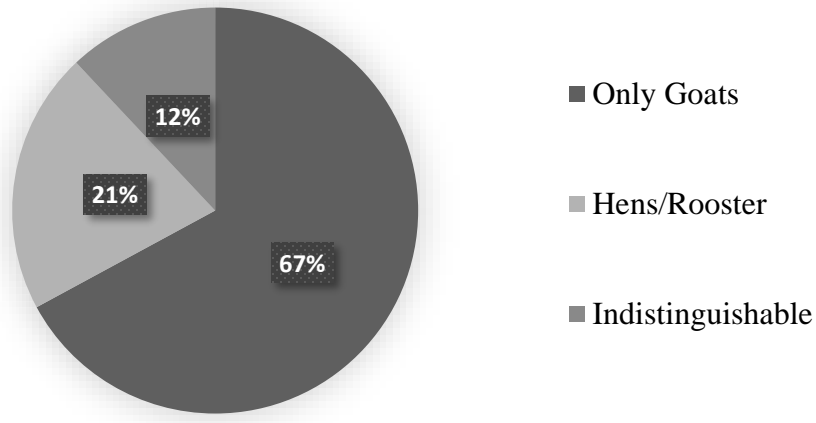
The first degree was characterized by students' engagements with animals as part of a task-oriented action. This categorization of interactions with the animals was based on their fulfillment of responsibility in feeding or bringing water to the animals. The characterization of the second type and level of interaction involved observations or actions that went beyond completing the chores for the animals and towards a general interest in the animals. The third degree to which students interacted with the animals was identified as the personal, sentimental and emotional engagements. Most interactions were classified into one of the three degrees of engagement, however certain interactions between the participants and the animals may include characteristics of more than one degree of engagement.

RESULTS

Descriptive Statistics of Student-Animal Interactions

Initial analysis of the field notes sorted interactions based on which animal a child or group of children were engaging. Figure 2.2 displays the percentage of student interactions that

occurred with specific animals. Two-thirds of recorded student interactions were with goats, followed by interactions with the hens and the rooster (21%). Interactions that were unable to be determined as focusing on a specific animal (goat, hen, or rooster) were categorized as indistinguishable (12%), as shown in Figure 2.2.

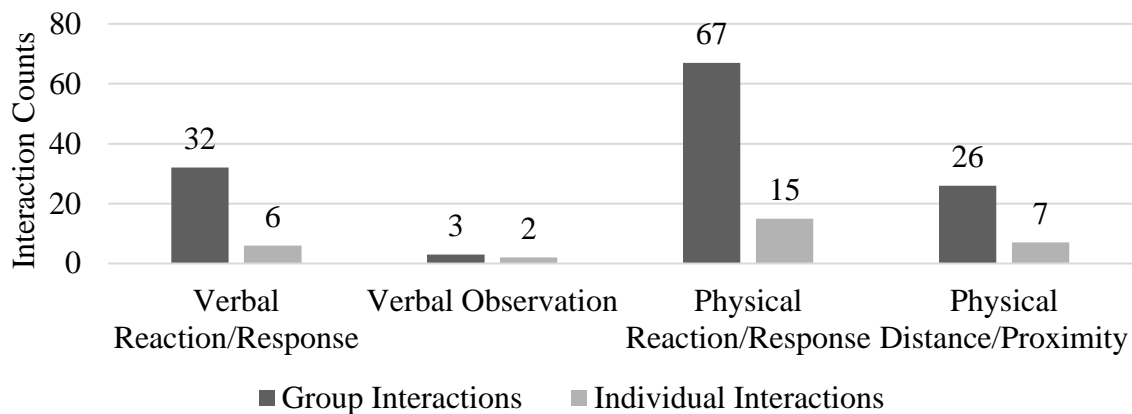


Goats: n=106; Hens/Rooster: n=33; Indistinguishable: n=19

Figure 2.2: Percentage of interactions students had with animals based on type.

Interactions were further categorized by the number of students involved in an engagement in order to classify interactions as either group or individual experiences. Due to the structure of the program, most interactions were categorized as group experiences. Individual interactions with the animals occurred but were less frequent since the program's activities required participation from multiple students and did not include substantial free time for students to explore or interact with the animals on their own.

Figure 2.3 displays the frequency of the different categories of interactions groups or individual students had with either the goats or hens and the rooster. In general, physical interactions were more common than verbal observations of the animals. Group interactions were also more frequently observed than individual interactions.



Group interactions: n=128; Individual Interactions: n=30

Figure 2.3: Interaction counts within group setting and for individuals.

The types of interactions (that students had with the animals) were categorized as either task-oriented interactions, interactions stemmed by curiosity or interest/disinterest, or emotional/sentimental engagements. Figure 2.4 identifies the percentages of interactions that occurred categorized by the degree of students' interactions with the animals. We find a relatively equal distribution of the different degrees of students' interactions with the animals, with emotional or sentimental interactions being the most observed interactions, accounting for thirty-nine percent of the total number of interactions that students had with the animals (Figure 2.4).

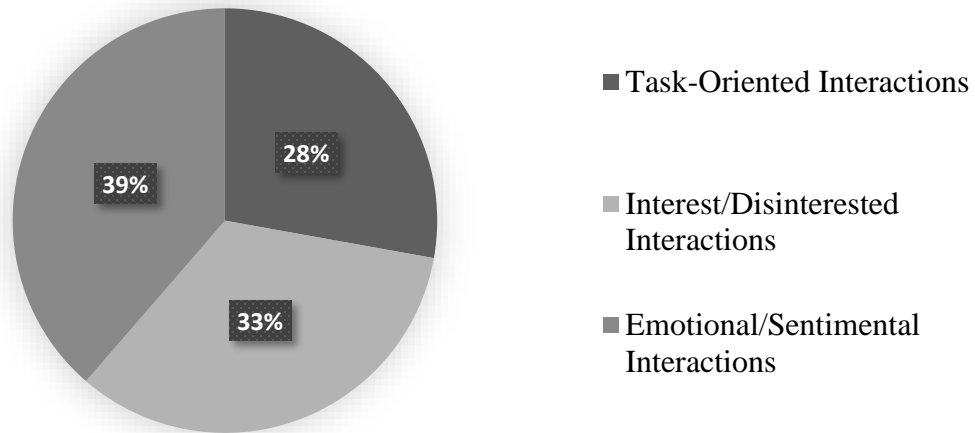
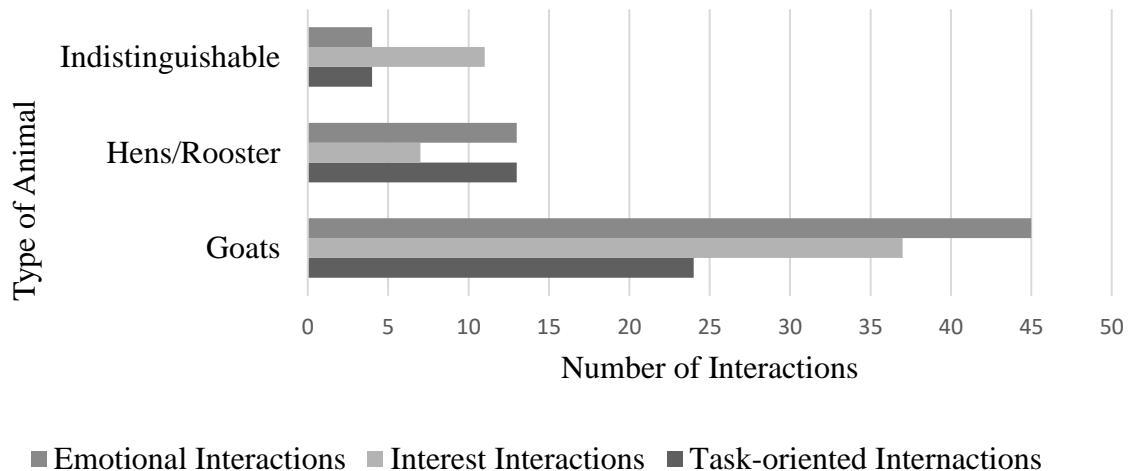


Figure 2.4: Degree of interactions by percentage of all animals.

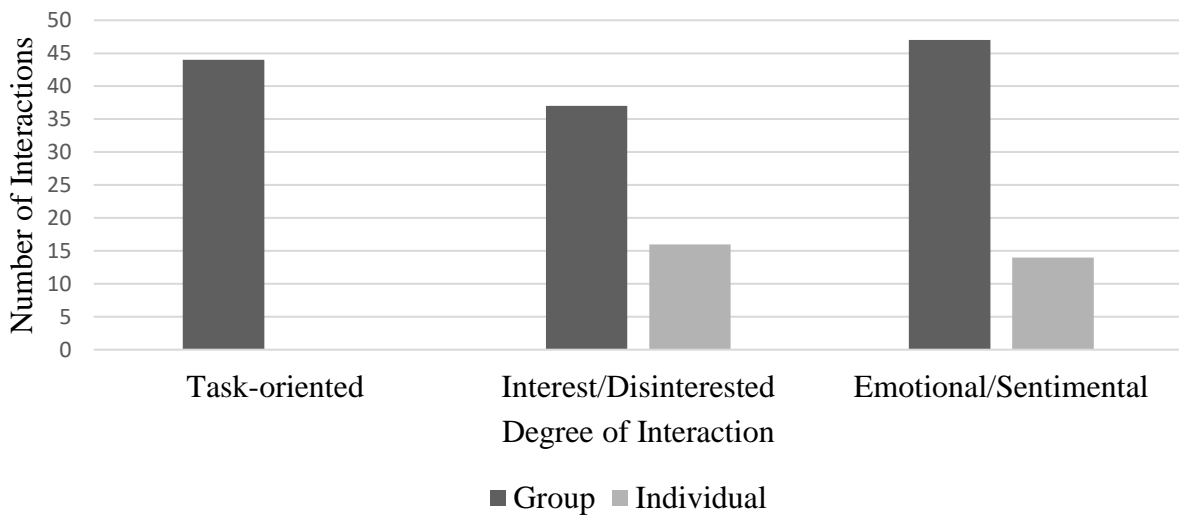
Figure 2.5 compares the quality and frequency of interactions dependent on the animal with which an individual or group of students were interacting. Interactions with goats predominantly were characterized as emotional/sentimental interactions, followed by interest-oriented interactions. As for hens and the rooster, as many interactions were based on task-oriented interactions as they were on the students' emotional or sentimental reactions or responses to the animals.



Emotional/Sentimental Interactions: n=62; Interest/Disinterest Interactions: n=35; Task-oriented Interactions: n=44

Figure 2.5. Degree of interaction by animal.

The different degrees of interactions were compared to the setting in which they occurred—group or individually, are shown in Figure 2.6. Individual interactions were not task-oriented, while for both individuals and groups a greater number of interactions with the animals were either based on a student’s interest/disinterest or their sentiment or emotions toward the animals.



Group: n=128; Individual: n=30

Figure 2.6. Degree of interactions by individual or group.

Groups of students tended to have interactions that were focused on completing tasks with the animals, but which also facilitated interest/disinterest or emotional/sentimental oriented interactions. It was also observed that no individual task-oriented interactions occurred. All interactions between animals and individual students not working in groups were interest-driven or emotionally-driven interactions (Figure 2.6).

Characterizing Interactions- Field Note Examples

Task-oriented interactions

Task-oriented interactions, accounting for 28% of all interactions and 34% of group interactions, included feeding and bringing fresh water to the animals. Most task-oriented interactions by students did not reveal any further interest in the animals themselves or in other aspects of nature. While working on these tasks most students, especially males, appeared to be indifferent toward the animals. Students involved in the summer Kitchen Garden Corps program and who also attended the school in which the animals were kept during the regular school-year, may have become desensitized to these tasks and the animals themselves as a consequence of participating in similar experiences throughout the regular school year. Completing the chore-oriented interactions took limited time, and students often were instructed to help with other chores after they were completed. Even without instruction, some students left the animal pen once tasks were completed rather than spending more time with the animals. Despite some students' indifference to the tasks they were completing, volunteering to help with the animal-chores was the most popular task among the children consistently week to week. During two instances, too many children volunteered to help with the animal-chores and had to be assigned to assist with another morning task because there were not enough students to complete the alternative chores.

Students also showed more interest in the tasks they had to complete regarding the animals when it was slightly different from the normal animal-care tasks they undertook. For example, during the last weeks of the program, students had to help move the female goats to a separate pen. Students were particularly engaged in this experience of herding the goats to a new location on the school's campus.

Interest interactions

Interest interactions accounted for 33% of students' interactions with the animals. Although the time allotted to students to spend with the animals was predominately while completing the animal-care chores, there were brief periods in which during or after the completion of chores when students had time to exhibit curiosity or direct interest in the animals. Interest in animals was determined by physical proximity and verbal interactions. Physical proximity interactions were generally characterized by students observing the animals from afar (e.g. outside of the animal enclosure) or in close proximity (e.g. inside the animal enclosure). Characteristically, these interactions also include commentary about the animals by the students and some physical interactions with the animals.

Most students showed a high initial interest in the animals, exemplified by the abundance of students who volunteered at the beginning of the day to help with animal chores. Several times, the students exhibited their interest in the animals by remaining with the animals after the chores were completed. Students would observe the animals either from outside or within the animals' enclosure—viewing the goats or hens/rooster eating or playing. Occasionally the observations or act of feeding the animals would lead students to comment on previous experiences they have had with the goats. For example, one child mentioned having fed the goats during the school year. She explained that she would arrive to school early to help the Agricultural Science teacher with the animals in the morning. This suggests a deeper interest in the animals by a student who is willing to use her mornings to help with the animals rather than socialize with other students upon arrival at the school.

While interacting and observing the animals, the students did not mention any other factors of the environment around them; however, they were attentive to the behaviors of the

animals. Particularly notable were students who anthropomorphized the animals—applying or attributing human characteristics to the animals—particularly the goats.

Instances of Anthropomorphizing

Students assigned humanlike qualities and abilities to the animals in two ways: 1) applying human physical characteristics to describe animals and 2) using human behaviors to the explain the behaviors of the animals. In one case, a student attributed humanlike characteristics to a goat as observed from the researcher's field notes:

When one of the female students was talking about the goats, she called their hooves hands. She corrected herself afterwards, however.

This was the only incidence when a student assigned physical human features to any of the animals. She did so while talking to another student about what one of the goats had done. Noteworthy is the fact that she realized she had done so and corrected herself, suggesting that although she may have viewed the animals as being somewhat similar to people, there was still a distinction in her mind to separate them from humans.

Other incidences of anthropomorphizing the animals occurred when students made comments on or responses to the animals' behaviors. An example of this occurring happened when the female goats were moved to the male's goat pen; several students, all male, commented on the behavior of the goats:

One of the children commented on the interactions between Sweetie and Boots, saying that [the female goat was upset at Boots] for not "paying his child support" during these past few months.

When Boots started to head-butt the other goats, Milt said, "I wonder what they are fighting about this time? Last time it was child support."

Joffrey was also voicing what he thought the goats would be saying to one another if they could talk.

In these cases, the students sought to explain the behavior of the goats by assigning them social roles that occur in human lives with similar background situations. In this case of the behavior between the two older female and male goats, the student reflected on the separation of the female goats and her offspring away from the male goat as equivalent to two people having separated or divorced. He then humanized the situation between the female and male goat, when they appeared distant and antagonistic toward one another, as an issue that people face if certain responsibilities are expected of the other and are not met. During this situation, the child assigned the negligence of not paying childcare, as the means of frustration and anger to explain what appeared to be hostility between the female, Sweetie, and male goat, Boots.

These interactions may express how students feel toward the animals. Psychologists have studied the social cognitive meanings behind applying human characteristics to nonhuman agents. One study revealed that assignments of humanlike attributes to nonhuman agents, such as animals, gives importance to the agent suggesting that they are capable of social influence, being accountable for its actions, and are worth moral care and consideration (Waytz, Epley, & Cacioppo, 2010). Furthermore, literature has highlighted the significance of children's nature experiences when they adopt the 'perspective' of the animals (as cited in Quinn et. al.). Gebhard, Nevers, and Billmann-Maheca (2003) found "that children's anthropomorphic views of non-human entities lead to empathy and moral consideration of those entities" (as cited in Quinn et. al., p.896-897).

An interaction exemplifying how a student viewed one of the animals as being accountable for its actions is explained below:

The camp director pointed out to me that Joffrey was trying to train the goats, so I stepped outside to talk to him about it. He had a bag of oats in one hand and a stick in the other, poking it through the holes in the fence. He was getting Sweetie to poke the stick with her head and then he awarded her with oats. He was able to do this only very briefly because the other VISTAS were telling him it was time to go back inside. He did it twice and both times she butted the stick and as a reward he fed her the oats from his hand.

Heather Gray, Kurt Gray, and Daniel Wegner (2007) explain that when people attribute human characteristics or actions to nonhuman agents and they become responsible for their own actions, and thus the agent becomes deserving of blame, praise, punishment, and/or reward. With the interaction above, the female goat was responsible for responding in a certain way to the child's actions. When the goat responded correctly, the child rewarded it.

Not all student observations of the animals occurred while outside or during the completion of the chores. When the students were inside the classroom waiting to be instructed on their next activity, certain students would take the opportunity to view the animals from the inside window. One student would frequently go to the window in the classroom to observe the animals from inside. The student observing the animals appeared to be considerably intrigued by the animals despite both artificial barriers and the rest of the students' focus on other tasks, which did not deter the student from observing the animals from indoors.

Students' interest in the animals also occurred physically. Several students petted the goats and the rooster. Although most were hesitant, a few students also tried picking up the rooster and holding it. Other physical interactions with the animals occurred when students supplemented the animals feed with other food sources, such as plucking grass to hand to the goats or taking vegetables from the garden to feed to the animals as exemplified in this field note:

They went inside the pen to give the goats the eggplant. Sweetie walked up to Jake who was holding out a piece of eggplant, she sniffed the plant and took a very small amount into her mouth, but she did not eat it.

Not all students were as intrigued with the animals. In one case, a child had entered into the goat enclosure along with other students but did not follow them toward the goats. Instead the student remained separated from the group and paced back and forth away from the animals and other children. The student appeared a little nervous, but also did not give any attention toward her peers or the animals. Another incident of perceived disinterest occurred during the morning assignment of chores. While several students had raised their hands to help with the animal-chores, a student exclaimed that they did not want to be a part of helping feed or bring water to the animals. This was the only time during the program that I observed a student verbally announce an objection to interacting with the animals.

Emotional and Sentimental Interactions

According to Sobel (1996), “children interact instinctively and naturally with animals, talk to them, and invest in them emotionally.” This was evidenced by the number of emotionally influenced interactions the children had with the animals. Emotional and sentimentally influenced interactions with the animals were the most frequent type of interaction, accounting for 38% of interactions between the students and the animals. Both verbal and physical responses of sentiment were observed, as well as negative emotional responses and sentiments.

Sentimental Physical Interactions

Students exhibited a number of sentimental physical interactions with the animals—particularly with the goats. Several times both male and female students petted the goats. Females also tended to attempt to pet the younger female goats, who were less sociable towards the children. Students also often expressed a certain “sweetness” to characterize the goats as they

petted the animals, suggesting that they liked the animals. Other interactions that indicated students felt a certain positive sentiment towards the animals were the voluntary feedings of the animals. Noted previously, several students found food for the goats either from the garden or their natural setting to give to the animals. During one instance, three female students observed the goats attempt to eat leaves from the branch of a tree in the enclosure. The animals reached up onto their hind-legs to retrieve the plant but could not reach it. One student then stood up and grabbed onto the branch to lower it toward the animal, so it could eat the leaves from the branch.

Sentimental Verbal Interactions

Students showed the greatest sentiments toward the animals through their verbalizations. A number of students commented on the goats as being sweet as well as cute as noted in the field noted below:

Kevin actually commented on Boots saying that he looked sweet.

Sweetie was...letting Phillip pet her and she was bowing her head so that he could scratch her head more easily. But both Harley and Ben agreed that she was a sweet goat.

Deeper concern and sympathy for the animals was evidenced by the separation that a couple of female students noticed between the male and female goats.

Lauren said that she felt bad for Boots because he is all alone in his pen away from the other goats.

When we walked over to Boots, Mary said that he was being neglected.

These comments of concern for Boots were not uncommon for children to express. Children often show a high degree of concern for the welfare of animals, and often protest that the lives of animals should be valued as human lives are (Bonnett & Willaims, 1998). With these

interactions between the students and animals, the school is able to facilitate the growth of the children's concern and empathy toward other living beings contributing to their personal development. Sobel (1996) also supports the cultivation of children's relationships with animals and promotes it as being the best practice to foster empathy during a person's childhood.

Negative Sentiments and Interactions

Not all animals garnered a positive response from or relationship with the children. For the Kitchen Garden Corps program this animal was overwhelmingly the rooster, Mittens. Early in my observations of the children interacting with the animals during morning chore-time, I caught one student repeatedly calling the rooster a "spawn of the devil." Her response, supported by her account of the time the rooster pecked at her and made her bleed during a previous week, was a shared sentiment among most of the students, although other students did not critique the animal with such severity. However, due to the animal's record of uninviting interactions with the children, many of them either avoided going near the animal or acted particularly cautious and afraid of it. This prompted some students to take precautions when going into the animal enclosure. For example, one male student defended himself from the rooster by finding a stick to carry inside the pen with him as he went to feed the goats and hens. Students' disdain for the animal also affected how much time they spent and interacted with the other animals. One student voiced not wanting to spend too much time in the goat pen because Mittens, the rooster, would be in the enclosure as well.

These negative interactions have a number of noteworthy influences on children's association with animals and nature. It appears that these interactions take away from the students' interest in the animal and others like it, which is a challenge that schools should be prepared to address with any animal, due to the variability of their actions. However, not all

students exhibited this same fear. Some students eagerly interacted with the rooster, holding it and petting it whenever they entered the pen. When students or staff engaged in these types of actions it presented an opportunity for more timid individuals to observe people having positive interactions with the animal, this in turn may have provided students with more favorable views of the rooster and encouraged those hesitant of the animal, to reevaluate their fears.

Although the goats were the most popular attraction to the children compared to the other animals at the school, there were some children who voiced their dislike for them. Particularly, one female voiced her dislike of Boots, the male goat, but exhibited cordiality for the other female goats by bringing them grass she had plucked from outside their enclosure to feed to them.

It is beneficial for schools, program directors, and students to be aware of and understand that animals are often unpredictable in their actions. It is also important to note that these negative interactions will occur but can provide learning opportunities to teach children how to properly handle and respond to animals, while also explaining why these responses from animals may be occurring.

Group vs. Individual Interactions

As noted above, a majority of students' interactions with the animals occurred in groups since task-oriented responsibilities were completed in small groups. It is significant to note the difference in the types of interactions children had with the animals while in groups versus those interactions children had alone with the animals. Studies within the field of social psychology find that people behave differently in groups among peers than when acting individually outside of groups (Anastasi, 1958; Forsyth, 2009; Gary, Luca, & Aldo, 2007; Gaviria & Raphael, 2001). This was witnessed as students' treatment and responses to the animals differed depending on

whether they were alone or among their peers. Students tended to verbalize more frequently about the animals and exaggerate responses toward the animals when in groups. Individuals interacting with the animals alone tended to be more nurturing and exploratory. Individual interactions with the animals also spurred students to spend additional time outdoors. The added time spent outdoors, often by individual students interacting with the animals alone, particularly with goats, led them to interact with other aspects of nature. For example, while one student spent time alone with the goats, he plucked grass nearby the goat enclosure to feed to them:

I noticed Everette was over by the goat pen petting Sweetie. He was picking the overgrown grass along the silver fence... He brought it over for the goats to eat and fed them through the fence.

Children and Their Interactions with Other Aspects of Nature

While children had the opportunity to help with animal care responsibilities, the FTS program also provided gardening activities for the children to participate in as well. In some cases, students were reluctant to help in the garden as recorded in the field notes below:

One of the VISTAS gathered Jeff and two of the females helping with the animals earlier and asked if they could help with planting flowers around the beds that were at the front corner of the garden. Cary and Lilly were reluctant to plant, but they compromised with the garden director so that they only had to plant a few plants and then could go mulch or help with building Boot's gate.

Mary did not want to go into the garden because she said she was wearing shorts and did not want to get bitten by anything.

During other times there were students who appeared to prefer to work in the garden over helping with activities such as animal-care tasks, as noted previously with regards to student disinterest, and exemplified here from the field notes:

There were also students that blatantly said that they did not want to help out with the chores regarding the animals.

During normal morning tasks were also chances for students to ask questions or engage with other aspects of nature. While rinsing out the water buckets used to bring water to the animals, the students noticed what was green algae forming on the bottom of the buckets. A nearby VISTA used this as an opportunity to explain to the students what the substance was and relate it back to farming and agriculture. It was noted that “the two girls seemed pretty interested in what the VISTA had to say.” Despite students’ interest and attention being given to the farm animals while animal-care tasks were being completed, one female student noticed an insect on the ground, calling it a “rolly polly” and remarking on the insect as part of her family in a matter-of-fact manner. Although the summer farm to school program’s activities focused on students taking care of the livestock and tending to the garden, the students were able to engage and explore other areas of their outdoor environments, exemplified in the above interactions.

DISCUSSION AND IMPLICATIONS

From the examination of this ethnographic case study of a farm to school summer program, we have gained a better understanding of the types of interactions children engage in with animals, particularly goats, and how these animals might influence students’ interest and broader engagement with the environment.

By categorizing how students interacted with the animals, we found that students spent a majority of their time with the goats, suggesting that goats not only take more time to maintain

and care for, but they also engage the students' interest more so than the other animals at the school. Interactions between students and the animals were most commonly interest/disinterest and emotional/sentimental interactions for both groups of students and individuals. Students interacting with the animals alone engaged in interactions characterized as emotional or sentimental also were observed to be more engaged and interested in their surrounding natural environment. Although not quantitatively measured, it appeared that the amount of time spent with animals contributed to the frequency of more emotional and sentimental interactions occurring between individuals and animals. Spending additional time with the farm animals allowed students to be outdoors for longer and interact with other aspects of nature. Programs that incorporate animals into their farm to school initiatives should allot time that students can spend outside of task-oriented experiences to provide space for students to play freely, explore, and create bonds with the animals and their outdoor environments. Although for some students, task-oriented interactions often did not facilitate further interaction with the animals after their completion, new or varied tasks tended to keep students engaged with the animals after being completed. In addition to the necessary animal-care tasks that must take place each day, instructors should consider occasionally incorporating new tasks or slightly different ways of completing those tasks that differ from routine responsibilities in order to sustain students' engagement and interest in task-oriented responsibilities after their completion.

Both time and type of animals contributed to determining how students interacted with the farm animals. Students' interactions with the goats were most often characterized as emotionally driven behaviors, providing evidence that students engage with animals on an emotional and sensitive level. Another emergent factor that may have contributed to determining how students interacted with the animals was gender. For males, it was evident that they

recurrently interacted with the animals on their own. There were fewer instances of individual females engaging with the animals on their own. However, for females, group settings were more commonly used to explore acts of positivity toward the goats and acknowledgement of them.

Among the emotional and sentimental degree of interactions were engagements in which the children anthropomorphized the animals. As previously expressed, children who adopt the perspective of the animal display an understanding of or connection with the animal and are likely to believe that they should have the same moral consideration as humans (Kahn, 2001; Parson, 2011). A child's consideration of the moral care animals deserve may also serve to suggest the likeliness of children to extend those beliefs to encompass the care of the environment more broadly (as cited in Parson, 2011). The anthropomorphizing of animals appears to have clear benefits for children's relationships to animals and their environment, but it may also be beneficial to their psychological wellbeing. Although there are few studies that look closely at the psychological benefits of anthropomorphizing animals, a study conducted to examine the relationship between dog owners' perceived social support, anthropomorphism and stress suggests positive consequences of anthropomorphizing (Antonacopoulos & Pychl, 2008). Antonacopoulos and Pychl (2008) found that dog owners who engaged in more anthropomorphic behavior with their pet perceived having a high level of social support from their dog; however, more anthropomorphic behavior appeared to be related to high levels of stress, though they cautioned placing too much emphasis on this result given the low magnitude of the correlation between stress and level of anthropomorphism. They also gave the explanation that individuals who seek dog ownership may be highly stressed and anthropomorphism may serve as a coping mechanism for these individuals. Children's interactions with the farm animals at the school may

serve as an outlet for students to express challenges occurring within their own lives or as a way to cope with those challenges as suggested by Antonacopoulos and Pychl (2008).

The goats and other animals helped students learn certain skills. Students practiced animal care responsibilities and effectively completed tasks related to those skills, which allowed the students to experience and gain an understanding of the duties of managing and caring for animals. While engaging in task-oriented interactions with the animals, students had the chance to closely encounter the animals even if students were solely focused on completing tasks and did not exhibit behaviors to suggest feelings of attachment or concern for the animals. Although these encounters did not always spur sentimental engagements, exposure to the animals provided new experiences for many children. Apart from learning animal care skills, students could witness and take part in often abstract or imagined ideas of common agricultural knowledge and practices. For example, one responsibility of the students was to check for and collect eggs from the hen pen. This provided students with insight into common agricultural practices, such as egg collection, and witnessing the processes (e.g. hens laying eggs) that commonly occur on farms that raise chickens. Including animals in children's farm to school experience enables students to participate first-hand in farm practices that are often only explained to them in the classroom, or that they see in the media.

Farm animals at the school even offered novel experiences to students who were familiar with farms or gardening. Students previously experienced with these activities were either exposed to new animals or gained new experiences by working with larger groups of individuals who may have influenced or brought new insights to a familiar practice. These experiences allowed both students familiar and unfamiliar with the responsibilities of taking care of animals to become more comfortable with animals they do not typically have the opportunity to interact

with. Having farm animals as part of the program also allowed the students to develop a better appreciation for those animals generally considered less popular such as the hens and the rooster. Schools that utilize animals on their campus to supplement their farm to school program should include these task-oriented experiences, so children can fully experience and understand the work put into managing and caring for animals on a farm. Furthermore, lesson plans and activities that involve animals, should include components that facilitate students to consider, respond, and play with the animals in an attempt to create deeper bonds between the children and the animals, as well as foster interest in them.

However, not all experiences were positive between the students and the animals. The temperament and behavior of the animals, as well as the reactions and responses of the students to those behaviors played a role in how the children shaped their attitudes toward the animals. As exemplified through the interactions with the rooster, which most students feared or disliked, the implications for the reputation of this specific animal among the group of students could mold how the students feel toward the same species or similarly grouped species of animals in future encounters. In preparation for potential negative attitudes or experiences with more temperamental animals, facilitators and instructors should ensure a basic understanding of animal behavior and proper response from students and caretakers.

Goats appeared to be a highly influential animal in the farm to school summer program because of their ability to engage the students with their surroundings. The goats fostered the most interest among students and were able to spur student engagement with other aspects of their natural environment; for example, students interacted with the plants on site when they picked grass or brought vegetables from the garden to feed to the goats or when a group of students considered the trees that goats were attempting to browse. These findings reinforce the

idea that goats may provide a gateway for students to become interested and more involved in farm to school activities and in the environment more generally. This is significant as more schools begin to consider incorporating ruminant or other farm animals into their farm to school programs.

Many farm to school programs already provide an avenue for children to spend more time outdoors through school gardens. Although not a focus of this study, it is important to credit the use of gardens within these programs as they also increase student interest in the environment. Furthermore, the use of plants and gardens provide valuable knowledge to children regarding food production and natural processes and systems within nature. In addition, it is important to note concerns within literature that consider how plants may be overlooked in the company of animals (Pany, 2014; Strgar, 2007; Wandersee & Schussler, 1999). Specifically identified as 'plant blindness,' coined by James H. Wandersee and Elizabeth E. Schussler, this term has been discussed by educational researcher, Jalka Strgar (2007), who revealed that students tended to rank plants below animals in terms of inferiority.

Programs that have or are considering the incorporation of animals will need to ensure that the ability of animals to quickly capture the interest of children does not overshadow the importance of plants. Striking a balance to achieve an equal appreciation of both plants and animals might be a unique challenge as schools begin to incorporate ruminant or other farm-typical animals within their curriculums or school events and activities. One solution in balancing the two may be to emphasize the importance of plants in relation to the animals as well as the importance of animals to plants. Farm to school programs may naturally lend themselves to these connections as observed within this study. For example, the goats prompted students to stay outside longer which led to further interactions with plants, both within and outside of the

garden. Furthermore, students identified certain plants or vegetables that were more favorable for the goats to eat. And for those students uncomfortable with interacting with animals, gardens are a valuable outlet to continue to participate in farm to school activities.

Not all students will necessarily be interested in the animals as exemplified by one student's distant and less interested actions observed in this study. We cannot assume that interactions with animals at school will always lead children to care for the animals or innately have interest in them. Schools might consider having a diversity of animals that can capture all students' interests while trying to engage students in outdoor activities through animal interactions.

Another important and potential opportunity stemming from the presence of animals in farm to school programs is their ability to engage children of any demographic background in uncommon experiences. This may be valuable for children from demographic minorities that may not normally be afforded these types of interactions. Today many children in urban areas appear to be spending less time outdoors, and schools providing opportunities for students to interact with animals can help to address this issue and support opportunities for children to build relationships with their environment.

While across the board children seem to be spending less time outdoors, according to previous research, Black children may have even less access to activities and resources to combat loss of time and knowledge of the environment, although much of the literature on environmental knowledge with regards to race is outdated. Theodore Washington (1976) explains that "wildlife is little more than a vestigial component in the lives of many urban blacks" because of the "lack of opportunity for meaningful wildlife-related experiences during [their] childhood" (p. 15). In assessing the influence of knowledge on young people's

perceptions about wildlife, David LaHart (1978) stressed that “knowledge of wildlife and the environment has been consistently found to be lower among young blacks than whites.” Kellert (1985) also echoed these claims in an assessment of American attitudes toward and knowledge of animals, finding that Blacks were among a variety of categorical groups least informed about animals, however, knowledge difference between Whites and Blacks was modest (54.5% to 46.9%, respectively).

Although there are few recent studies that continue the examination of possible relationships between race and environmental knowledge, current studies tend to focus on race and environment in regard to environmental concerns and environmental inequality. Within this field of literature that are important considerations to point out with regards to these topics. For example, there have been a number of studies that indicate that access to greenways, trails, and park resources are relatively limited for youth from low-income and minority families and generally Latinos and African Americans (Strife and Downey, 2009). These findings might provide explanation for a more recent study, conducted using a survey to determine how much time children spend outdoors and how they spend their time outside, which revealed that compared to White children, Black children spent less time outdoors (Larson, Green, & Cordell, 2011). Schools should consider providing platforms in which students can spend time outdoors, and measures to encourage Black and other minorities to participate in outdoor school activities. In initiating farm to school programs and incorporating gardens and animals into these programs, schools can offer occasions of environmental engagement to children who are at risk of spending less time outdoors and have the greatest disadvantage seeking and accessing opportunities to explore the natural environment.

Because goats are used throughout the world, schools could also use goats to address local environmental problems by connecting local environmental issues to environmental challenges in other parts of the world. This may help address previous research findings regarding children viewing more distant global problems as being more severe than local issues (Bonnett and Williams, 1998; Uzzell, 1995).

Finally, an important aspect of farm to school programs are their ability to engage a school's broader community. During the summer Kitchen Garden Corps program, the central part of the week-long camp was the weekly pop-up restaurant catered for the local community. These events allowed parents, school faculty, community members and leaders to recognize the benefits and importance of students participating in farm to school and farm to table activities. Furthering the opportunities for community engagement is the presence of the outdoor animals at the school. In a study conducted at elementary schools in Japan, researchers investigated the impacts and challenges of keeping goats at the schools, which revealed benefits to the children and between schools, parents, and their communities by creating stronger ties between each of these groups (Koda et al., 2016). Discussion and awareness of the presence of the goats at the school during community events, such as the Kitchen Garden Corps pop-up restaurant, may spark additional interest from community members and perhaps can play a more direct role in the future to bring community, students, and schools together over the care and interest of goats.

CONCLUSION

This preliminary study contributes to the very limited research that has addressed the use of farm animals at schools and how they are used in and contribute to farm to school programs. Continued research and exploration into the integration of farm animals in public schools and environmental education is needed to collect more robust data to determine differences between

farm to school programs that utilize animals and those that do not. Future research can also begin to determine how these differences impact students' relationships with the environment. New research can further examine the potential of goats or any livestock animal in school settings as tools to foster and develop environmental bonds and amplify farm to school experiences for students.

This ethnographic case study of the Kitchen Garden Corps summer program provides a better understanding of student interactions with animals during FTS initiatives and how the presence of goats and other animals during the program influence students' interest and broader engagement with the environment. Farm to school practices facilitate a unique opportunity for schools not only to teach curriculum relating to food processes and promote local farms and healthy eating habits, but additionally provide novel solutions to address concerns regarding children's interactions with nature, especially within urban areas, by using the combination of school gardens and animal interactions.

CHAPTER 3

PARENTS' ATTITUDES TOWARD GOATS IN SCHOOL AND COMMUNITY SETTINGS AND THEIR PERCEIVED IMPACTS ON THEIR CHILD'S EDUCATIONAL AND OUTDOOR EXPERIENCES

ABSTRACT

Indoor pets are common for many schools, and studies have shown several benefits from their use within classrooms. Yet recently, the use of larger animals such as goats has been incorporated into schools' programs and courses. However, the impact of their presence and use has not been extensively examined. By surveying parents of children who attend a secondary school that utilizes farm animals throughout a number of its programs and courses, we focus on the use of goats and parents' attitudes toward their presence as well as parents' perception of the impacts that goats have on their child's educational and outdoor or farm to school (FTS) related experiences. Furthermore, we examined parents' attitudes and acceptance toward the use and presence of goats within their community. Parents reported having positive attitudes toward goats and other FTS-related activities before and after their child's enrollment in the school. Parents also indicated believing goats were a positive influence on their child's educational and outdoor/FTS experiences. Finally, participants showed high levels of acceptability of the presence and use of goats throughout their broader community. These findings contribute to the limited knowledge on the acceptance of parents toward the use and presence of goats within schools and community settings and suggests goats have positive influences on children's educational and outdoor/farm to school experiences and interests.

INTRODUCTION

The adoption of farm to school (FTS) programs is becoming increasingly popular throughout public schools in the United States (Joshi et al., 2008). As these programs are integrated into educational curriculums, schools seek to develop and enhance FTS programs through the addition of activities involving hands-on participation of students, often through the creation of school gardens (Ozer, 2006; Schafft, Hinrichs, & Bloom, 2010; Vallianatos, Gottlieb, & Haase, 2004). Some schools have also begun to integrate the use of farm animals such as goats at their schools to expand FTS programs and related courses (e.g., Agricultural Science, Family and Consumer Science, etc.).

Schools have long used animals in their classrooms and educational programs for student learning and leisure (Hedda & Brinda, 2010; Jegatheesan & Meadan, 2006; Rud & Beck, 2003; Tamir, 1980; Zasloff et al., 1999). Farm to school programs might consider employing these practices to provide students with opportunities to interact with farm animals. One such animal that might be useful to incorporate into FTS programs are goats. Although there are only a few reported cases, goats have been used in schools either specifically for FTS programs or other educational learning activities.

There is limited literature exploring the use of goats in school settings, which have largely been conducted outside of the United States. In Japan, researchers have begun to uncover how goats impact student interest in science and professional careers, which have led to recommendations regarding how goats can serve as a useful species to teach children about social systems related to agriculture. (Koda et al., 2013; Koda et al., 2016). Furthermore, much of the literature on the use of animals in school settings have only examined teachers' and students' attitudes (Rud & Beck, 2003; Tamir, 1980; Zasloff et al., 1999). Research has rarely

considered parents' attitudes or perceptions regarding the presence of animals within schools. In order to fill these gaps within the literature, we examine parents' attitudes and perceptions and use them to evaluate how goats impact and influence students' educational and outdoor experiences, particularly within farm to school programs and courses.

Determining the attitudes of parents may not only provide insight into the animals' impacts on their children, but also serve as a measure for schools to gauge their students' parents' willingness to support and aid in animal care efforts. For FTS programs that utilize animals, they may need assistance not only from school staff but parents too due to the greater demand of time and attention that is required to care for outdoor animals at schools. Furthermore, a school's success and ability to initiate and sustain school initiatives outside of normal course facilitation is often dependent on parents' support. (Berger, 1991; Comer & Haynes, 1991; Epstein & Dauber, 1991; Grolnick & Slowiaczek, 1994; Henderson, 1988; Shaver & Walls, 1998). As schools begin to consider the integration of larger animals that have not been traditionally used in North American educational programs and courses, understanding parents' attitudes toward their presence will help better predict parent interest and involvement in supporting such initiatives.

Investigations by Koda and his colleagues (2016) of goats at elementary schools in Japan presented effects and challenges of keeping outdoor livestock in these educational settings. A common barrier presented by keeping goats at the elementary schools was identifying people willing to care for the animals during holidays. Participants of the study revealed that schools could develop a system to cooperate and collaborate with parents, neighbors, and other school personnel in order to address the challenge—highlighting both the usefulness and importance of parent engagement in school programs and activities. Examples of these practiced solutions will

be important and necessary considerations as FTS programs become more complex and demanding of schools. Koda et al.'s (2016) work has laid the foundations for better understanding the beneficial impacts as well as the challenges schools face when they provide their students with learning opportunities utilizing goats. Importantly, their research has also emphasized goats' ability to stimulate the formation of bonds between schools, students, parents and communities.

This leads us to consider the acceptability of using goats within the broader communities that encompass schools since parents' attitudes toward goats in educational institutions may be linked to attitudes regarding goats in their residential communities. Goats are appearing more and more frequently in residential spaces in the United States, Canada, Europe, and Australia because of their growing popularity to help control invasive or overgrown vegetation and other landscape management uses. Goats-for-hire (GFH) businesses are emerging among urban and semi-urban areas to rent goats to residents, businesses, and public entities. While the trend has been frequently noted in news media (Bounds, 2010; Brown, 2001; Foderaro, 2012), and previous literature has explored community attitudes and social acceptability of goats in other contexts (Oseguera Montiel et al., 2014; Sahoo, Tiwari, Roy, Bharti, & Dutt, 2016; Wyatt, Rousseau, Nadeau, Thiffault, & Guay, 2011), the topic of community attitudes and the social acceptability of prescribed goat grazing in urban areas has remained largely unstudied (Salter, MacDonald, & Zachary, 2013).

This study examines parents' attitudes toward the presence and use of goats both at their child's school and within their community. The aims of this investigation were to assess parent attitudes in order to: explore potential impacts goats have on student's educational and outdoor experiences; understand how parent awareness and transfer of knowledge influence parental

attitudes toward goats; and summarize the acceptability of goat's presence and use throughout an urban community. This study will further add to literature on the impacts of using animals in schools, with a primary focus on goats. It will also provide preliminary insight into parents' attitudes toward goats in a farm to school program as well as in an urban community setting.

Based on previous literature discussions on the educational use of goats in schools and their impacts on communities (Koda et al., 2013; Koda et al., 2016; Morand-Fehr et al., 2004; Oseguera Montiel et al., 2014), we ask four questions:

- What are parents' awareness of and attitudes toward farm to school programs and the presence of goats at the school?
- What influence do parents perceive goats to have on their child's educational and outdoor experiences?
- How will parent awareness and knowledge from their child regarding the presence or use of the animals and their involvement in FTS courses and activities influence their attitudes toward their acceptability of goats at the school?
- Within an urban area, what are the community's attitudes toward the presence and use of goats as a landscape management tool?

RESEARCH DESIGN

Respondents and Site

This study was conducted at a public middle school located in an urban county from April 2017 to November 2017. Comparison of the school's student body, survey participants, and the county wide racial/ethnic breakdown can be found below in Table 3.1.

Table 3.1. Race/ethnicity percent breakdown within the Middle school, the survey, and within the county.

<i>Race/Ethnicity</i>	<i>School Percentage</i>	<i>Study Survey</i>	<i>2010 US Census county wide</i>
<i>African American</i>	46.5%	19.1%	26.6%
<i>American Indian Alaska Native</i>	0.1%	0.0%	0.2%
<i>Asian</i>	1.7%	1.9%	4.25%
<i>Hispanic</i>	13.8%	6.7%	10.4%
<i>Hawaiian Native and Pacific Islander</i>	0.1%	0.0%	0.9%
<i>Multi-Racial</i>	4.9%	3.8%	2.2%
<i>White</i>	32.9%	65.7%	61.9%
<i>Total:</i>	100%	97.2%	100%
		(2.8% Prefer not to respond)	

Source: U.S. Census Bureau. (2018, March 21). QuickFacts

The studied school is one of three middle schools in the school district that keep farm animals on its campus and was ultimately chosen after permission was obtained from the school’s administration. It has the most extensive FTS program within the district and cares for a rooster, goats and hens. These animals are utilized in its mandatory and elective Agricultural Science and Family and Consumer Sciences courses as well as its “Grow It Know It” farm to school program which encompasses the Kitchen Garden Corps summer program and the school’s produce market. In addition to animals, the school maintains an outdoor garden, a greenhouse, and a composting program used throughout each of the courses and activities listed above. The school has several groups, clubs, and other initiatives that also utilize the school’s garden and help with composting duties. The goats specifically have been a focal point for the school: Agricultural Science students bring them fresh water and food, mentors and mentees spend time with the goats, a program for sixth grade students is spent by the goat pen each week, and during the summer Kitchen Garden Corps program, students complete animal care tasks each day.

Because the Agricultural Science and Family and Consumer Science classes are mandatory for all sixth graders, nearly all students have observed or interacted with the goats at some point in their tenure at the school. Our study focuses on courses, programs, and activities that integrate farm to school initiatives and involve student interactions with the school's animals. These specifically include the Agricultural Science, the Family and Consumer Science (FACS) courses, and the afterschool and summer Grow It Know It farm to school programs. Parents and guardians of students at the middle school were the target participants, and they served to represent two populations: parents and guardians at the secondary school and members of the local community. Parents were targeted to assess their acceptability towards the use of goats at the school and within the community as well as to inform the impacts goats have on their child's school experiences and outdoor engagements.

Data Collection and Procedures

We obtained permission to survey parents and guardians (referred to as parents hereafter for brevity) of the middle school's students from the Principal and the school district's Director of Grants and Research. This study was also approved by the University of Georgia's Institutional Review Board. The survey instrument was a questionnaire containing 34 questions, divided into four topic sections: student involvement and parent awareness (9 questions), parents' attitudes toward the use of goats at school and knowledge (4 questions), acceptability of goats in the community (15 questions), and socio-demographic characteristics of the respondents (5 questions). Demographic information collected from the participants included their age, race/ethnicity, educational background, gender, and income level. Response formats included yes/no, multiple choice, Likert-scale rankings, and short written responses (survey instrument in

Appendix B). Table 3.2 displays questions from the survey instrument and the corresponding topics they address.

Table 3.2. Survey questions and topic focus.

<i>Topic</i>	<i>Survey Question</i>
<i>Parent awareness of animals at school</i>	Are you aware there are farm animals present at the school? Please choose all animals you are aware of at the school.
<i>Child involvement</i>	Please select the activities your child/ren have participated in. Is the outdoor coursework a new experience for your child?
<i>Child interest in animals/farm to school related activities</i>	Which of the following activities/topics have you heard about from your child/ren? Since taking Agricultural Science or Family and Consumer Science, has your child shown increased interest in farming, gardening, or animal care activities outside of what is offered at the school?
<i>Parent Attitude toward animals at the school</i>	When my child talks about the goats it is because... Is the presence of goats at school a positive or negative influence on the following: Do you have any concerns regarding the presence and use of goats at the school? What are your attitudes toward the following:
<i>Parent awareness of goats in the community</i>	Where have you seen goats within the county's area?
<i>Parents' attitudes toward the use/presence of goats in the community</i>	Please indicate your level of acceptance to the idea of goats in the county in each of these capacities: Please list any potential benefits of owning/renting goats: Please list any potential risks/drawbacks of owning/renting goats: Have you considered owning/renting goats while living in this county? What is your opinion on the effectiveness of goats clearing out overgrown areas of vegetation? Do you believe goats cause damage to the environment?
<i>Parent/guardian demographics</i>	What is your age? What is your gender? What is your race/ethnicity? Please indicate your highest level of education. Which best describes your income level?

**Modifications were made to survey questions, regarding location specifics, for participants' anonymity.*

A mix-mode survey sampling method was used to distribute surveys to parents (De Leeuw, 2005). The initial method was an online survey, with recruitment through the school's

principal's weekly newsletter. The newsletter was sent by the principal to a listserv of all parents and guardians of students attending the school. Provided in the newsletter was a description of the study, its purpose, and information regarding consent. A web address was also provided to direct participants to a questionnaire administered electronically through the research and survey software, Qualtrics. Survey reminders were sent out bi-weekly through the newsletter from April 2017 through mid-May 2017. Surveys were not collected while school was closed during the months of student summer vacation. In August 2017, invitations to participate in the study were sent out again through the principal's weekly newsletter.

Due to low response rates to the online survey (38 responses), we used in-person distribution of printed surveys of the same questions for the remainder of the survey collection period (between September and November 2017). A convenience sampling strategy was utilized, facilitating recruitment of members of the target population due to accessibility, location proximity, and availability at a given time (Etikan, Musa, & Alkassim, 2016). A self-administered questionnaire was distributed at the school during band and orchestra concerts and academic school-wide events; surveys were collected following the end of these events. A total of 129 questionnaires were distributed at three school functions, of which 99 surveys were collected.

A total of 137 online and hard copy surveys were received. We excluded surveys that were less than 50% completed, giving a final total of 112 surveys usable for analysis. Of these respondents, the average age of respondents was approximately 44 years; 72% were female, 65.7% were White, 19.1% were Black or African American, 6.7% were Hispanic/Latino or Hispanic/Latino mix, and the remainder of respondents identified as Asian (3.8%), or a mix of ethnicities (1.9%). Three respondents selected not to respond with their race/ethnicity (2.8%).

Although White parents were overrepresented in the survey results according to the racial/ethnic distribution of the school (Table 3.1), distribution of the surveys during school events helped to diversify the sample. Prior informed consent was obtained from each respondent in accordance with Institutional Review Board policies. For the confidentiality of participants, we have used pseudonyms for the name of the school and the names of students involved.

Data Analysis

In order to examine parents' attitudes and perceptions towards the use of goats within both a school and community setting, we used mixed quantitative and qualitative methods to ensure contextual relevance (Hagger, Dwyer, & Wilson, 2017). All data, including paper surveys, were compiled onto the Qualtrics survey platform (Qualtrics, Provo, UT). Survey responses were then analyzed using the statistical software program, JMP (JMP, Cary, NC). A distribution analysis for each survey question was completed to determine frequency of answers and overall dispersal of responses among those surveyed.

To assess parents' and guardians' knowledge, awareness, and attitudes toward the use and presence of goats at the school, we calculated means and standard deviations for numerical and Likert scale questions. Chi-square analyses (Likelihood Ratio) were used to compare frequencies of categorical response variables for their reliability in analysis of small sample sizes (Geweke & Singleton, 1980; Satorra & Saris, 1985). We analyzed differences in responses between parents' self-identified racial/ethnic groups, but due to low counts for many groups, we only statistically analyzed differences between surveys in which parents identified as White or Black and/or African American.

Survey answers requiring written responses for questions regarding benefits and concerns of goat use at school and in community were coded using thematic analysis approach. For

answers given to questions in which a free response was written, we coded them according to the emergent categories that arose from participants responses and identified themes among these groupings (individual participant responses may have been identified with multiple codes and therefore was placed in more than one thematic category) (Saldaña, 2015).

RESULTS

Parent Awareness of Farm Animals and the Presence of Goats at the School

General parent awareness of the presence and types of animals at the school was first evaluated to determine the number of respondents who knew about the animals at the school. Parents were asked whether they were aware of animals being kept at the school, followed by a question which listed the species present at the school that allowed respondents to choose the animals they were aware of being there. Out of 111 respondents, 102 (91.9%) reported being aware of the presence of farm animals at the school. Of those who were aware, 97% reported knowing goats were among the different animals present, which was higher than their awareness of hens/chickens (85%) and the rooster (51.5%). Even for the 20 respondents who reported that their child had not participated in any of the FTS-related courses or activities, 15 (75%) were aware of the presence of animals at the school.

When asked how they learned about the animals at the school, parents reported most frequently learning about the animals present at the school through either their child, school events, or a combination of the two, sometimes in conjunction with other option choices which included the school newsletter, a community member, another parent or the option to write in a written response for 'other'. For respondents who indicated becoming aware of the animals by other means, they noted other groups of people such as school faculty or staff, having personally

seen them, or via social media. For example, one respondent reported learning about the animals through the social media platform, Facebook.

Parent Knowledge on Farm Animals and FTS-related Activities

Parents were asked to indicate whether they had learned anything new about the farm animals at the school or the school’s FTS activities since their child’s enrollment at the school. They were given the option to state whether they had learned nothing, learned a little, or learned a lot. When asked this question, 62.4% responded they had learned either a little or a lot of new information about goats (Table 3.3). When asked about the hens and the rooster, between 50 and 60% of respondents reported having learned nothing new about these animals since their child’s enrollment in the school. As for the FTS-related activities, since parents’ children’s enrollment at the school, 51% of respondents reported having learned something new about composting and 54% reported learning something new about gardening (Table 3.3).

Table 3.3. Percent of parents who either learned something or nothing about the animals, other FTS-related activities, or other topics since their child’s enrollment at the school, and mean ratings of degree of learning.

<i>Category</i>	<i>n</i>	<i>Learned Something (little or a lot) %</i>	<i>Learned Nothing</i>	<i>Mean Ratings</i>	<i>S.D.</i>
<i>School</i>	108	77.8	22.2	1.15	0.763
<i>Goats</i>	109	62.4	37.6	0.77	0.699
<i>Awareness of Environmental Issues</i>	107	57.9	42.1	0.68	0.653
<i>Gardening</i>	107	54.2	45.8	0.67	0.697
<i>Composting</i>	109	51.4	48.6	0.63	0.689
<i>Hens</i>	107	46.7	53.3	0.54	0.634
<i>Roosters</i>	105	40.0	60.0	0.46	0.621
<i>Other Farm Animals</i>	106	34.9	65.1	0.39	0.583

Degree of knowledge learned is based on the ratings: 0 = nothing; 1 = a little; 2 = a lot

However, when rating the degree to which parents learned a little or a lot about a specific topic, animal, or FTS-related activity by assigning values to each answer choice (0 = nothing; 1 = a little; 2 = a lot), the mean scores show that parents appeared to feel that overall they had

learned very little about each of the categories asked about, with the exception of school, which parents reported learning more about than all other categories. Table 3.3 also shows the degree to which parents felt they had learned something new about animals, FTS-related activities, or other topics.

When comparing the relationship between whether parents learned something new since their child’s enrollment in the school about the school’s animals, FTS-related activities, and other school-related topics against their child’s participation in the schools FTS-related courses and activities, we find that for all but two of the animals, FTS-related activities, and other topics there were positive correlations between these categorical variables. No relationship was found between a child’s participation and parents’ learning something about school and gardening, as shown in Table 3.4. Interestingly, the most significant result was between parents’ feeling they had learned something new about environmental issues and their child’s participation in FTS-related courses or activities ($p < 0.0001$).

Table 3.4. Chi-square analyses of parent knowledge and child participation in FTS-related courses or activities.

Dependent Variable		Learned Something New	Learned Nothing New	n	df	Chi-square (Likelihood ratio)	p-value
Child Involvement							
School	Not Participated	11	7	105	1	2.878	0.0898 ^{NS}
	Participated	70	17				
Goats	Not Participated	6	12	106	1	7.503	0.0062**
	Participated	60	28				
Awareness of Environmental Issues	Not Participated	3	15	104	1	14.828	0.0001***
	Participated	56	30				
Gardening	Not Participated	7	11				
	Participated						

Composting	Participated	49	37	104	1	1.960	0.1615 ^{NS}
	Not Participated	5	13	106	1	4.782	0.0287*
Hens	Participated	49	39				
	Not Participated	3	15				
Roosters	Participated	45	41	104	1	8.303	0.0040**
	Not Participated	2	16	102	1	8.376	0.0038**
Other Farm Animals	Participated	38	46				
	Not Participated	2	16	103	1	5.917	0.0150*
	Participated	33	52				

(* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, NS = not significant)

Child Involvement and Interest

Determining which activities or courses that a child has participated in provides insight into the number of students who have been in contact with the school's animals through its farm to school related courses, programs, or activities. A large majority (88 of 108, 81.5%) of respondents reported that their children had participated in one or more of the farm to school related courses or activities. Respondents were also asked whether the outdoor coursework and activities were a new experience for their child. Responses to this question were nearly split in half: 50.5% reported that these or similar activities were not a new experience for their child, while 49.5% reported that the outdoor FTS experiences were new to their child.

To clarify children's interest in goats, we assessed which topics parents heard their child speak about and how conversations about the goats were initiated between child and parent. Our results showed that parents indicated hearing their child talk about goats and gardening activities more frequently than other FTS activities or animals, as shown in Table 3.5.

Table 3.5. Distribution of respondents who have heard their child speak about a specific animal or FTS activity.

<i>Category</i>	<i>n</i>	<i>% of Respondents</i>
<i>Goats and Other</i>	88	78.6
<i>Gardening and Other</i>	83	74.1
<i>Garden Market and Other</i>	64	57.1
<i>Hens/Rooster and Other</i>	59	52.7
<i>Composting and Other</i>	58	51.8
<i>Have not heard my child speak about any of these animals or activities.</i>	8	7.1%

**Counts do not reflect a total percent. Proportions are based on total counts that a topic has been discussed own its own and in conjunction with other activities/topics.*

Parents also indicated that their child more frequently initiated conversations about the goats on their own than any alternative mode of enquiry such as a parent asking their child about their day or about a specific class. Parents were also asked to rank the topics or animals their child had mentioned to them on a scale from 1-5 (1 representing the topic or animal a child was most enthusiastic or interested in and 5 representing what a child was least interested or enthusiastic about). Goats were ranked consistently among the animals or activity as being the topic that children were most interested or enthusiastic about. Following behind goats were children’s interest/enthusiasm for gardens. Chickens were also highly ranked, but lower than goats. Parents’ rankings of the FTS activities and animals that they thought their child was most interested and enthusiastic about, aligned with the topics their child most frequently discussed with them.

We also assessed whether students became more interested in farm to school activities after taking the two mandatory elective courses, Agricultural Science (Ag. Science) and Family and Consumer Science (FACS). We asked parents if their child showed interest in farming, gardening, or animal care activities outside of what was offered at the school since their enrollment in those courses. Out of the 93 respondents who answered this question, 51 (54.8%)

reported their child had shown other interests relating to farming, gardening, or animal care since their participation in Ag. Science and FACS. Parents were asked to provide written responses of the activities their child showed interest in since their participation in these two courses. Three themes of interest emerged among responses: school activities, home activities, and community activities. Although parents were asked to indicate interests separate from the FTS-related courses and activities at the school, parents indicated FTS-related courses and activities within their responses, reflected in Table 3.6. Other environmentally-themed clubs and organizations at the school were also mentioned, and interest in animal-related activities were present among each theme.

Table 3.6. Categorization of children’s interests since taking Ag. Science and/or FACS.

Theme	n	Category	n	Example
School Activities	15	Courses		Agricultural Science
			4	Family and Consumer Science
		Clubs/Programs	7	Future Farmers of America Sustainability Corps
			3	“more time with goats”
Home Activities	22	Cooking	3	“wanted to cook at home”
		Environment/Plants	14	“growing plants at home”
				“garden at home”
		Animals	5	“wants to have chickens etc. at home”
Community Activities	9	Animals	9	“greater attention to household pets”
				“bee keeping”
				“volunteering at animal shelter”

Parents’ Attitudes Toward Goats, Other Animals, and FTS Activities

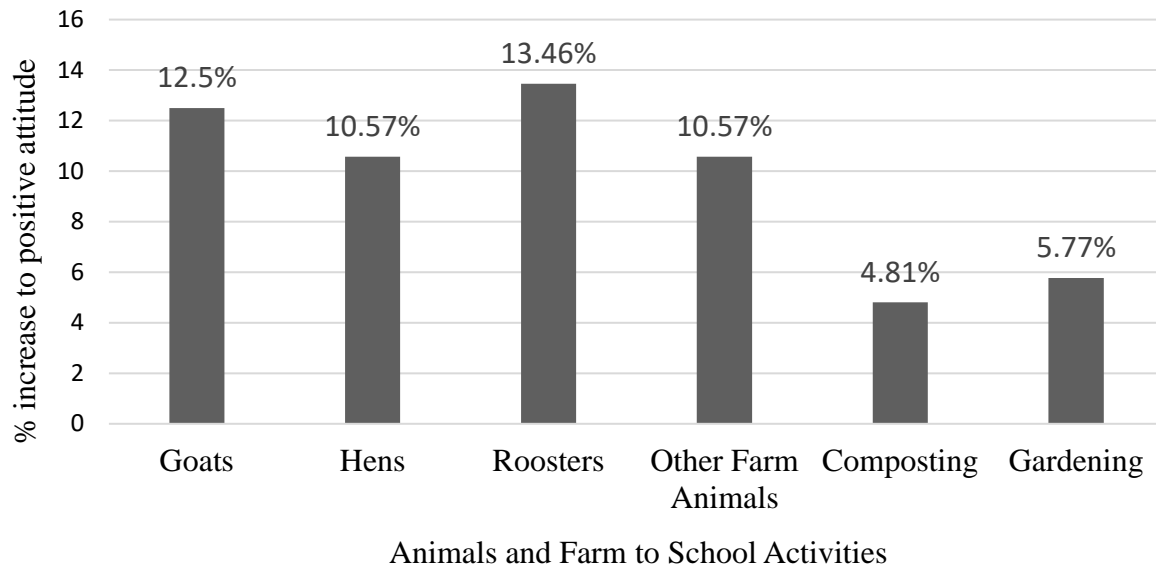
We asked parents to rate their general attitude toward goats, other animals, and farm to school activities at the middle school before their child’s attendance to the school on a 3-point

Likert scale from positive to negative, and then after their child’s attendance as either positive, negative, or neutral. Parents revealed an overall positive attitude toward goats both before and after their child’s attendance to the school. Prior to their participation 87 out of 104 (83.7%) stated already having a positive attitude toward the animal, 15 (14.4%) were neutral, and 2 (1.9%) were negative. Among the 17 parents who reported negative or neutral attitudes toward goats initially, 13 gained a positive attitude, and four respondents maintained a neutral attitude. Table 3.7 displays the percentage of respondents and their attitudes toward the animals and FTS-related topics before and after their child’s attendance to the middle school.

Table 3.7. Parent attitudes before and after children attended the middle school.

<i>Category</i>	<i>n</i>	<i>Before student attendance</i>			<i>After student attendance</i>			<i>Increase in positive attitudes (%)</i>
		<i>Positive (%)</i>	<i>Neutral (%)</i>	<i>Negative (%)</i>	<i>Positive (%)</i>	<i>Neutral (%)</i>	<i>Negative (%)</i>	
<i>Goats</i>	104	83.7	14.4	1.9	96.2	3.8	0	12.5
<i>Hens</i>	104	76.8	15.4	1.9	93.3	6.7	0	10.6
<i>Roosters</i>	104	67.9	21.2	5.8	86.5	11.5	1.9	13.5
<i>Other Farm Animals</i>	104	75.0	17.3	1.9	91.3	8.7	0	10.6
<i>Composting</i>	105	80.4	12.4	1.9	90.5	9.5	0	4.8
<i>Gardening</i>	105	81.3	12.4	0.9	92.4	7.6	0	5.8

When compared to other animals and FTS activities, parents’ attitudes toward goats showed a 12.5% increase to a positive attitude, the second highest increase change (Figure 3.1). The greatest increase in positive attitudes were for roosters, which had the lowest initial favorability rating. However, despite the increase in positive attitudes toward roosters, it was also the only animal to have some parents maintain a negative attitude toward the animal after their child’s attendance to the school. With the exception of roosters, for each of the categories (displayed in Figure 3.1), all previous negative attitudes improved to positive attitudes. Neutral attitudes that parents had toward a specific animal or farm to school related activity, including composting and gardening, either remained neutral or improved.



Note: The results are based on varying number of responses dependent on each category (n = 103-111).

Figure 3.1. Improvement of parents' attitudes.

Examination of Potential Impacts of Interest, Knowledge, and Awareness on Parent Attitudes

We conducted chi-square likelihood tests to determine whether there were any statistically significant relationships between parents' attitudes toward goats and parents' knowledge of the presence of the animals at the school; their general knowledge about the animals and other FTS activities; and lastly, their child's interest or involvement in the school's FTS courses and activities. Child interest in goats was determined by whether parents reported their child speaking to them about the animal and whether a parent reported that their child brought up the subject of goats on their own, the response distribution of these results are shown in Table 3.8. Parents' and guardians' attitudes toward goats appear to be unimpacted by their child's interest in the animal. Parents' attitudes also appear to be unimpacted by their own awareness and knowledge of the animal as shown from the chi-square tests in Table 3.8.

However, there was a significant correlation between parents' positive attitude toward goats and their child's participation in these courses and activities ($p < 0.05$) (Table 3.8).

Table 3.8. Parent response distribution and chi-square analyses between parent awareness, knowledge, child interest, and child participation and parent attitude toward goats.

<i>Independent Variable</i>	<i>Perception of goats improved?</i>				<i>df</i>	<i>Chi-square (Likelihood ratio)</i>	<i>p-value</i>
	No change/No	Positive Change/Yes	Total				
Child Interest							
<i>Which of the following activities/topics have you heard about from your child/ren? (Specific for goats)</i>	Have heard about goats	73 (70.2%)	11 (10.6%)	84 (80.8%)			
	Have not heard about goats	18 (17.3%)	2 (1.9%)	20 (19.2%)			
<i>Total</i>		91 (87.5%)	13 (12.5%)	104	1	0.148	0.7000 ^{NS}
When my child talks about the goats it is because...	...my child brings it up	53 (51.5%)	9 (8.7%)	62 (60.2%)			
	...my child does not talk about the goats	25 (24.3%)	2 (1.9%)	27 (26.2%)			
	Parent prompts the child	12 (11.7%)	2 (1.9%)	144 (13.6%)			
<i>Total</i>		90 (87.4%)	13 (12.6%)	103	2	0.994	0.6084 ^{NS}
Awareness and Knowledge							
<i>Are you aware there are farm animals present at the school?</i>	No	6 (5.8%)	1 (0.97%)	7 (6.8%)			
	Yes	84 (81.6%)	12 (11.7%)	96 (93.2%)			
<i>Total</i>		90 (87.4%)	13 (12.6%)	103	1	0.018	0.8925 ^{NS}
<i>Awareness of goats' presence at the school.</i>	No	2 (2.11%)	0 (0.0%)	2 (2.11%)			
	Yes	81 (85.3%)	12 (12.6%)	93 (97.9%)			
<i>Total</i>		83 (87.4%)	12 (12.6%)	95	1	0.546	0.4598 ^{NS}
<i>Since your child has attended the</i>	No	34 (33.7%)	2 (1.98%)	36 (35.6%)			

<i>school, have you learned anything new about any of the following: goats?</i>	Yes	54 (53.5%)	11 (10.9%)	65 (64.4%)			
	<i>Total</i>	88 (87.1%)	13 (12.9%)	101	1	3.00	0.0833 ^{NS}
Child Involvement							
<i>Please select the activities your child/ren have participated in.</i>	Not Participated	18 (17.5%)	0 (0.0%)	18 (17.5%)			
	Participated	72 (69.9%)	13 (12.6%)	85 (82.5%)			
<i>Total</i>		90 (87.4%)	13 (12.6%)	103	1	5.378	0.0204*
<i>Is the outdoor coursework a new experience for your child?</i>	Not a new experience	49 (48%)	4 (3.9%)	53 (52%)			
	New Experience	40 (39.2%)	9 (8.8%)	49 (48%)			
<i>Total</i>		89 (87.3%)	13 (12.8%)	102	1	2.728	0.0986 ^{NS}

(* $p < 0.05$, NS = not significant)

Parents' assessments of impacts on their child's educational and outdoor experiences

Since goats were present and used in the many of the school's FTS activities and some courses, we examined goats' influence on children's educational and environmental experiences. Parents were asked, using a 5-point Likert scale (1 indicating a an extremely negative influence to 5 indicating a highly positive influence), to rate how goats positively or negatively influenced their child's interest in school, acting as an engaging educational tool, overall contribution to the school, and increasing children's interest in gardening, among other FTS, educational, or environment attributes (full list is provided in Table 3.9). Responses ranged from neutral to highly positive, revealing that respondents did not have any negative attitudes toward the influence of goats on the categories listed in Table 3.9. A distribution analysis revealed that parents believed the presence of goats at school was a positive influence on each of these aspects with at least 70% of participants reporting goats being either of a slightly or highly positive influence on these

aspects of their child’s educational and outdoor experience. We found that 88% believed goats were a slightly to highly positive influence on increasing their child’s interest or enthusiasm for school. Respondents also reported that they felt goats were a positive influence on teaching their children responsibility through animal care, increasing their child’s interest in gardening, their interest in farming, and in animal care. Furthermore, 80% of respondents felt goats were increasing the time their child spent outdoors. In regard to goats’ influence toward the overall contribution to the school, 87% of respondents found them to be slightly (16%) to highly (71%) positive. Mean Likert ratings of each category that parents were asked about, regarding the type and degree of influence goats had on farm to school educational aspects, were consistently high, and are given in Table 3.9.

Table 3.9. Mean scaled scores of the negative (1) to positive (5) influence of the presence of goats at the school on different educational, farm to school, or environmental aspects.

<i>Questionnaire Item</i>	<i>n</i>	<i>Mean</i>	<i>S.D.</i>
<i>... overall contribution to the school</i>	107	4.65	0.648
<i>...acting as an engaging educational tool</i>	108	4.64	0.648
<i>...teaching children responsibility through animal care</i>	107	4.60	0.699
<i>... increasing children’s interest in animal care</i>	107	4.57	0.688
<i>...increasing children’s interest or enthusiasm for school</i>	108	4.54	0.662
<i>... increasing children’s interest in farming</i>	107	4.51	0.757
<i>...increasing children’s time spent outdoors</i>	106	4.49	0.746
<i>... increasing children’s interest in gardening</i>	108	4.43	0.776
<i>... increasing children’s awareness of environmental problems</i>	107	4.38	0.797

Respondents were given the option to address other ways in which the goats may have been a positive or negative influence on their child's educational or outdoor experiences. These free text responses were categorized into three groups, reflecting the nature of the influence: positive influences, concerns, and uncertainties. Positive influences that parents noted were related to the overall contribution to the school, general likability, and contributing to academic success. One respondent noted that the goats positively impacted their daughter's math grade because while initially attending school early in the morning in order to assist with the care of the goats, her daughter would afterwards attend a math program which contributed to her earning an A in her mathematics course. Another respondent stated being concerned for students who were unable to take courses or participate in activities that incorporated the goats as they would be "miss[ing] out".

In response to direct yes or no questions about concerns relating to goats at the school, 107 out of 110 (97.3%) responded that they had no concerns. Of the 3 (2.7%) who responded with having concerns regarding the presence and use of goats at the school, only one respondent indicated an actual concern relating to their child. Text responses given included one concern regarding the spread of disease from animal to child, uncertainty about the school having proper permission to have goats at the school, and the third respondent indicated that they did not have sufficient information about the use and presence of goats at the school to determine their concerns, if any.

Sociodemographic Variables' Impacts on Child Interest, Involvement, and Parent Attitudes

Race and ethnic demographic factors had minor statistical bearings on a child's involvement, their interest, or a parents'/guardians' awareness and knowledge of the animals at

the school. However, a child’s previous exposure to outdoor coursework similar to that offered by the school did vary significantly with respondents’ race/ethnicity. Children who were Black or African American were significantly less likely to have experienced outdoor course work before their participation in their school’s farm to school courses and programs as compared to White students ($p < 0.05$). White parents were also more likely to be aware of the presence of the farm animals at the school than Black or African American parents ($p < 0.05$). Furthermore, a smaller percentage of Black and African American children participated in the school’s farm to school programs compared to white students’ participation rates (73.7% vs 89.7%), and a smaller percentage of Black and African American students displayed interest in similar activities outside of school, compared to white students (43.8% vs. 66.7%); however, these differences were not statistically significant (Table 3.10).

Table 3.10. Chi-square tests of child involvement, child interest, and parent/guardian awareness and knowledge based on race/ethnicity.

Dependent Variable		White	Black and African American	n	df	Chi-square (Likelihood ratio)	p-value
Child Involvement							
My child has participated in one or more of the FTS-related courses or activities.	Not Participated	7	5	87	1	2.823	0.0929 ^{NS}
	Participated	61	14				
Is outdoor coursework (gardening, animal care, composting, etc.) is a new experience for your child?	No	38	5	88	1	5.105	0.0239*
	Yes	31	14				
Child Interest							
Heard about one or more of the FTS activities/topics from my child.	No	3	3	90	1	2.410	0.1205 ^{NS}
	Yes	67	17				

Since taking Agricultural Science and Family and Consumer Science, my child has shown increased interest in farming, gardening, or animal care activities outside of what is offered at the school.	No	20	9	76	1	2.743	0.0977 ^{NS}
	Yes	40	7				
My child talks about the goats.	No	12	8	89	1	4.837	0.0279*
	Yes	58	11				
Awareness and Knowledge							
Respondents aware there are farm animals present at the school.	No	2	4	89	1	5.827	0.0158*
	Yes	67	16				
Awareness of goats' presence at the school.	Not Aware	1	1	82	1	0.960	0.3273 ^{NS}
	Aware	65	15				
Since your child has attended the school, have you learned anything new about goats?	No	22	7	88	1	0.164	0.685 ^{NS}
	Yes	47	12				

(* $p < 0.05$, NS = not significant)

Parents' Awareness of and Attitudes Toward Goats in the Community

As members of the broader community, we used parents as a proxy to determine community perspectives toward the presence and use of goats within the urban area. When asked whether respondents had seen goats in their community, 78.4% reported that they had, while 9.9% of respondents were aware of their use but had never observed them in the community, and 11.7% of respondents had not seen goats and were not aware of their use in the community. Respondents most frequently reported viewing goats on private non-residential properties (e.g. farms and business properties), and on public property (e.g. parks and state forests), and 20.5% had specifically seen goats within their neighborhood or in neighboring yards.

As shown in Table 3.11, at least 67% of respondents felt that it was slightly or strongly acceptable to have goats within the community for the following practices: owning or renting goats on residential property, owning or renting goats to have on private, non-residential

property, businesses that rent out goats for landscaping, and the presence of rented goats on public property.

Table 3.11. Acceptability of practice ranking toward goat presence and use in the community

<i>Most acceptable practice ranking</i>	<i>Practice</i>	<i>n</i>	<i>Mean</i>	<i>S.D.</i>	<i>Percent of respondents who find this practice either slightly or strongly acceptable</i>
<i>1</i>	people having rented goats on private, non-residential property	108	4.48	0.88	78.57%
<i>2</i>	businesses that rent out goats for landscaping	108	4.39	1.02	78.57%
<i>3</i>	people owning goats on private, non-residential property	111	4.28	1.22	81.25%
<i>4</i>	rented goats on public property	108	4.26	1.11	73.21%
<i>5</i>	people having rented goats on residential property	108	4.1	1.25	70.54%
<i>6</i>	people owning goats on residential property	108	3.98	1.21	67.86%

Respondents were asked to list potential benefits of owning/renting goats. Participants’ open-ended responses were categorized according to the type of benefit they presented for either the people that rented/owned them or according to their impact on the environment based on ecosystem service categorizations. These categorizations included provisioning, regulating, and cultural services, which for this study were used to group the benefits respondents reported of owning/renting goats as functions or services to the environment or to people. Respondents reported that renting or owning goats would be beneficial because of their enjoyment, their environmental service uses, their use as a source of food, their ability to provide people with a connection to nature, their economic benefits, and/or their ability to act as an educational tool. Respondents also noted their benefit to the environment, stating their ability to act as an eco-friendly lawn care/maintenance tool because they could reduce carbon emissions, remove

invasive species, and reduce pollution and waste created by alternative lawn care control.

Categorization of responses are shown in Table 3.12 (respondents' responses may have been characterized in more than one theme).

Table 3.12. Categorization of respondents' reported benefits of renting/owning goats.

Theme	n	Category	n	Example
Provisioning Services	57	Food	16	Dairy Meat
		Vegetation control	41	Lawn care
Regulating Services	26	Vegetation control	16	Invasive plant removal Improving soil health
		Reduce carbon emissions	7	"No pollution from machines"
		Pollution/waste reduction	3	"Reduction in herbicide use"
Cultural Services	41	Enjoyment	24	Companionship/Pet Aesthetic (character and appearance)
		Connection to nature	1	"back to nature"
		Education	2	"educational benefits"
		Personal finance	14	Source of income Savings

Based upon ecosystem service categories from/developed by Ehrlich and Ehrlich, 1981; Costanza et al., 1997; De Groot et al., 2002; Millennium Ecosystem Assessment, 2003

Participants were also asked to list potential drawbacks of owning or renting goats. Open-ended responses were categorized into four major topics: animal care, demeanor, environmental impacts, and uncertainty. Subcategories under animal care revealed that people were concerned about the responsibility of owning or renting goats and being inexperienced or unknowledgeable about caring for the animal. Responsibilities related to animal care included protection, expense, excrement, illness, and treatment/mistreatment. Space, with regards to the amount of land needed to support the animals, was another category that fell under animal care as a drawback to owning or renting goats. With regards to the demeanor of the animals, respondents reported their odor, noise, and behavior as potential drawbacks to owning or renting the ruminant animal. Responses

that were categorized as behavioral drawbacks were further grouped into nuisance, eating habits, escaping, or causing harm or injury. Responses that were included as a negative impact on the environment included erosion, water pollution, and overgrazing. Finally, some responses from parents revealed their uncertainty about the risks and drawbacks of owning or renting goats (Table 3.13).

Table 3.13. Categorization of potential risks/drawbacks of owning/renting goats.

Theme	n	Category	n	Example
Animal Care	39	Responsibility	37	Protection
				Expense
				Illness
				Treatment/Mistreatment
				Excrement
		Inexperience/Unknowledgeable	1	“not knowing how to work with goats”
		Space	1	“may need more space than urban yards have”
Demeanor	40	Odor	9	“smelly”
		Noise	5	“Can be a little noisy but not very often”
		Behavior	26	Nuisance
				Eating habits
				Escaping
				Harm or injury
Environmental Impacts	8	Erosion	1	“erosion”
		Water pollution	4	“feces in water runoff”
		Overgrazing	3	“eat too much vegetation”
Uncertainty (about risks/drawbacks)	4	Disease	1	“disease? (I am only guessing)”
		Space	1	“may need more space than urban yards have (I don’t really know)”
		Overgrazing	1	“maybe they eat too much vegetation, IDK”
		No clear response	1	“?”

Respondents were asked to indicate an acceptable number of both rented and owned goats for people to have on a private, residential property. Nearly 70% of respondents reported between one and five goats as an acceptable number of owned goats to live on a private, residential property, while 20% of those respondents felt 6-10 goats were an acceptable amount.

Respondents were also asked to indicate an acceptable amount of time that rented goats could stay on a private, residential property given their answer to the previous question regarding an acceptable number of rented goats on this type of property. Approximately a third (32.98%) of respondents reported 1-3 weeks as acceptable amount of time, another 21.3% felt 1-3 months as being acceptable, and 12.77% recorded 1 year or more as being an acceptable period of time for rented goats to be used on private, residential property. The most frequent combination of the number of goats and the amount of time to have this number of rented goats on a private residential property was 1-5 goats for 1-3 weeks, with 26% of respondents recording this response combination.

Only 6 respondents had rented or owned goats previously. Four respondents who either owned or rented goats did so to get rid of invasive plant species. One respondent recorded having a pet goat and the other respondent reported owning goats as a source of food. Given the small sample size of respondents with prior goat experience, we were unable to test for a significant relationship between the attitudes respondents had toward the different uses of goats in the community and whether they had or had not rented or owned goats. However, of those that had previously rented goats, all reported that the ownership or rental of goats on different types of property and their use in businesses were acceptable practices, and they also maintained a positive attitude toward each of the animals and FTS activities after their child's attendance to the school, apart from roosters.

Over 70% of respondents had not considered renting or owning goats while living in the county. Between 23 and 26% of respondents had considered either owning or renting goats with slightly more respondents having considered owning over renting goats. While a contingency analysis between the consideration of owning or renting goats and income level revealed no significant results between the consideration of *owning* goats and income level, a significant relationship appeared between consideration of *renting* goats and income level (p -value <0.05). Although for each income level bracket there was a greater percentage of respondents who had not considered renting goats, 52% of respondents who have considered renting goats fell into the \$50,000-\$99,000 income level bracket. Only 1 respondent who considered owning goats earned an annual income of \$50,000 or less (Table 3.14).

White respondents made up 95% of those who had considered owning goats while living in the town, while only one Black/African American respondent had considered this idea. As for the consideration of renting goats while living in the city, all Black/African American respondents answered no to having considered renting goats. A likelihood ratio chi-square test revealed significant results (p -value <0.01) for the relationship between respondents of races White and Black/African American and consideration of renting goats (Table 3.14). Many census statistics reveal a correlation between race and income (U.S. Census Bureau). The relative influences of race and economic status on consideration of renting or owning goats may be confounded because of that broader socioeconomic trend.

Table 3.14. Sociodemographic factors and consideration of owning or renting goats in the community.

<i>Independent Variable</i>	<i>Dependent Variable</i>	<i>Response</i>		<i>n</i>	<i>df</i>	<i>Chi-square</i>	<i>p-value</i>
		Yes	No				
	Income						
<i>Considered Owning Goats</i>	\$100,000 +	5 (22.7%)	17 (77.3%)	22	3	2.456	0.4833 ^{NS}
	\$50,000-\$99,000	15 (34.9%)	28 (65.1%)	43			
	Less than \$20,000	5 (19.2%)	21 (80.8%)	26			
	Prefer not to respond.	3 (23.1%)	10 (76.9%)	13			
<i>Considered Renting Goats</i>	\$100,000 +	6 (27.3%)	16 (72.7%)	22	3	10.432	0.0152*
	\$50,000-\$99,000	13 (30.2%)	30 (69.8%)	43			
	Less than \$20,000	1 (3.8%)	25 (96.2%)	26			
	Prefer not to respond.	5 (38.5%)	8 (61.2%)	13			
	Race/Ethnicity						
<i>Considered Owning Goats</i>	Black and African American	1 (5.0%)	19 (95%)	20	1	7.127	0.0076**
	White	21 (31.3%)	46 (68.7%)	67			
<i>Considered Renting Goats</i>	Black and African American	0 (0.0%)	20 (100%)	20	1	11.421	0.0007***
	White	19 (28.4%)	48 (71.6%)	67			

(* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, NS = not significant)

Goat Effectiveness and Use in the Community

Goats have been used throughout the Athens community for landscaping uses, particularly the use of clearing out invasive species. When asked their opinion on the effectiveness of goats at clearing out areas of overgrown vegetation, nearly 86% of all respondents recorded them being either slightly or very effective. More respondents felt neutral toward their effectiveness than respondents who felt that they were not effective.

Table 3.15. Attitudes toward use of goats and their impacts.

	<i>n</i>	<i>%</i>	<i>n</i>	<i>Mean</i>	<i>S.D.</i>
<i>Respondent's opinion on the effectiveness of goats at clearing out overgrown areas of vegetation</i>			98	4.65	0.75
<i>Effective</i>	92	93.8%	-	-	-
<i>Not effective</i>	2	2.1%	-	-	-
<i>Neither ineffective nor effective</i>	4	4.1%	-	-	-
<i>Respondent's beliefs on whether goats cause damage to the environment</i>			104	3.96	0.94
<i>Probably-definitely do not cause damage</i>	75	71.8%	-	-	-
<i>Probably-definitely cause damage</i>	6	5.8%	-	-	-
<i>Might or might not cause damage</i>	23	22.3%	-	-	-

Note: Respondents answers based on Likert scale (1=Very Ineffective...5=Very Effective); (1=definitely yes...5=Definitely not)

When asked whether goats cause damage to the environment 71.8% of respondents reported that they either probably or definitely did not cause damage to the environment. However, 22.3% of respondents were uncertain (Table 3.15).

For those respondents who answered, ‘probably yes’ or definitely yes’ to goats causing damage to the environment, many of their written responses reflected the risks or drawbacks for owning or renting goats listed by respondents when asked about their concerns. Categorization of the ways in which people believe goats cause environmental damage are displayed in Table 3.12.

Table 3.16. Categorization of responses on how goats cause damage to the environment.

Theme	<i>n</i>	Category	<i>n</i>	Example
Overgrazing	11	Overeating	3	“eating more than overgrown vegetation”
		Eating native/desired plants	8	“damaging native plant species”
Pollution	8	Waste	3	Excrement
		Release of greenhouse gasses	1	“greenhouse gasses”
		Water pollution	2	“Water pollution from manure runoff”
		Erosion	2	“overgrazing, cause erosion”
Competition	1	Competition for food	1	“competing with other animals food”

Uncertainty (about damages)	6	Grazing	2	“might eat neighbors plants”
		Insufficient Knowledge	1	“Don’t know enough to say”
		Pollution	2	“I have no idea...may cause high levels of pollutants...”
		Uncertainty	1	“Not sure”

DISCUSSION AND IMPLICATIONS

Few studies have been done regarding the use of goats in schools and their impacts on educational outcomes (Koda et al., 2013; Koda et al., 2016); this research provides the first examination into the attitudes of parents and guardians toward the use of goats at schools as well as goats’ impacts on farm to school related courses and activities. This investigation is also the first to study the acceptability of goats used in communities within the United States, particularly for landscape management and prescribed grazing.

Based on the sample of parents and guardians within this study, we illustrate that attitudes toward goats used at the school for FTS educational programs are overwhelmingly positive. This study also suggests that our sample of community members is accepting of prescribed grazing activities done by goats within their broader community. Furthermore, the use of goats at school and during farm to school activities and programs were perceived by parents to have a positive and beneficial impact on their children and the school. Through this study, we were also able to gauge how parents gained awareness and knowledge about the farm to school programs offered and the animals present at the school, and how those courses, programs, and animals impact their children’s interest in related activities.

Child Involvement

The school studied offers its students various opportunities to engage in activities, courses, or programs related to the theme of farm to school. In part due to the many opportunities the children have to learn about or participate in farm to school activities at the school, we found a high rate of student participation in the offered farm to school related courses and activities. The importance of providing these programs and the multiple ways to be involved in them are instrumental in supporting fair and equal learning opportunities and experiences for all students. Having goats and other farm animals present at the school further enhanced those opportunities, especially allowing for novel learning experiences to students who are unfamiliar with animals or are not given opportunities to interact with animals otherwise.

Research has revealed that animals can have several benefits on the educational and personal development of children (Bjerke, Kaltenborn, & Ødegårdstuen, 2001; G. F. Melson & Melson, 2009; Prokop & Tunnicliffe, 2010; Rud & Beck, 2003; Shepard, 1997; Zasloff et al., 1999). However, studies have also shown that those experiences are often limited to particular socio-economic/demographic groups. Schools using animals in their curriculum and programming are able to give students that might not have experiences with animals outside of school an opportunity to develop and explore their interests in animals. When comparing parent awareness and student involvement across racial/ethnic groups, Black/African American respondents reported being less aware of the animals' presence and their children having less experiences and exposure to farm to school activities both within and outside of school. Future research should further consider the awareness of FTS programs between different races and ethnicities. Our results showed that experience with outdoor coursework was a new experience for many more minority students than for white students. It should be noted that Black and

African American students are the largest racial/ethnic group (46.5%) of the students at the school. The use of goats at this school gives students from minority demographic backgrounds opportunities to engage with animals that children from majority ethnic backgrounds tend to already have. These new experiences for students and their interaction with animals at school will hopefully positively impact their attitude toward animals, farming, science and respect for the environment into the future (Bjerke et al., 2001).

Parent Awareness

Two-thirds of parents were aware of the presence of the farm animals at the school even if their child had not participated in courses or activities that would have exposed them to the animals. It appears that the presence of animals at the school interests students who do not participate in courses or activities that interact with the animals. Nearly all respondents who were aware of the presence of animals at the school knew that the school had goats. This indicates not only a high interest from most students attending the school, but also the popularity of the programs and activities that utilize goats. Goats especially play an important role for the school in bringing awareness to its learning opportunities and farm to school initiatives.

Parent Knowledge

Parents reported learning relatively very little new knowledge about the animals, FTS-related activities, or other topics since their child's enrollment in the school. However, results showed that parents who reported learning something (to the degree of a little or a lot) about these categories, were also more likely to have a child who participated in one of the related FTS courses or programs. This finding proposes that children not only discuss with their parents the activities they are involved in and bring awareness to the parents about these activities, animals, or other topics but also that children can play a role in informing or transferring more specific

knowledge to their parents about what they learn in school or during FTS-related courses and activities. Some studies may suggest this assumption be taken lightly. For example, a study done on the transfer of environmental information and ideology concluded that although children passed on information to their parents, the transfer was often unreliable, and the information exchanged was generally vague (Southerland & Ham, 1992).

There may be certain factors that contributed to the quality of the information transferred from child to parent, among them are the materials used to help facilitate learning. Unlike studies that looked at the use of educational materials in aiding in the transfer of knowledge such as worksheets, coloring books, and homework assignments (Vaughan, Gack, Solorazano, & Ray, 2003), this study did not consider if or how supplemental tools were used in the learning process of the school's courses and farm to school programs. Instead, it examined if knowledge transfer occurred specifically through verbal communication from child to parent. Because we did not investigate other ways information may have been shared and what specific knowledge was shared about the animals and related topics, we cannot determine the depth or quality of the knowledge transferred from child to parent. Although parents indicated gaining knowledge regarding the different animals or FTS activities at the school, we caution the actual extent of the new knowledge learned from their children, which overall, was fairly little with the exception of roosters and other farm animals (Sutherland & Ham, 1992).

Despite that the actual knowledge that may have been transferred from child to the parent may have been limited, there may be significance in the awareness that children bring to their parents rather than knowledge about the presence and use of goats at the school that extends beyond either the recorded attitudes of the child or the parent. Research on the effect of environmental education on schoolchildren, their parents, and community members found results

that suggest that information was disseminated from classroom to community (Vaughan et al., 2003). Understanding the impacts of shared information hints that the knowledge gained from children's experiences with the goats and the lessons taught about the animal may not be limited to their conversations with their parents. Once parents are relayed new information or stories from their child about the animal, there is the possibility of guardians transferring that knowledge further: to friends, colleagues, and community groups. This web of knowledge transfer can impact the attitudes of community members not associated with the school and even influence their acceptance of using goats in other areas of the community (i.e. landscaping by goat for hire businesses).

With regards to parents' learning something new about the animals, FTS-related activities, or other school-related topics, many of these categories had a significant relationship to whether their child participated in the school's FTS-related courses and activities. This finding suggests that parents are more likely to feel they gained knowledge about the school's animals, FTS-related activities, or other school-related topics if their child has been involved in the school's FTS-related courses or programs. It appears a child's exposure to the animals leads to parents also learning about those animals, as all results for learning something about the animals present at the school and the children's status of participation in FTS-related courses or activities were significant. Furthermore, our results showed that a child's participation in FTS activities or FTS-related courses is significantly related to parent's gained knowledge about environmental issues. This finding suggests that children are learning about environmental issues throughout these FTS-related courses and program. Literature has previously gauged how students view environmental issues and concluded that environmental problems that appear to be more global or farther away are determined by children to be more severe than environmental issues that are

local (Bonnett and Williams, 1998; Mori, 1993; Uzzell et al., 1995). Farm to school programs and courses related to farm to school may present an opportunity for both school faculty and parents to help children bridge the relationship between global and local environmental issues.

Child's Interest in Animals & Farm to School Related Activities

To determine which animals and FTS program activities children were the most interested in, parents indicated which of these topics they heard about from their child and parents' rankings of the animals and FTS activities based on their child's interest or enthusiasm. Our results showed that respondents' children talked most frequently about the goats as well as initiated conversations about them more than other prompts, affirming what appears to be general interest in goats. The animals and FTS activities that parents' children most commonly talked to them about aligned to parents' rankings of what they thought their child was most interested or enthusiastic about. Parents ranked goats the highest followed by gardening. Chickens were also highly ranked, but lower than goats—a result reflective of a study that found more students would be willing to cause irrevocable harm to chickens than to goats when asked which animals they would be willing to cause irreversible harm to for a biological experiment (Tamir, 1980).

Animals used in the classroom have been perceived to advance curriculum and encourage student involvement (Arcken, 1989; Huddart & Naherniak, 1995; McIntyre, 1981; Nickelson & Slesnick, 1973). Parents whose child had taken the Agricultural Science or Family and Consumer Science (FACS) course were asked to indicate if their child showed increased interest in farming, gardening, or animal care activities outside of what is offered at the school. A slight majority said their child had shown interest in similar activities outside of school, suggesting that courses employing hands-on activities and animals can engage children beyond school activities

and prompt them to explore similar areas or topics outside of the classroom and expand children's experience and knowledge within those activities and topics. Involvement with animals has shown to be positively associated with non-school activities and being involved in organized group activities (Melson, 1988). Parents in our study reported that after their child's participation in Agricultural Science and or FACS courses, students volunteered for animal shelters, at zoos, and one respondent mentioned their child being interested in bee keeping. Additionally, this research also indicates that involvement with animals is potentially related to involvement in school activities. Parents reported their children becoming increasingly interested in courses offered at the school, school clubs and programs, and more specifically, spending more time with the goats at the school.

Bjerk et al. (2001) looked at the effects of pet ownership on children and generalized that ownership of a pet could influence owners' attitudes, interest, and inclination to participate in animal-related activities. Although our study does not specifically investigate pet ownership as an influence on children's attitudes, interests, and activity choices, we propose that student's interactions with the goats and other animals at the school may potentially influence their attitudes, interests, and participation choices as they grow older. These influences are significant to the development of student, parent, and community attitudes toward animals, nature, and broader environmental issues.

Parents' Attitudes toward Animals at the School

Our study finds that parents have an overwhelmingly positive attitude toward the presence and use of goats at the school. These attitudes do not differ across a respondent's race or educational background, which suggests that parents at other schools may be willing to support the implementation of having goats as an educational tool. This recommendation comes

with some guidance from Koda et al.'s (2016) study that highlighted the challenges teachers and other school personnel faced when taking care of the goats at their schools. The teachers and other school personnel recommended that schools should have a plan for detailing the responsibilities before acquiring goats. Among the challenges of keeping goats at their elementary schools were taking care of goats over holidays, caring for goats during poor weather conditions, seeking medical care for the animals, potential harm or injury to the children caring for the goats, unfamiliarity or insufficient knowledge about treatment and care for goats, and potential student fear of the animals (Koda et al., 2016).

Despite certain challenges of keeping goats, teachers and other adult caregivers of the goats at the Japanese elementary schools recognized the many educational and personal benefits of having goats at school, a list this study can affirm and add to. Across all variables that parents were asked about with regards to the influences goats had in either a negative or positive way, a majority (>77% for all variables) of participants responded that the presence of goats at the school was a positive influence. Parents and guardians thought goats were a positive influence on their children's interest or enthusiasm for school, increasing their child's time spent outdoors, teaching them responsibility through animal care, increasing a child's interest in gardening, farming, animal care, increasing their awareness of environmental problems, and generally an overall positive contribution to the school. Adding to the number of advantages of keeping goats at schools are their promising benefits to the development of farm to school programs or related courses and adding to the overall educational and aesthetic experience of a school. Literature on the use of animals in classrooms further points to the potential benefits of keeping goats at schools such as the benefits they can have on science education (Koda et al., 2013; Zasloff,

1999), teaching humane attitudes and values, motivating students with behavioral or learning difficulties, and improving student performance while also reducing their stress (Zasloff, 1999).

When we asked parents if they were concerned about the use or presence of goats their responses reflected their overall positive attitude and acceptance of the animal at the school. All respondents short of three indicated having no concern. Even for three respondents who listed concerns, they were based on the authorization of having them at the school, uncertainty, and only one reflected any potential drawback for their child (potential exposure to disease or illness).

Acceptability of Goats in the Community

Parents generally accepted the presence, ownership, and rental of goats within the community. However, acceptance in the community appeared to be less favorable than their use at school. In respondent's rankings of the acceptability of people owning or renting goats on different types of land (i.e., residential, public, private, etc.), they revealed they were most accepting of people owning goats on private, non-residential property. This suggests that parents and perhaps other community members are more accepting of goats at zoos and farms. These places provide educational opportunities and may be why parents appear to be highly accepting of goats' presence at school. Regardless of goats' presence in certain types of locations throughout the community, respondents were overall accepting of goats' presence in the community.

Respondents also reported businesses renting out goats for landscaping as an acceptable practice. Of places where respondents felt it was acceptable to have rented goats, most respondents showed a greater acceptance for people having rented goats on private, non-residential property, although acceptance was high overall. When asked to report on the potential

benefits of renting/owning goats regulating services such as vegetation control, reduction in pollution due to less frequent use of chemicals, and removal of invasive plant species. A number of cultural services provided by the goats were listed, which included goats being a source of enjoyment for both the respondent and their child, providing a connection to nature, and serving an educational purpose. Interestingly, more respondents frequently listed goats as being an enjoyment for their children than being an educational tool. Though parents reported goats as beneficial to their child's school and being an effective educational tool, there seems to be a detachment between their values at schools versus in the community. In order to bridge these connections, businesses that rent out goats could work alongside schools to educate community members about the educational aspects of utilizing goats. In return, goat-for-hire businesses may serve to care for the animals when schools find it challenging to care for them.

Respondents also were asked to list any potential risks or drawbacks of owning or renting goats. The most commonly reported disadvantages were the responsibilities of taking care of the animals, followed by their demeanor, and lastly the potential environmental harm goats can cause. Parents voiced more uncertainty about the risks that are associated with owning or renting goats than uncertainties about their benefits.

Although our results indicated that few residents had considered renting goats while living in the community, respondents that had considered the idea were more likely to be White and earn between \$50,000-\$99,000. On the other hand, families with lower incomes were considerably less likely to consider owning or renting goats. These findings may suggest that wealthier, White families may be more willing to consider keeping animals and perhaps larger species than families earning lower incomes may lead to children in lower income families having fewer opportunities to engage with animals. Previous literature points out these gaps

between socio-economic groups and their children's opportunities and experiences with animals or other outdoor-related activities. This positions schools to earnestly reflect on the importance and significance of providing animal or outdoor related experiences for students, especially for those students whose families are not likely to have the means to pursue or encourage their children to participate in non-school related opportunities to interact with animals and/or the outdoors.

Children, Parents, Community, and Goats

Although this study did not measure the relationship goats have on strengthening ties between the school, parents, and the community, goats may be influential in creating stronger bonds between each of these entities in turn (Koda et al., 2013; Koda et al., 2016). Our study directs schools toward the several opportunities goats can provide to connect students, schools, parents, and communities together through farm to school related courses and programs. Goats utilized in these programs can enhance the educational and personal development of middle school students, while also bringing schools, parents, and communities together.

Parent Involvement through Goats at School

Parents often have difficulty maintaining involvement in their child's schooling, especially during their middle school years due to the complexities of the increased number of instructors, course tracking, and diverse curriculum choice (Hill & Tyson, 2009). However, during these years of a child's schooling, it is particularly important for parents to stay engaged in their child's education because of the significant transitions they are making in their academic and developmental states (Hill & Tyson, 2009). There have been indications that during this stage in a child's academic career, students often show declines in their academic performance (Hill & Tyson, 2009). As children enter into middle school, they take on learning differently, and

parent involvement in their education should change as well (Hill & Tyson, 2009). Academic socialization is one suggested method of continuing parent involvement in schooling. Academic socialization provide links between schoolwork and current events or occupations (Hill & Tyson, 2009).

Animals used in secondary school, and specifically goats, can be used to facilitate academic socialization and serve to better maintain and reintegrate parent involvement into their child's schooling. The presence of animals and their use in curriculum can support student interest in a number of subjects while also promoting their academic performance. Furthermore, retaining parents' integration and support of their child's education and school have been shown to maximize students' potential and close demographic gaps in achievement (Dearing, Kreider, Simpkins, & Weiss, 2006; Hampton, Mumford, & Bond, 1998; Hara, 1998). Allowing and encouraging parents to become involved in the outdoor coursework and other animal-related activities can be a solution to maintaining parents' involvement, awareness, and assistance in increasing their comfort with the material being taught in middle school (Dauber & Epstein, 1993; Hill & Tyson, 2009). Farm to school programs present a unique platform for these links to occur, and the integration of goats and other farm animals into these programs offer opportunities for parents to enter into the different and changing roles of educational involvement.

LIMITATIONS

Results across respondents showed modest heterogeneity which may be a factor of the sample itself. The sociodemographic characteristics of our sample were biased toward white, middle income categories, and did not represent the distribution of demographics at the school. Furthermore, bias may exist within the sample of parents who took the survey after reading the

principal's weekly newsletter and those responses gathered from school functions; respondents who participated in the questionnaire may generally be more involved, engaged, or interested in the topic presented.

Results regarding children's interests and attitudes toward the farm to school animals and programs may not be fully accurate regarding the students' actual interests and attitudes since parents reported from their own perceptions of their child's interests and attitudes. It is not evident how much access parents and guardians have to observe the range of behaviors that might indicate their children's interests and attitudes towards these topics and even parents with more available access to observe these behaviors, we cannot determine how well they are represented (Evans et al., 2007). In future investigations, with permission attained, researchers should have parents and their children take comparable surveys of their attitudes toward animal or goat utilization at school to better control for parent's bias toward their child's interests and attitudes.

We also cannot say with certainty that respondents are truly aware of their child's school involvement unless we had indicators to identify parent and child matches to compare their actual enrollment and participation in the courses and programs we were interested in. In order to mitigate assumptions that parents are aware of what their child is involved in at school, future investigations should survey or interview students to determine the courses and activities they have been involved in throughout their attendance to the middle school.

Results regarding transfer of knowledge are also limited in their assumptions of broad application. Because we did not provide a measure to determine the level of knowledge parents had on the topics and animals before a respondent's child had participated in the relevant courses and activities, the degree to which parents gained knowledge or more specifically knowledge that

was learned from their child at school cannot be determined from this study. The administration of pretests and posttests is recommended to better quantify knowledge acquired from children by parents before and after a child's participation in these types of courses or farm to school related activities. Two further limitations of determining the transfer of knowledge between children and parents in this study are 1) the respondent's own bias on self-reporting if they have gained any new knowledge and 2) the actual association between what parents perceived they have learned and their child's involvement in FTS-related courses and activities. Due to these limiting factors, we suggest future studies should determine if the influence of parents' perceived knowledge acquisition influences their awareness of their child's educational involvement and the school's educational tools and programs.

CONCLUSION

Until recently, few studies have tried to identify the social and ecological benefits of using goats in schools and communities. This study expands on the limited understanding of the impacts goats have in educational and community settings, and also appears to align to Koda et al.'s (2013; 2016) findings regarding goats impacts on enhancing children's personal development. This study also continues Koda et al.'s (2016) examination of the educational opportunities goats present for schools, especially for FTS programs, as exemplified in this study. Among the benefits goats have on students, results determined that parents perceived goats as a positive influence on their child's interest in school, time spent outdoors, and teaching their child about responsibility through animal care. Goats also appeared to increase children's interest in farm to school related activities such as gardening, farming, and animal care. Additionally, parents thought that goats positively influenced their child's awareness of environmental problems, and ultimately, were an overall positive contribution to the school.

Previous studies have revealed many benefits of using animals in schools. Among the benefits have been animals ability to increase student interest in science, (Zasloff et al., 1999) while others have suggested that specifically goats can promote science education (Koda et al., 2013). We accept those findings and add that goats also promote farm to school related courses and programs. As revealed through this study, the integration of goats into farm to school programs can offer students a better understanding of farming and human-animal relationships. Stevens (1990) found that children living in urban areas with pets were more attached to their animals than rural children. Although parents' attitudes toward goats and their acceptability of them throughout their community may be unique to the studied school and community, it serves as an example in which schools located in urban areas, like the one in this study, can provide children with opportunities to interact and bond with animals and their environment in a setting where those relationships are not always readily available.

CHAPTER 4

GOAT-ASSISTED RESTORATION: PARTICIPANT VALUES AND OUTCOMES

ABSTRACT

Restoration practitioners and ecologists have studied the social dimensions of ecological restoration projects often by determining stakeholder's values and motivations. However, the value identification of participants involved in ecological restoration have yet to be studied for projects that utilize prescribed grazing and more specifically goat-assisted restoration. In this research, we present two case studies of volunteer driven goat-assisted restoration projects and determine 1) what values motivate participants involvement in goat-assisted restoration, 2) what changes occur to participants' values after involvement, and 3) what outcomes do participants perceive to occur from goat-assisted restoration projects through semi-structured interviews and retrospective pre-post survey evaluations. Analyses of values from interviews and surveys responses were done based on a four-quadrant values model for ecological restoration; although additions to value categorizations were made based on the researcher's interpretation of the model and emergent themes from the data. Value determination, changes, and perceived outcome results suggest participants may not be motivated by the use of livestock within these projects. Process examination of the model used to categorize values also suggests the need to develop a more comprehensive model to categorize and assess restoration participants' values and motivations.

INTRODUCTION

Green spaces within urban areas are valued by the individuals and communities that surround them (Ryan & Grese, 2005). Communities are even realizing the importance of natural spaces in conditions that are not preferable to human use such as natural spaces that have been overgrown by vegetation. In some instances, these spaces are then sought to be made more accessible for people's use and enjoyment or to be restored to a perceived ideal ecologically functioning state—a common goal for many ecological restoration projects which try to reestablish function and structure to ecosystems (Bainbridge, 2012). One practice that has been used to assist in the restoration of these land areas is prescribed-grazing.

Farmers and land managers have long used livestock grazing as a vegetation management tool (Launchbaugh & Walker, 2006). Today, grazing has also been applied to contemporary vegetation management challenges such as helping to clear natural spaces overrun by invasive plant species, mitigating the risk of fires within wildland-urban areas, and avoiding the use of harsh chemicals or heavy machinery in organic agriculture or near water ways (Launchbaugh & Walker, 2006). Livestock grazing is becoming more widely adopted to address these challenges, and its growing use by restoration practitioners, government officials, and community organizations has further contributed to its popularity. As groups harness the ability of livestock to fulfill landscape management or ecological restoration goals, determining the challenges of these practices and their potential social benefits will create a better understanding of the effectiveness of using prescribed-grazing and its impacts on those participating.

Throughout the state of Georgia and the U.S., goats and sheep have become increasingly popular in their use to clear and restore areas overrun by invasive flora. Frequently, goats have been used in urban areas to help restore land or manage overgrown vegetation in public parks,

green spaces, and airports. In several of these instances, the use of goats has brought about public interest, media coverage, and the potential for community engagement. While some research has been conducted on the ecological and best management practices for prescribed grazing, few have examined the social implications of using goats within restoration projects.

Social and Value Considerations in Ecological Restoration

Values play an important role in the decisions and actions people make to better themselves, community, or environment. Our values develop based on the experiences we incur throughout our lives (Ardoin, 2013). For example, research shows that early exposure and familiarity with nature provides a foundation for future environmental stewards (Chawla, 2009; Melson, 2005). Engaging in restoration projects is one way in which individuals and communities might practice environmental stewardship as well as exhibit their ecological values and other ideals.

Values relate to “people’s judgements of what is important and reflect what people care about” (Keeney & Raiffa, 1993 cited in Guerrero et al. 2017). The ethics and values surrounding ecological restoration practices have long been debated among restoration ecologists. These debates about ethics in ecological restoration provide guidelines on how to develop restoration goals and the set of values that they should reflect, including the ethical and philosophical principles restoration practitioners actions are based on, the goals of the project, and determining people’s placement within nature in relation to its functions (Hobbs et al., 2004). Furthermore, these deliberations highlight the ongoing challenges faced within the field to constructively integrate social dimensions into restoration theory and practice (Anderson & Havlick, 2013).

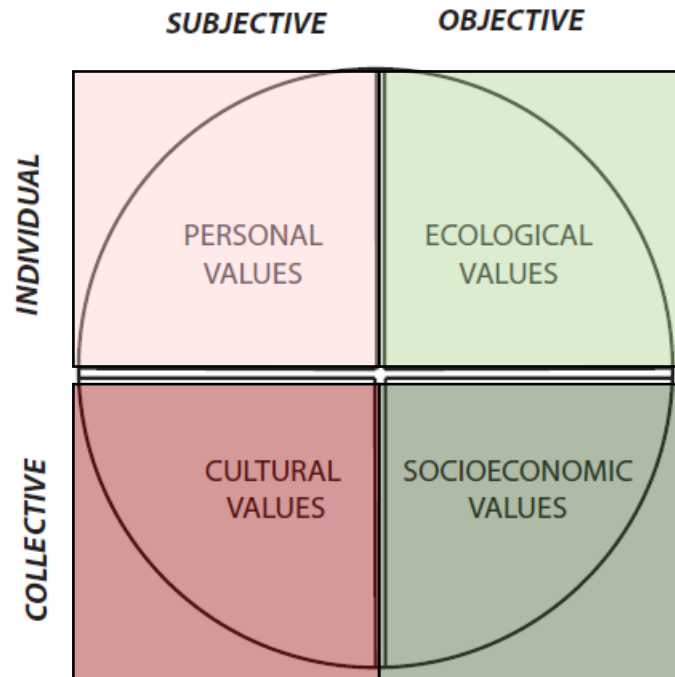
One way in which restoration ecologists or practitioners consider the social dimensions of their projects such as stakeholder interests or participant commitment is by determining and

evaluating the motivations and values of organizers, volunteers, and the communities in which restoration occurs. Researchers have previously explored the benefits, values, and motivations of volunteers and stakeholders involved in ecological restoration (Hagger et al., 2017; Metcalf, Mohr, Yung, Metcalf, & Craig, 2015; Miles, Sullivan, & Kuo, 1998; Ryan, Kaplan, & Grese, 2001). Miles, Sullivan, and Kuo (1998) examined how volunteers benefited from their participation in ecological restoration and determined that restoration satisfaction was connected to participant involvement. Volunteers who participated less reported lower levels of satisfaction in categories such as personal growth, physical work, and fascination with nature, as opposed to frequent participants who reported high levels of satisfaction (Miles et al., 1998). In a more recent study, the evaluation of stakeholder motivations for participating in the restoration of native vegetation across Australia revealed that motivations were diverse across regions and varied by stakeholder (Hagger et al., 2017). Motivations of those involved in the projects varied from ecosystem service provisions to political reasons (Hagger et al., 2017). While describing the development of a community-based tool that would evaluate expert objectives to restore an estuary with community members' expressed values and concerns, researchers focused on stakeholder values related to environmental policies and trade-offs between environmental, economic, health, and social effects that would result from the actions proposed by technical experts (Gregory & Wellman, 2001).

Over the years, the identification and examination of values and motivations have helped restoration ecologists and practitioners improve the development of not only the environmental objectives and goals of ecological restoration but the social dimensions of their projects as well. Understanding values and examining experiences might also be used to increase restoration participant engagement and acceptance—their values may affect their motivations, and in turn

their experiences may shape their values (Ardoin, 2013). Examination of ecological restoration participants' experiences could also inform land managers, restoration practitioners, or ecologists on whether individuals' experiences in their projects leads to the development or realization of values not previously considered by the participants. This knowledge could then serve to be a measure of the social impact ecological restoration has on its participants.

To better understand what motivating values are typically considered in ecological restoration, Clewell and Aronson (2013, p. 16) adapted philosopher Ken Wilber's (2001) four-quadrant schematic diagram as a framework to categorize and define ecological restoration values from multiple perspectives in a holistic manner by recognizing the objective or subjective and individual or collective characteristics, and to identify the motivations of people who seek to participate in restoration activities or engage in restoration efforts professionally (Figure 4.1). The model considers values on the basis of their subjectivity or objectivity determined by whether they can be measured and analyzed empirically. Values are also divided by their focus on individual or collective goals. Within their four-quadrant model for ecological restoration they identify four categories of values: personal, ecological, cultural, and socioeconomic.



**Colors are used to represent values throughout analysis.*

Figure 4.1 Clewell and Aronson (2013) four-quadrant model of motivations for ecological restoration.

Clewell and Aronson (2013) define personal restoration values as those motivations that are represented by people’s emotional reactions to ecological impairment, and which allow us to contribute directly or indirectly to restoration goals. These contributions may provide people with the satisfaction of contributing to solving a problem that concerns all of us. One example that Clewell and Aronson provide to describe personal values that might motivate someone to participate in ecological restoration, is a person who thinks there is an environmental crisis and feels personal responsibility for it, so they decide to do something about it. Ecological motivations are based on objective concerns that pertain to the values we give to intact and healthy ecosystems, landscapes and the biosphere and are focused on ecological impairment and recovery. These values might provoke someone to attempt to recover an ecosystem’s impaired

biophysical conditions. Clewell and Aronson address socioeconomic values as collective values based on the ecosystem services or goods (the natural goods and services provided by ecosystems free of cost to humans) which are inhibited or lost due to ecosystem impairment. These values may be realized by people who rely on natural areas for ecotourism. Finally, the lower left quadrant of Clewell and Aronson's model represents the collective cultural values which have been impinged on by ecosystem neglect, disturbance, or degradation. Cultural values can move people to restore ecosystems because of their iconic or cultural importance or their contribution to knowledge and education.

By identifying the values that motivate people to participate in ecological restoration, project managers can work to address the range of human needs that would help facilitate support for these projects (Geist & Galatowitsch, 1999). However, value identification of participants involved in ecological restoration have yet to be studied for projects that utilize prescribed grazing and more specifically goat-assisted restoration. As city officials, community leaders, and restoration practitioners continue to utilize or consider the use of goats for landscape management, it may be strategic to be aware of the values of those people who devote their time and energy to these projects. In addition to values, determining what participants perceive as the beneficial or negative outcomes of goat-assisted restoration projects can aid in better understanding the effectiveness of using prescribed-grazing as a landscape management or restoration tool. Incorporating participants' values into project goals may effectively harness the contributions of volunteers and organizers, prepare for potential project challenges, and serve to better evaluate the outcomes of goat-assisted restoration especially, as volunteers continue to play a vital role in the success of many restoration projects (Grese, Kaplan, Ryan, & Buxton, 2000; Ryan et al., 2001).

Volunteers often play a crucial role in achieving the goals of restoration projects, and because of this it is important to recognize their values and motivations (Richardson, 2014). Consideration of the values that motivate participants can allow project managers to tailor objectives and goals that fit into participants' values. Furthermore, understanding how participants' values may change from the experiences gained from participating in restoration projects may be predictors for the social outcomes of the projects they are involved in. Using two case studies of goat-assisted restoration projects taking place within urban settings, we used interviews and surveys to determine (1) what are the motivating values of volunteers and organizers involved in goat-assisted restoration projects; (2) how does the importance of people's values change or shift after being involved in a goat-assisted restoration project; and (3) what are participants perceived outcomes of using goats in restoration projects.

STUDY DESIGN

Case Identification

We used prior awareness of ecological restoration projects utilizing goats and Google News Search to identify relevant and recent goat-assisted restoration projects. For the confidentiality of participants, we have used pseudonyms for the names of the restoration projects and organizations as well as for the names of informants who we interviewed. We identified two projects that met the needed criterion of being within 1.5 hours driving time of the University of Georgia and having histories and records of volunteer participation. One project, organized by the University of Georgia's Hands and Hooves, was positioned within a semi-urban university campus. The other project, organized by the Oakland Forest Park Community Advocacy Group, Atlanta, was situated within a community located on the perimeter of a

sprawling city. The volunteers and community members in each case had a significant hand in the implementation and success of these goat-assisted restoration projects.

Case Descriptions

University of Georgia Hands and Hooves Restoration Group, Athens, GA

In the Fall of 2010, a graduate student developed a conceptual green infrastructure plan proposing alternative uses of neglected and degraded green spaces on the university's campus. Although this plan was not formally adopted by the university, parts of the plan have been incrementally integrated into campus projects by university planners and architects (Richardson, 2014). It has also inspired senior undergraduate projects. One of these led to an analysis of the history and ecology of the Grove Creek watershed, which includes a large portion of the university's property (Richardson, 2014). As a result of an undergraduate's project findings, which discovered that the creek was contaminated with fecal coliform and *E. coli*, university students and faculty realized the need to restore the local watershed (Unified Government of Athens-Clarke County 2011; Richardson, 2014). The detection of these contaminants prompted discussions that later led to the use of prescribed grazing on the university's portion of the stream (Richardson, 2014).

Initiated as a pilot study in the spring of 2012, the UGA Hands and Hooves (originally called the Grove Creek Hands and Hooves) was started by faculty, staff, and students at the University of Georgia to restore the University's portion of Grove Creek. The aim of the study was to provide insight on the use of prescribed-grazing in urban natural-areas, to explain the roles that domesticated animals can play in restoring urban green spaces, and to engage community and public interest (Richardson, 2014). The project was not the first to use prescribed grazing on the institution's campus. University architects and physical plant staff previously

used prescribed grazing with sheep to clear invasive woody species from a floodplain along a stream located on the campus (Richardson, 2014).

Over the years, the Hands and Hooves program expanded to include restoring a small area of old-growth piedmont forest also located on the campus known as Shady Creek Woods. The program has been maintained through student organizations and is now primarily run by one faculty member and an Office of Sustainability intern. Volunteers are recruited via social media, an email listserv comprised of interested or previously involved volunteers, student organizations looking to fulfill community service hours, and by instructors whose courses offer participation in the project as an opportunity to earn extra credit. Participants engage in activities that include species identification and removal, seed collections, and the preparation of the restoration sites, such as establishing fences, for the arrival of goats. These opportunities are provided in accordance to seasonal changes or when the organizer determines their necessity. Typically, multiple opportunities are offered each month for volunteers to participate in the Hands and Hooves restoration projects, while summer opportunities tend to be fewer. Goats are rented from a local goats-for-hire business and have been used periodically throughout the course of the restoration projects, typically spending a few weeks during the spring and fall. They have been reported to stimulate community interest, student engagement, and provide ecological benefits (Richardson, 2014).

Oakland Forest Park Community, Dekalb County, GA

In 2014, a group of community members in Dekalb County banded together after learning of discussions between a private contractor and Dekalb county officials to develop the largest remaining natural space inside a major interstate highway loop, encircling the city of Atlanta (Ellis & Flowers, 2017). Ten community members formed the Oakland Forest Alliance

to educate the surrounding community, speak at public hearings, and engage an attorney to further defend saving the public greenspace from development. After civil engagement with county officials and the creation of a memorandum that presented reasons against the development of over forty housing units, which included evidence citing the ecological damages and losses that would take place if developed, the county voted against the development and the developers ceded. In the fall of 2015, the county bought the land as public green space, but did not have the funds to maintain the area. As a result, community members formed the Friends of the Oakland Forest Park Community (OFPC) organization, formed in part out of and in addition to the Oakland Forest Park Alliance, to restore the forest and maintain the land for public use. Land use and restoration goals were developed by the board members of the OFPC.

As part of the restoration efforts, sheep were first used to clear out heavy patches of invasive plant species. The following year after sheep were used, goats were employed to continue clearing out dense areas of invasive vegetation. The park continues to be maintained by volunteers on the board of OFPC and other community members and volunteer groups. Volunteers are recruited word-of-mouth, through their organization's website, and at community-wide events held at the park. OFPC holds monthly workdays typically engaging thirty to sixty community members comprised of long-term participants, volunteers associated with other outreach groups in the community, and student groups such as co-ed scout troops.

Informants

Participants from the Hands and Hooves project included undergraduate and graduate student volunteers, student interns, faculty volunteers, and a faculty organizer. Participants from the OFPC project included community volunteers, volunteers from non-community related organizations, and organizers serving on the OFPC board. Because participants within both

projects vary in experience and frequency of participation in the restoration projects, we categorized informants based on the frequency of their involvement and whether participants were present while goats were used at the project sites (Table 4.1). Specifically, for volunteers within the UGA Hands and Hooves restoration project, we have sorted volunteers into two distinct groups: Hands and Hooves long-term volunteers, who were a mix of community members, former students, and university faculty, had ongoing participation in the project, and had volunteered when goats were on site; and short-term volunteers who were current UGA students, had brief participation and were not present during goat-use at the sites.

Since proximity to participants and time were limiting factors of this study, we used convenience sampling at both project sites during project workdays to recruit participants. Convenience sampling is a type of nonrandom sampling that allows researchers to recruit members of the target population usually based on easy accessibility, location proximity, availability at a given time, or willingness to participate (Etikan et al., 2016). Snowball sampling (also known as chain referral sampling) was also used to identify previous volunteers of the Hands and Hooves project and organizers of the OFPC project. Snowball sampling allows researchers to access concealed or hard to reach populations through informants who provide the name of another potential study participant (Atkinson & Flint, 2001). Former UGA Hands and Hooves long-term participants were recruited through the UGA Hands and Hooves email listserv or by individual email. Organizers were recruited by e-mail and interviews were conducted either in person or over phone. Volunteer interviews were conducted on site during project work days or were scheduled via email and done in person or over phone. A total of 29 respondents volunteered for this study, 15 from the UGA Hands and Hooves projects and 14 from OFPC restoration project. A summary of the informants' data including their role in the project,

whether their experience with the project included goats, and whether they previously volunteered for the project, can be found in Table 4.1.

Table 4.1. Summary of participant data.

Participant Role, Experience and Involvement	<i>Participant Group and Project Case</i>		
	Hands and Hooves Volunteers	Student Volunteers	Oakland Forest Park Community Participants
ROLE			
<i>Organizers</i>	1	-	4
<i>Volunteers</i>	8	6	10
Total Participants	9	6	14
GOAT EXPERIENCE			
<i>Experienced Goats</i>	7	0	12
INVOLVEMENT			
<i>Volunteered Previously</i>	9	2	13

Data Collection

We used open-ended and semi-structured interviews and surveys to assess the values of the organizers and volunteers participating in goat-assisted restoration projects, evaluate changes to their motivating values as a result of their participation, and identify participants' perceived outcomes of the two cases utilizing goats in their restoration projects.

The surveys and interview questions for participants and organizers and the protocols for their administration were reviewed and determined as exempt from human research by the Institutional Review Board of the Office of Research at the University of Georgia.

Semi-structured Interviews

We used qualitative analyses to study and analyze our research questions. Qualitative interviews provide insight into the meanings informants make from their experiences and attempts to understand participants from their own words (Brenner, 2006). The development of a semi-structured interview protocol allowed questions to be consistent among informants and

flexible for interviews to adapt according to a participant's level of involvement in the projects. A funnel approach was used in the protocol, first asking general questions about the informant's involvement in the project to more specific questions about their experience (Brenner, 2006; Spradley, 2016; Werner & Schoepfle, 1987). The interview protocol had three sections: questions about involvement to infer initial values (Section A), questions about informants' experiences and changing views to infer potential developments in values (Section B), and the final section asked questions regarding participants' perceived outcomes of the projects (Section C) (provided in Appendix C).

Each participant was interviewed once individually either face-to-face or by phone, depending on the availability of the participant. Interview length varied from five to 45 minutes. Interview lengths were highly variable due to the diverse levels of participant engagement and the length of time a participant had contributed to the efforts. Interviews took place on site during project workdays or at locations convenient to the participant. Each interview was audio recorded, and detailed notes were taken throughout the interviews. All audio recordings were transcribed, excluding conversation pauses, overlaps, and intonation (Mishler, 1986; Poland, 2003).

Surveys

Surveys were also given to participants after their interviews. Surveys asked participants to rank five statements relating to motivating values: one relating to goats and the others each relating to one of Clewell and Aronson's ecological restoration values, as presented in their four-quadrant model. For the ranking exercise on the survey, participants had to place statements along a line indicating the level of importance of each statement to the respondent (Appendix C).

These responses, dependent on statement indicator placements, were ranked comparable to Likert scale questions.

Data Analysis

Interviews were analyzed to help answer each research question, while survey analysis was only used to inform how participant values shifted or developed since their experience in the restoration project (research question 2). In order to analyze interview data, a content analysis approach was used. Content analysis is done by searching for recurring words or themes from the collected data text (Patton, 1990). This approach was used to understand the “manifest and latent meaning of the response within the respondent’s frame of reference” in order to determine respondents’ values (Mostyn, 1985, p.118). Key concepts were identified and coded according to a modified Clewell and Aronson ecological restoration values model framework. Our own interpretation of the model led us to consider categorizing values based on the four quadrants provided in Clewell and Aronson’s model, with the view that the subjective and objective descriptions on the model are characteristics of those values that fall beneath them. In other words, personal and cultural values are considered subjective and ecological and socioeconomic values are objective. Further explanation of model interpretations is discussed within the Limitations section of this chapter. Furthermore, to identify more specific motivations and changes within values, we have divided each major value category (personal, ecological, cultural/community, and socioeconomic) into subcategories dependent on emergent and commonly stated reasons for participating in these projects.

A retrospective pre-post-test evaluation was also done to compare participants’ statements given to questions regarding their motivations (survey Section A) in comparison to their responses reflecting on their most important experiences (survey Section B). This

evaluation was also used to analyze data gathered from the surveys, which asked respondents to rank value statements based on the statement’s importance to the participants’ experience both in reflection to their experience and in regard to how they would have ranked them prior to their experience in the project (Appendix C). Retrospective pre-post-tests have the advantage of being administered only once and provides respondents with a reference point of their behavior or attitudes, which allows them to reflect more accurately on the degree of change in their views or attitudes (Davis, 2002; Rockwell & Kohn, 1989).

To identify and organize codes, a coding scheme was developed with the following types of codes: attribute codes, value codes, structural codes, and descriptive codes (Saldaña, 2015). Attribute codes were used to identify specific characteristics of participants such as informant’s role and length of involvement in their respective project. Value codes were determined a priori using Clewell and Aronson’s (2013) four-quadrant model of ecological restoration values (discussed above). However, additional expansions of their meaning were developed for each value (except for the description of socioeconomic values) in response to the data to include values not taken into account by Clewell and Aronson’s model, shown in Table 4.2.

Table 4.2. Four-quadrant ecological restoration model value definition/characteristic and meaning expansions.

<i>Value Code</i>	<i>Clewell & Aronson Value Definitions</i>	<i>Expanded meanings</i>
	<i>Participants motivated by...</i>	
<i>Personal</i>	Emotional reaction to ecological impairment	Individual benefits gained from participating in restoration that enhance one’s personal and or professional interests or goals, or overall wellbeing
<i>Cultural</i>	Cultural values that were impinged by ecosystem impairment	Social interactions people value while involved in restoration efforts
<i>Ecological</i>	Ecological features that people value as attributes of intact, healthy ecosystems and	

<i>Socioeconomic</i>	ecological landscapes; and to the biosphere, and its integrity or interconnectedness	Ethical responsibility to mend neglected and degraded natural spaces
	Ecosystem services that were curtailed or lost from ecosystem impairment	No modifications

Structural and descriptive codes were assigned to particular text segments to identify and categorize participants’ perceptions of outcomes (Research Question 3). As described by Saldaña (2009), structural codes are content based and relate to the research questions. Descriptive codes are words or short phrases that identify primary topics of a text or section of text (Saldaña, 2015). Descriptive codes were data-driven and were modified throughout sequential rounds of coding (Huckin, 2004).

Although not all participants’ experiences included goats, interview questions were asked to infer how goat-assistance as a factor of these projects influenced particular values or motivations of the participants. Analysis was conducted comparing three different populations from our sample: Hands and Hooves student volunteers (short-term volunteers), Hands and Hooves volunteers/organizer (on-going or persistent volunteers), and Oakland Forest Park Community participants (both short-term and persistent volunteers and organizers). For each restoration project, analysis of interviews was also grouped by responses from project organizers and responses by volunteers.

RESULTS

Research Question 1: What are the motivating values of volunteers and organizers involved in goat-assisted restoration projects?

When analyzing interview data, volunteer and organizers’ responses were categorized into one or more of four value groupings: personal, ecological, socioeconomic, or

Personal Values

Personal values for this study have been identified as the emotional reaction people have toward ecological impairment (Clewell & Aronson, 2013) and individual benefits gained to enhance one's personal and or professional interests or goals, or overall wellbeing. Volunteers and organizers across both cases most frequently reported their initial reasons for participating in goat-assisted restoration in alignment to personal values. Student volunteers' interview responses indicated only being motivated by personal values, of which have been placed into the subcategory, academic achievement or extra credit (values and subcategory code descriptions are provided in Table 4.3).

Most Hands and Hooves volunteers reported personal interests as motivating their participation. Monica, a Hands and Hooves intern for the university's Office of Sustainability, sought the opportunity because it was "the most fitting to what [she] was interested in." The other Hands and Hooves informants were motivated by personal values exemplified in their willingness to participate for skill and knowledge development, including professional experience. A graduate student volunteer stated that once he was aware that "they were working specifically on native plants, [he] wanted to know more about those" and wanted to learn more about the methods used in ecological restoration to identify and remove invasive plant species. For a former Hands and Hooves intern, he relayed that his involvement in the restoration projects was to get "a little bit of a hand" in receiving the Hands and Hooves intern position with the Office of Sustainability—a motivation we aligned to the subcategory of professional experience.

Several participants of the OFPC restoration project felt the need to prevent the development of the green space, providing the reason that they would prefer the natural space more than new housing. We have categorized these responses as being the personal value

subcategory, environmental crisis response. Clewell and Aronson (2013) highlight this as a subcategory of personal values. Termed by writer and journalist, Paddy Woodworth, he defines environmental crisis response as people's recognition of having to act to mend the human population's environmental challenges for future insurance of the world's wellbeing (Clewell & Aronson, 2013). For our study, we have made slight modifications to the definition of environmental crisis response subcategory value and provide a scaled down scope of the meaning so it relates to people's responses to particular events or challenges facing their local environments. Volunteers from the Oakland Forest Park Community also reported being motivated by personal enjoyment, physical activity, and reconnection to nature—a subcategory value that Clewell and Aronson (2013) identify as the reentry value, borrowed from Bill Jordan (1986), who has provided explanations for the ways in which people come into contact with nature. Exemplifying the reentry value is a long-time volunteer for the OFPC who, while recalling his childhood, stated that the Oakland Forest reminded him of the “hundred acres that [he] had to grow up in.”

The subcategories of personal values that were identified had little to no overlap between the two organizations. While participants involved in Hands and Hooves restoration efforts had personal values focused on educational and career experience and advancement, participants from the Oakland Forest Park Community Group had personal values that promoted their own well-being or need to provide protection of vulnerable spaces or assistance in community efforts which were related to the environmental crisis response personal value subcategory. Table 4.3 provides each value, their descriptions, and number of participants whose motivating reason for participation fell into the personal value category; examples are also given.

Table 4.3. Subcategory codes related to personal values.

Restoration Case	Personal Value Subcategories	Description	Example Quotes
Hands and Hooves Volunteers, Student Volunteers, and Organizer	Academic achievement	Taking opportunities to better grades	"extra credit"
	Faculty Responsibility	Academic advising responsibility as major professor for graduate student	"Well, I first started out as the advisor, faculty advisor of a student who proposed the grant. I guess that was beginnings and I continued to do that. "
	Interests	Interests related to major, career interests, or general	"I perused the internship availabilities and that project seemed the most fitting to what I was interested in."
	Skills & Knowledge Development	Involvement provides opportunity to learn about ecological restoration practices, gain skills, and knowledge about site, plant species (native and non-native), and site ecosystem	"...when I heard they were working specifically on native plants, I wanted to know more about those."
Both Cases	Professional experience/development	Involvement provides opportunity to develop professional skills: networking, resume enhancement, communication, leadership	" I also had heard about the Office of Sustainability internships, so I thought that volunteering would get me a little bit of a hand..."
Oakland Forest Park Community Volunteers and Organizers	Physical Health/Activity	Provides exercise	"And it's a good work out."
	Environmental Crisis Response	Realization of loss of environmentally significant areas due to threat by human actions and the need to combat those challenges	"Well, I would've hated to see this all clear-cut."
	Reentry	Nostalgia for interaction/experience with nature	"I grew up in Illinois playing in the woods and this reminds me of my hundred acres...that I had to grow up in. "
	Personal Enjoyment	Involvement provides joy or personal fulfillment	" My own enjoyment..."

Note: Some respondents gave answers that portrayed more than one code within the value category

Cultural/Community Values

Cultural/community values were represented by the social influences, expectations, and community bonds that are created or strengthened through involvement in restoration efforts.

Cultural/Community values were also represented by those who valued participating in community efforts or causes, sharing or protecting public spaces, and providing educational

opportunities from the process of restoration. Cultural/community values were the second most common drivers for participation in goat-assisted restoration efforts between the two projects.

Codes and their descriptions relating to the cultural/community values are provided in Table 4.4.

The subcategories of cultural/community values varied between cases. The Hands and Hooves participants made up all informants who reported social engagements or influences as motivating their involvement. Of the three respondents, two attributed their involvement in the restoration projects to their involvement in a student organization that promoted the opportunity; one Hands and Hooves volunteer reflected that “Hands and Hooves’ volunteer days [were]...a way to be involved in the club’s activities.”

Most participants of the OFPC initiative acted on motivations that contributed to community efforts/causes and/or motivations based on values around protecting or providing accessibility to shared natural spaces. Participants reported volunteering to further the organization’s restoration efforts, make a difference, or to provide other services to the community through the restoration project. A parent volunteer who attended a workday with their child’s scout group revealed their involvement as a “good opportunity for [them] to get to do some service and something the community needs also.”

Table 4.4. Subcategory codes related to cultural/community values.

Restoration Case	Cultural/Community Subcategory Codes	Description	Example Quotes
Hands and Hooves Volunteers, Student Volunteers, and Organizer	Socialization	influence of friends; obligations to student organizations; interest in meeting new people	"...it was a way to meet and interact with other environmental engineers."
Both Cases	Education and Investigation	Assisting or providing educational learning opportunities for students or the community	"...care about this little learning area for kids..."

OFPC Volunteers and Organizers	Community Effort/Cause	protection of public space; making a difference; or contributing to efforts by providing community service	"Just to be helpful."
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Socioeconomic Values

Borrowing from Clewell and Aronson (2013), we identify socioeconomic values as those who want to restore services provided by an ecosystem which have been damaged or lost due to is impairment. These damaged or lost ecosystem services or goods might include loss of accessibility or use of a natural space by public for their collective enjoyment. Socioeconomic subcategory values present among the OFPC group volunteers were related specifically to cultural ecosystem services such as recreation and aesthetic benefits (Gómez-Baggethun et al., 2013) rather than regulating services such as providing natural barriers for erosion control. Among the subcategories of socioeconomic values motivating OFPC volunteers were maintaining a space that could be aesthetically enjoyed and having a green space that could be used for leisure as well as protecting or providing accessibility to shared natural spaces. Five respondents' values supported the availability and accessibility of natural public areas for community use and enjoyment frequently commented on the importance of the Oakland Forest site and their efforts to make it available "not only [for] this neighborhood," but "for others" on "this end of town," or put more specifically, "everybody [in] this whole part of Atlanta." Two respondents provided explanations related to education and investigation, aspects valued by communities, as motivating their participation. Bethany stated becoming involved in the OFPC project to care for a "learning area for kids".

No socioeconomic values arose as motivating *organizers* in the OFPC project. Only one response by a Hands and Hooves volunteer, who was a previous faculty member of the

university, mentioned being motivated by a loss or damage to an ecosystem service. She stated while viewing a garden she took care of on campus, she realized it had “overgrown the groundcovers,” disrupting the aesthetic scene of the garden. Student volunteers did not report motivations aligning to socioeconomic values in their interview responses.

Ecological Values

We identified ecological restoration values as people’s feelings toward the impairment of ecosystems and concern for the recovery of these systems to “wholeness in terms of their ecological integrity and health” (Clewell & Aronson 2013, p. 19), related to serving or protecting nature for its own sake or intrinsic value. Motivations influenced by ecological values were not present for participants of the Hands and Hooves restoration project, and only one OFPC volunteer was ecologically motivated stating that she was participating “to help mother nature out a little bit.”

In summary, participants overwhelmingly championed personal values as the driving reason for participation in the goat-assisted restoration initiatives. These values were closely followed by cultural and community for both groups. There were no informants that specifically reported the presence of goats as a motivating factor of their initial involvement, and only one volunteer had motivations aligning to ecological values.

Research Question 2: How do people’s values change after their involvement in a goat-assisted restoration project?

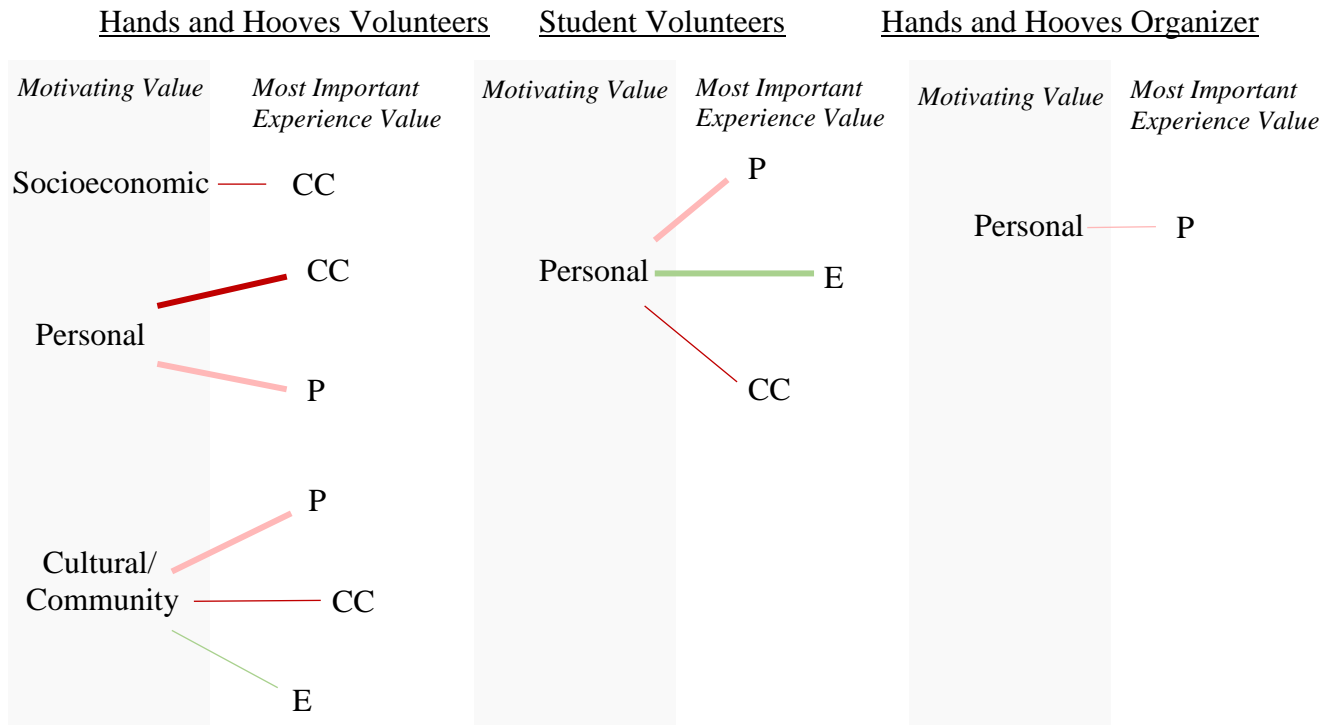
Hands and Hooves and Student Volunteer Interview Data

Participants were asked a series of questions based on what they considered to be the most important part of their experiences while being involved in the goat-assisted restoration projects in order to evaluate whether their motivations or views had changed or shifted

(including enhancement of initial values) in relation to their responses regarding their motivations. When Hands and Hooves volunteers were asked in their interview to reflect on the most important part of their experience while participating in goat-assisted restoration, responses typically indicated a higher placement of importance on personal values. Hands and Hooves volunteers also stated cultural/community values upon reflection on their most important part of their experience showing a realization in these values which differed from their initial socioeconomic and personal values. Hands and Hooves volunteers also appear to have enhanced or developed their cultural/community values from those cultural/community values they previously held as motivating their participation. However, ecological values were represented very little: only one Hands and Hooves volunteer's response elicited this value. Figure 4.2 displays the initial motivating values of participants and the values Hands and Hooves volunteers found to be most important after their experience. When student volunteers reflected on their experiences, they indicated that ecological, personal, and cultural/community values were the most important part of their experiences during their involvement in the restoration project, though more student volunteers recounted experiences related to personal and ecological values than cultural/community (Figure 4.3).

The Hands and Hooves organizer informant revealed experiences that suggested strengthening of their personal values throughout their experience with the goat-assisted restoration project. What motivated the organizer was having a personal and professional obligation to the project. This personal value subcategory transitioned into a different subcategory of personal values represented by their interest in the goats and people's interactions with them as well as their recount of experiencing a "nice rhythm to things" and how they incorporated the goats' presence into their routine: "...I liked to stop in at least once a day

sometimes to check in on the animals.” A personal connection to the land being restored was also indicated in his participant’s response when he noted that he would also stop by the site when the goats were not there to see “how the site ha[d] changed.”



* S-socioeconomic values; P-personal values; CC-cultural/community values; E-ecological values
 ***Line thickness represents frequencies of respondent transitions from one value category to another..

Figure 4.3. Value importance transitions/changes for Hands and Hooves restoration participants based on interviews.

Oakland Forest Park Community Volunteers- Interview Data

Among the volunteers of the Oakland Forest Park Community restoration project, most volunteers (8) shifted or strengthened their initial motivating value toward cultural and community values. Specifically, OFPC volunteers repeatedly reported that their most important experience was supporting a community effort or cause. Volunteers also found it important to connect with others, either by meeting their neighbors or other community members. Five OFPC volunteers developed or strengthened the importance of their personal values (meaning initial

motivating values are the same as those indicated as the most important part of a participant’s experience). Volunteers recalled experiences related to reentry into nature as an important experience. Bethany, a resident of the neighborhood and frequent volunteer, stated her most important experience as “just being out there, doing something positive with nature and meeting neighbors, and the group experience of working together with others to accomplish something,” which highlighted an enhanced valuation of her personal experiences and her experiences with others (cultural/community). Figure 4.4 displays the initial values of OFPC volunteers and the values they maintained or transitioned to after reflecting on their experience.

Oakland Forest Park Community Volunteers

Oakland Forest Park Community Organizers

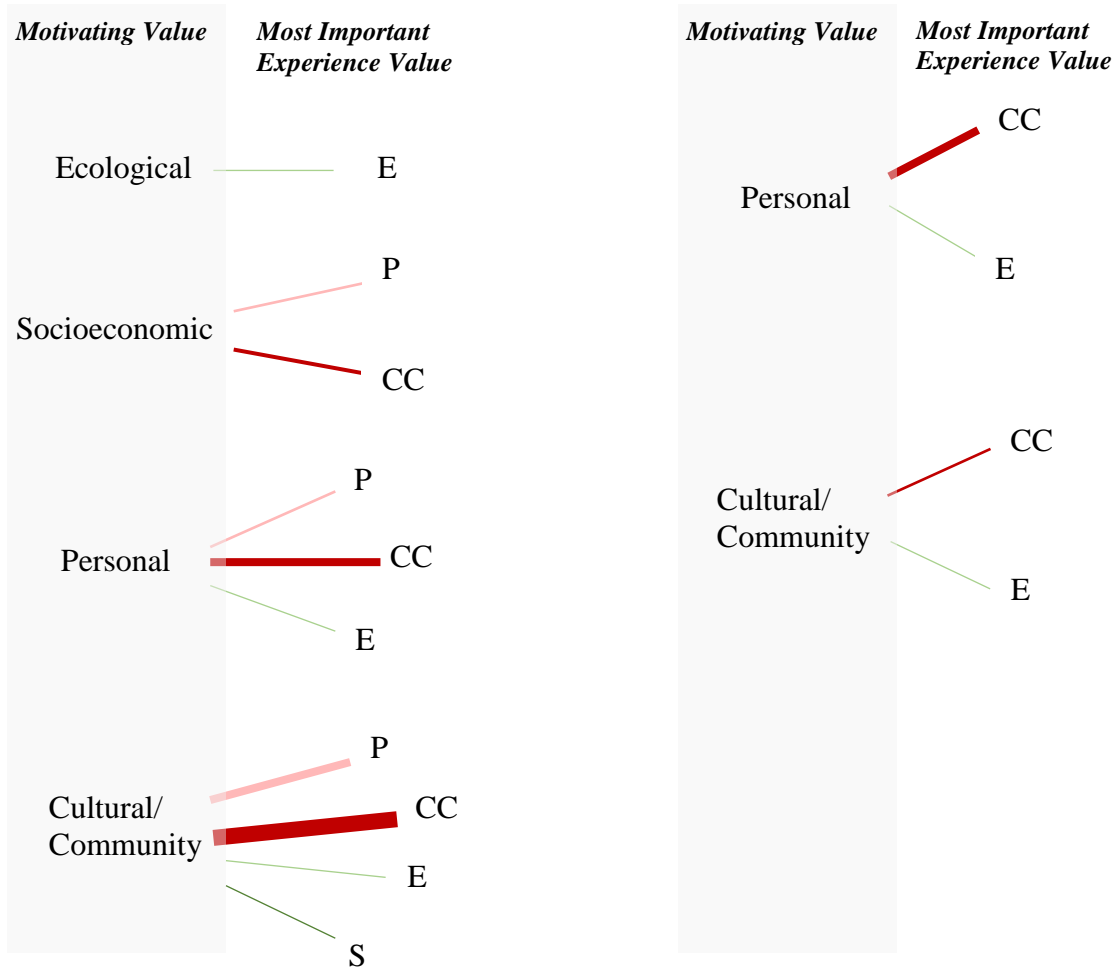


Figure 4.4. Value importance transitions/changes for Oakland Forest Park Community restoration participants

Oakland Forest Park Community Organizers Interview Data

When organizers of the Oakland Forest Park Community restoration project were asked to reflect on the most important part of their experiences while working on a goat-assisted restoration project, they recounted experiences related to cultural/community values. Only one respondent also stated an experience related to ecologic values while realizing the need to have a “clear vision of how to move forward and have ecological standing.” All organizers reported valuing community involvement and togetherness. Gretchen stated that, “It [was] wonderful that people from our community were brought together” and another organizer exclaimed, “The community effort is just wonderful!”

Across all volunteers in both cases, cultural/community values were strengthened most frequently, followed by, strengthened personal values. Very few volunteers reported experiences that suggested them placing increasing importance on ecological values, and those that did were mostly student volunteers a part of the Hands and Hooves restoration project. Of the restoration project organizers, two had experiences that were valued as personal or ecological, all others or in addition to, placed greater importance on experiences that were related to cultural/community values.

Value Changes and Transitions Based on Surveys

Participants were asked to rank five statements (each relating to a particular value or aspect of the projects), once based on their importance as a reflection of their involvement and a second time to consider how they would have ranked the same statements by importance before their involvement (surveys can be found in Appendix C). Although respondents were forced to rank the statements side-by-side along a line which indicated the level of importance of a statement to the participants’ experiences, there was considerable spacing variation along the line

between statement placements. Therefore, rankings cannot tell us whether participants considered certain value statements as ‘not important at all’, rather these rankings tell us a statement’s importance relative to the placement of other statements. Statements used on the survey and their corresponding values can be found in Table 4.5.

Table 4.5. Survey value statements and their corresponding value category

Corresponding Value/Topic	Value Statement
Personal Values	“I benefitted personally from my time participating (it was rewarding, relaxing, educational, etc.)”
Cultural/community	“I valued the interactions and connections with other people around a common cause.”
Ecological Values	“I helped nature by restoring the habitat and natural environment.”
Socioeconomic Values	“I helped make this place more valuable to our community.”
Goats	“I liked being around the goats.”

Based on the surveys given to participants, all value statement rankings shifted in importance for each Hands and Hooves informant with the exception of the socioeconomic value statement which maintained its ranking placement among the other statements. Upon reflecting on their experiences, participants of the Hands and Hooves restoration projects ranked “...help[ing] nature by restoring the habitat and natural environment” (Ecological Values) as the most important and consistently ranked “...being around the goats” 5th among all other values. In reflection of their experience, volunteers and organizers a part of the OFPC project also ranked ecological values higher in importance than other value statements. Being around goats was ranked 5th by most OFPC participants. Changes in importance rankings for both cases are displayed in Table 4.6.

Table 4.6. Value statement rankings based on frequency of occurrence.

Value Statement	“I helped nature by restoring the habitat and natural environment”	“I benefited personally from my time participating (it was rewarding, relaxing, educational, etc.)”	“I helped make this place more valuable to our community”	“I valued the interactions and connections with other people around a common cause”	“I liked being around the goats”
Hands and Hooves Importance rankings <i>before</i> participation	2	4	3	5	1
Hands and Hooves Importance rankings <i>reflecting on</i> experience	1	2	3	4	5
OFPC Importance rankings <i>before</i> participation	2	1	4	3	5
OFPC Importance rankings <i>reflecting on</i> experience	1	2	4	3	5

*1=Very important; rankings 1-4 are based on placement of statement in comparison to other value statements and does not indicate degree to which a statement is ‘not important’.

Many Hands and Hooves participants showed a dramatic shift in their ranking of goats. Goats appeared to be considered less important than ecological, personal, socioeconomic, or cultural/community experiences. However, for OFPC participants, goats were consistently ranked as not being as important as other aspects of their experience both upon reflection of their experiences and in retrospection of how they would have ranked these statements before participation (Table 4.6).

Hands and Hooves Participant Survey Value Ranking Placements

For volunteers and organizers of the restoration efforts at the university, ecological values appeared to stay the most consistent in their ranking of importance when comparing the retrospective before experience ranking and the reflection on experience ranking from the survey. Finally, for those involved in the Hands and Hooves restoration project, after reflecting on their experience, 73% ranked the personal value statement higher in importance, while experience with goats and ecological values showed the least increase in their importance ranking placement, as shown in Table 4.7.

Table 4.7. Aggregate percentage change in placement of Hands and Hooves participants' value statement rankings.

<i>Change in Importance</i>	Value									
	Personal	n	Cultural/ Community	n	Ecological	n	Socioeconomic	n	Experience with Goats	n
No Change in Importance	6.7%	1	33.3%	5	46.7%	7	6.7%	1	20%	3
Decreased Importance	20%	3	20%	3	33.3%	5	33.3%	5	66.6%	10
Increased Importance	73.33%	11	46.7%	7	20%	3	60%	9	13.3%	2

Responses throughout all Hands and Hooves participants revealed that many felt their personal or ecological related experiences were the most important, as shown in Figure 4.5 by the amount of transitions in values that went toward personal or ecological experiences. Specifically, for Hands and Hooves volunteers, it appears that for those who indicated the most important part of their experience was related to the environment also felt they would have ranked ecological experiences high in importance before their participation. Upon reflection on their experiences with the projects, participants also appeared to place personal value experiences high among their importance placement rankings as several participants transitioned toward personal values (Figure 4.5).

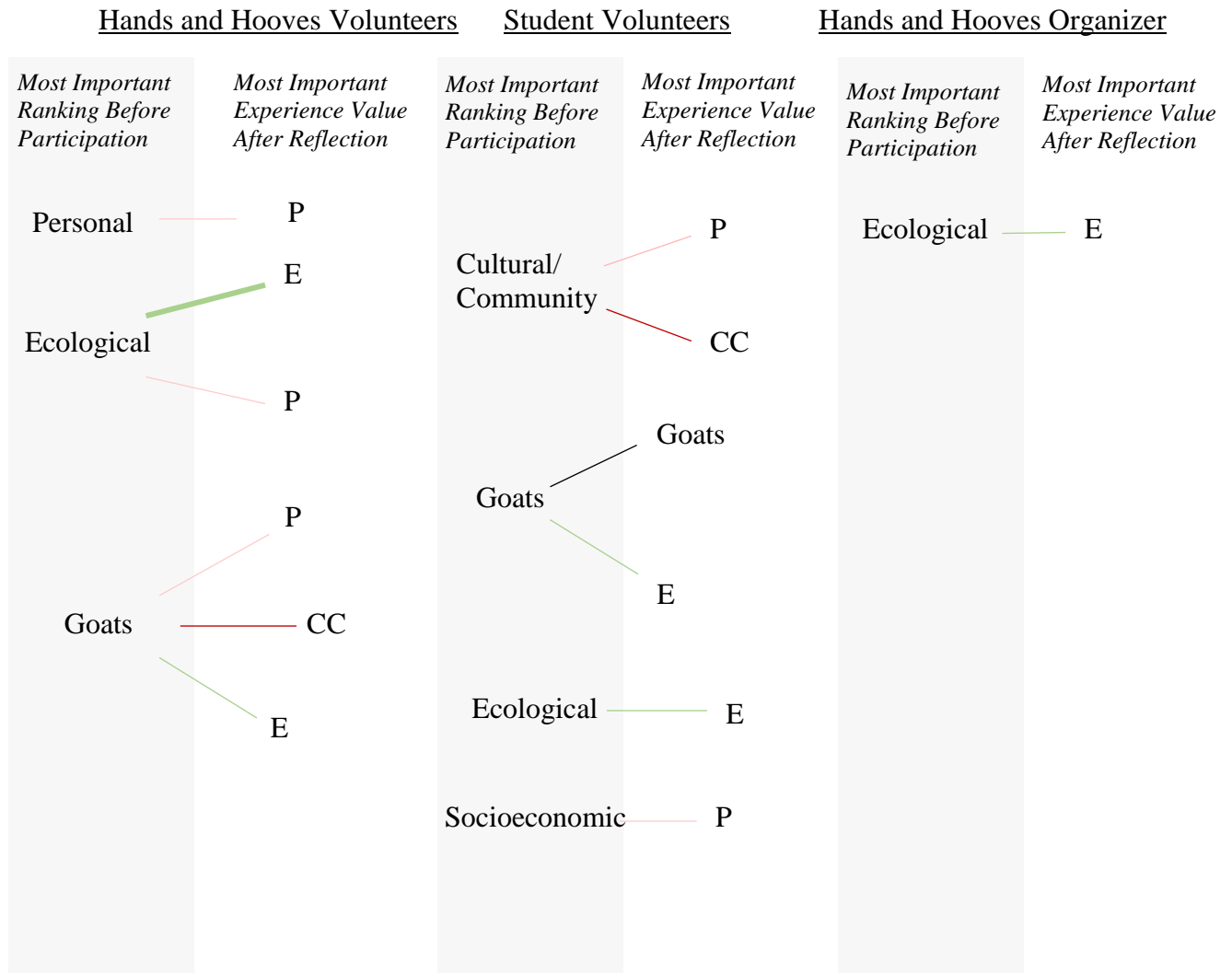


Figure 4.5: Value importance transitions/changes for Hands and Hooves restoration participants based on surveys.

Oakland Forest Park Community Survey Value Ranking Placements

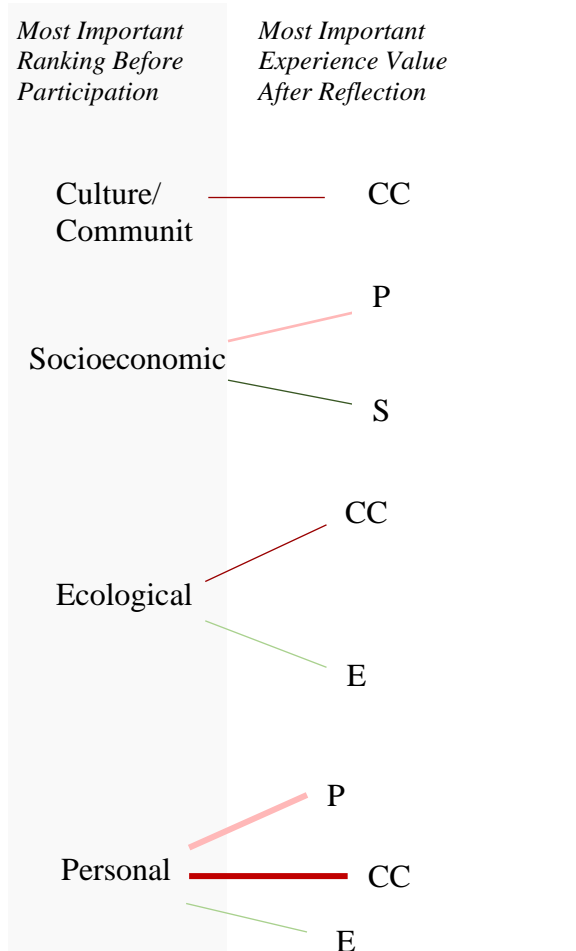
Volunteers and organizers of the OFPC restoration project saw the least amount of change in importance related to their experiences with goats and experiences relating to socioeconomic values. For OFPC informants, the greatest increase in importance for any value statement was for experiences representing ecological values. Approximately, 30% of volunteers and organizers ranked the ecological value statement higher upon their reflection of their experiences, displayed in Table 4.8.

Table 4.8. Aggregate percentage change of OFPC participants' value rankings.

Change	<i>Value</i>									
	Personal	n	Cultural/ Community	n	Ecological	n	Socioeconomic	n	Experience with Goats	n
Count No										
Change	46.2%	6	46.2%	6	53.8%	7	38.5%	5	76.9%	10
Decreased										
Importance	30.8%	4	30.8%	4	15.4%	2	46.2%	6	7.7%	1
Increased										
Importance	23%	3	23%	3	30.8%	4	15.4%	2	15.4%	2

Upon reflection of their experiences, OFPC volunteers' most common transition was to cultural/community values, displayed in Figure 4.6. Among OFPC organizers, ecological values were ranked highest in importance most commonly. Interestingly, an organizer indicated that being around the goats was the most important part of their experience during their involvement in the goat-assisted restoration project, which no other participant of the OFPC had indicated. Of all OFPC participants, the ecological value statement, followed by the cultural/community value statement, were ranked the highest among all other statements in regard to being the most important part of participants' experiences (Figure 4.6).

Oakland Forest Park Community Volunteers



Oakland Forest Park Community Organizers

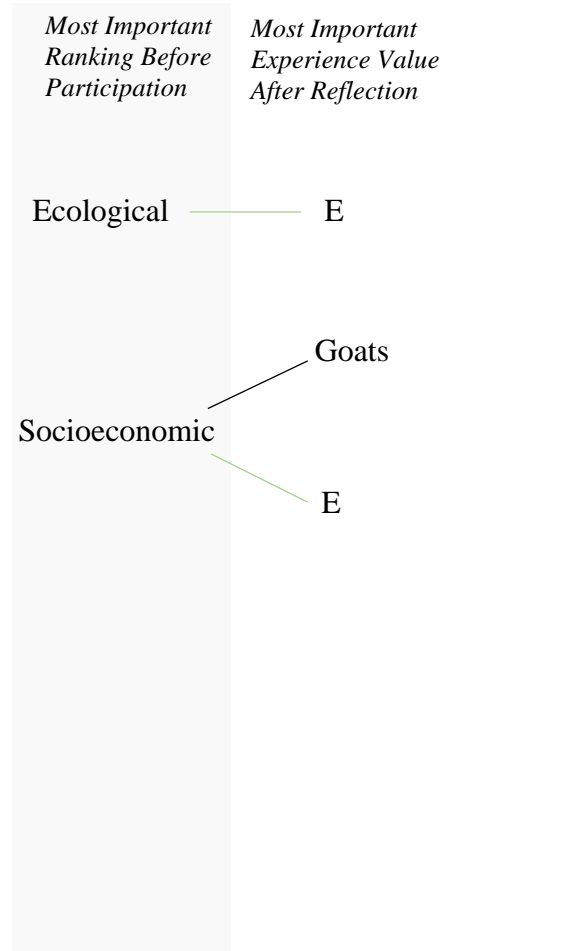


Figure 4.6: Value importance transitions/changes for OFPC restoration participants based on surveys.

Of all total informants from both cases (volunteers and organizers), based on survey rankings, 50% ranked personal values higher in importance after reflecting on their experience in relation to how they would have ranked it before their experience.

Comparing Value Transitions and Importance Rankings Between Short-term/Long-term and Goat-experienced/No goat experience Participants

Participant’s level of involvement as well as their experience with goats appeared to elicit an increase in importance for particular values. Volunteers were considered short-term participants if they had participated two or fewer times in the projects. Long-term participants

had volunteered multiple times and typically were involved in the projects over an extended period of time. Participants were categorized as goat-experienced if they indicated their involvement was during some time goats were present and being used at the site being restored. Those participants considered as having no goat-experience were not involved or present during the use of goats within the project. All student volunteers were considered short-term participants and as having no goat-experience. As for each case, nearly all volunteers were long-term participants and had experienced goats. Organizers from both cases were considered long-term and goat-experienced participants.

Hands and Hooves-Participant Involvement, Experience and Values

Among all levels of involvement and experience, when Hands and Hooves participants reflected on the most important part of their experience, personal values appeared to persist, with the exception of short-term, no goat-experience participants who were not represented in this sample. However, cultural/community values were considered more frequently among long-term, goat-experienced participants than either long-term/no goat experience or short-term/no goat experience participants when they considered the most important aspect of their involvement. For volunteers whose involvement did not include experience with goats, ecological values emerged for both long and short-term participants upon reflection of their experiences (Table 4.9).

Table 4.9. Hands and Hooves long-term/short-term and goat-experience/no goat experience value transition comparison between participants based on interviews.

HANDS AND HOOVES PARTICIPANTS			
		<i>Motivating Value</i>	<i>Most Important Experience Value</i>
Long-term participants	<i>Goat Experience</i>	Personal (6) Cultural/community (3) Socioeconomic (1)	Personal (5) Cultural/community (5)

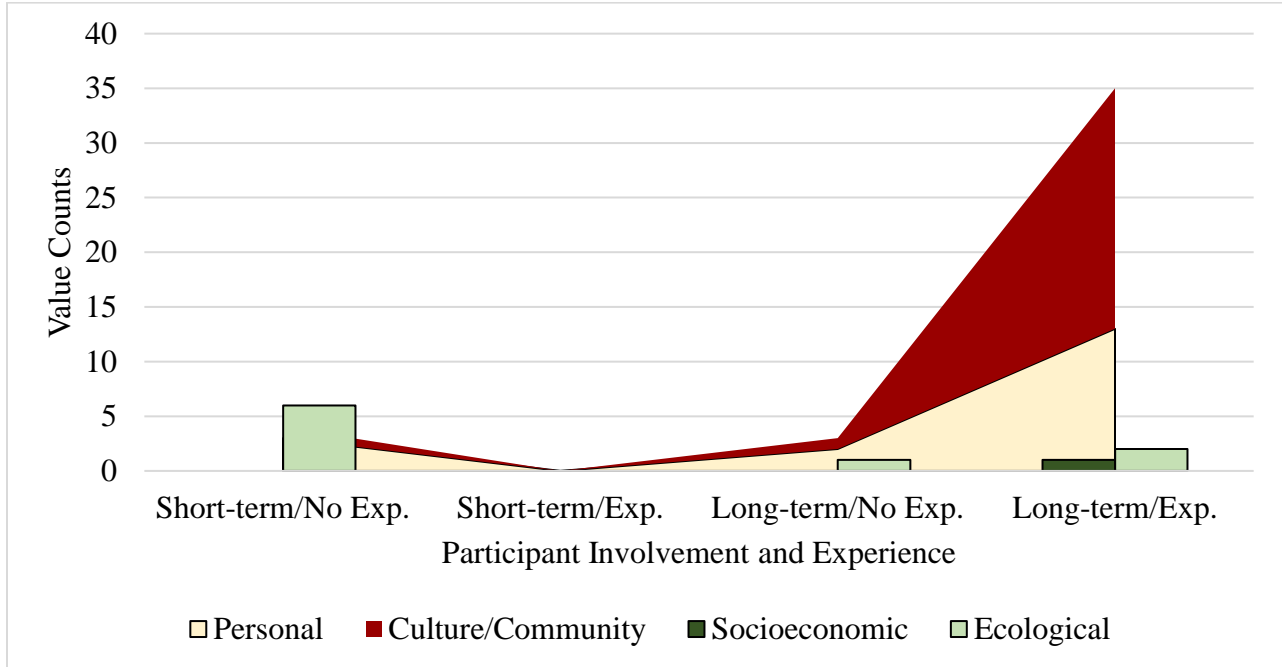
	<i>No Goat Experience</i>	Personal (1) Cultural/community (2)	Personal (2) Ecological (1)
Short-term participants	<i>Goat Experience</i>	---	---
	<i>No Goat Experience</i>	Personal (6)	Personal (3) Cultural/community (1) Ecological (3)

Oakland Forest Park Community-Participant Involvement, Experience, and Values

Participants involved in the Oakland Forest Park Community restoration project were almost exclusively long-term and goat-experienced participants. For this group of volunteers' experiences relating to cultural and community values were overwhelming the most important part of their involvement. While personal values motivated each of the involvement and experience groups for this case, only participants who were long-term and goat-experienced felt that their personal value experiences were the most important part of their experience. Although long-term and goat-experienced OFPC participants exhibited ecological values, they were greater for those OFPC participants who had not experienced the goats.

Table 4.10. OFPC long-term/short-term and goat-experience/no goat experience value transition comparison between participants based on interviews.

OAKLAND FOREST PARK PARTICIPANTS			
		<i>Motivating Value</i>	<i>Most Important Experience Value</i>
Long-term participants	<i>Goat Experience</i>	Personal (10) Cultural/community (13) Socioeconomic (5)	Personal (8) Cultural/community (17) Socioeconomic (1) Ecological (2)
	<i>No Goat Experience</i>	Personal (1)	Cultural/community (1)
Short-term participants	<i>Goat Experience</i>	---	---
	<i>No Goat Experience</i>	Personal (1) Cultural/community (1) Ecological (1)	Ecological (3)



Note: Exp. – Experience (Exp.-involvement with goats; No Exp.- no involvement with goats)

Figure 4.7 Across case comparison of participant involvement and experience with goats in relation to most important experience value.

Although short-term participants who had experience with goats was not a present group in either case, participants who had more frequently experienced goats reported cultural/community values to be the most important part of their experience more than those participants who had not experienced goats, displayed in Figure 4.7. Furthermore, those participants who had not experienced goats were more likely to state experiences that aligned to ecological values when asked about the most important part of their experience than those who had experienced goats. In summary, personal values remained an important part of participants’ experiences regardless of their level of involvement in the project or their experience with goats, and for those participants who had experienced goats, they felt their experiences regarding cultural/community were the most important in contrast to those who did not experience goats and placed greater importance on ecological values.

Comparing Value Transitions and Importance Ranking Between Survey Responses and Interview Responses

There were discrepancies between what participants described as most important in the interviews versus the surveys. According to survey responses, for all groups of volunteers and organizers, except for student volunteers, ecological values were ranked highest in comparison to all other values. Student volunteers ranked cultural/community experiences the highest in importance on the survey. However, these results do not reflect the experiences that participants described as the most important during their interviews. Hands and Hooves participants found personal values most important. Student volunteers also ranked ecological experiences as high as experiences representing personal values. For both volunteers and organizers of the Oakland Forest Park Community restoration project, cultural/community experiences were reported as being the most important. Comparison of value rankings between survey and interview responses are shown in Table 4.11.

Table 4.11. Importance value ranking comparison between survey and interview responses

	Survey: Value Statement Importance Ranking (highest ranking)	Interview: Most Important Experience Value
Student Volunteers	Cultural/community	Personal and Ecological
Hands and Hooves Volunteers	Ecological	Personal
Hands and Hooves Organizers	Ecological	Personal
OFPC Volunteers	Ecological	Cultural/community
OFPC Organizers	Ecological	Cultural/community

Note: 'Value Statement Importance Ranking' indicates the value with the highest mean ranking given by the corresponding group and 'Most Important Experience Value' represents the corresponding value assigned to the experiences that participants considered the most important.

Research Question 3: What are participants’ perceived outcomes of goat-assisted restoration projects?

To determine participants’ perceived outcomes of goat-assisted restoration projects, participants were asked to describe both beneficial effects of the restoration project and negative effects, if any. Outcomes were categorized based on whether they were negative or positive outcomes and then further grouped on their impacts to either the environment, the community, individuals, or socioeconomic factors. The number of informants who discussed each code subject and relevant examples are provided in Table 4.12.

Table 4.12. Value categories and themes related to participants identification of positive and negative outcomes occurring from goat-assisted restoration projects.

ECOLOGICAL	Hands and Hooves Student Volunteers	Hands and Hooves Volunteer/ Organizer	Oakland Forest Park Community (Volunteer/ Organizer)
Positive			
• Helping or bettering the environment	x	x	
• Making it more accessible to the goats	x		
• Not using chemicals	x		x
• No reliance on heavy machinery		x	
• Removal of invasive plants		x	x
• Maintaining a natural space			x
• Maintaining space for wildlife			x
• Protecting/restoring old growth forest			x
Negative			
• Clearing plants that might serve a purpose to other organisms	x	x	
• Goats eat native plants		x	
• Goats causing ecological problems unaware		x	x
• Goats not necessarily most effective			x
CULTURAL/COMMUNITY			
Positive			
• Student interest/involvement/engagement	x	x	
• Community Involvement/interest	x	x	x
• Brings community together		x	x
• Educational opportunity		x	x
• Encourages children to go outdoors		x	

<ul style="list-style-type: none"> Promotes and brings awareness to other departments and projects Socialization with others Community enjoyment Public space for everyone 		X	
		X	X
			X
			X
Negative			
<ul style="list-style-type: none"> Not having desired number of help/volunteers Potential closing or use to public Project lacking involvement of key stakeholders Protection/responsibility of goats 		X	X
		X	
		X	
		X	
PERSONAL/INDIVIDUAL			
Positive			
<ul style="list-style-type: none"> Physical Activity Interacting with nature New experience Professional development Feeling of ownership and valuable to the project Expanding perspectives and views Psychological benefits 	X		X
	X		
	X		
		X	
		X	
		X	
			X
SOCIOECONOMIC			
Positive			
<ul style="list-style-type: none"> Prevents traffic Provides enjoyment Prevents runoff Leisure Beautification of the area Bringing awareness to the area 			X
			X
			X
			X
			X
			X
	X	X	
Negative			
<ul style="list-style-type: none"> Noise Removal of natural privacy barriers Minor increase in traffic Potential Erosion Potential fecal pollution in watershed 			X
			X
			X
		X	
		X	

Positive Outcomes

Participants identified positive ecological, community, personal, and socioeconomic outcomes. Among student volunteers helping with the Hands and Hooves restoration project,

positive environmental outcomes were most commonly stated. A few student volunteers reported bringing awareness of the restoration site as a beneficial outcome of the project:

“...increased awareness about environment around us, like it’s part of campus...”

“...it’s kind of to help the environment for things that go unnoticed because I never knew this was back here, and I’m sure I wasn’t the only one... just helping us be more aware of what we have going on besides just like the busy streets like what’s behind the streets and what’s behind the buildings. We just never really pay attention to them. So bringing awareness towards things that go unnoticed.”

“I would say that people walking by, if they realize this area and they think “man that’s, that’s a pretty area, I wonder what they are doing in there?” It could have a positive impact on the public and therefore spread.”

Student volunteers also recognized personal and community benefits as a result of the restoration project, but no student volunteers identified socioeconomic benefits. Between Hands and Hooves volunteers and the organizer, community benefits were the most notably stated. Most common among the community benefits were the projects’ ability to bring the community together and engage them. For example, Jack reflected on the benefits of the project related to community bonding and engagement facilitated by the use of goats as an educational opportunity:

“It also brings the community together—seeing the goats. And it’s a learning opportunity for all ages, really for kids especially, they kind of get to see animals in nature and how they’ve been effective.”

Positive community outcomes were also reported most frequently by volunteers and organizers associated with the Oakland Forest Park Community Group restoration project. Outcomes commonly stated by OFPC volunteers and organizers were community related benefits such as community engagement, interest, involvement, and providing socialization opportunities in which community members could get to know one another. For example, Bethany revealed not only her own benefits as a result of her participation, but she also provides a frank reflection on the outcomes that have benefitted her husband as well:

“I think the participation and helping to beautify it. I knew that I would enjoy doing the work, but I didn't...actually to be truthful my husband isn't real social, so I am thrilled that he has found a community here that, it pulls him out. It helps him be a little more sociable. So that's a positive thing.”

Volunteers from both restoration projects recognized the personal benefits of their involvement with the projects. Participants discussed enjoying the physical work, mental benefits, building leadership and professional skills as well as the significant outcomes of changing perspectives. Hands and Hooves volunteers in particular discussed how involvement in the projects revealed new perspectives toward sustainability, restoration practices, and the land itself, which were both positive outcomes for themselves as well as for their community. While recounting a design competition to build the goats a shelter, Monica, a Hands and Hooves Intern, discussed a number of beneficial outcomes including giving students a new perspective on how different fields could potentially intersect in their work:

“I think the benefit there was getting really involved with students and helping getting students access to a real-world problems and projects that they can get hands-on help with... resume building, experience building, and also

you know, maybe a mechanical engineer never thought about working on a project surrounding sustainability before but now they can do both.”

Outcomes relating to socioeconomic benefits were also mentioned, but only among OFPC volunteers. Among socioeconomic benefits mentioned by OFPC volunteers included preventing runoff, providing leisure space, and preventing increased amounts of traffic in the area. Clayton explains the potential impacts that may have occurred if the site was not restored and preserved as a green space:

“Cherokee road, I don't know if you are familiar with it, it goes straight downhill...that would [have been] impacted heavily by the runoff. And then traffic is bad enough in Atlanta. Can you imagine 43 more homes with probably 100 more cars coming in here and just the construction would be in here 2-3 years...would have been bad for our neighborhood.”

Negative Outcomes

All but one student volunteer did not mention any negative effects of the restoration project (Table 4.12). Donna explained one potential negative impact of the restoration work dealing with the removal of plants:

“The only thing that I can think about that may be negative is the plants that are actually helping some insects that are here or to insects that [are] kind of adaptive to the plant, and we're kind of taking away from.”

Almost all Hands and Hooves volunteers provided potential drawbacks to the project, although most were speculative negative impacts. Hands and Hooves volunteers considered drawbacks that might have impacted the environment or the community. Among their considerations were fecal pollution from the goats flowing into nearby streams, unknown

ecological impacts as a result of using goats as well as unknown impacts of removing plants regardless of their status as an invasive or non-native plant species. Sarah, for example, spoke to the uncertainties of particular restoration practices stating:

“...the hard part is that a lot of the time when you are trying to change [a damaged site] you can make other issues at the same time.”

Other Hands and Hooves volunteers reflected on the drawbacks relating to community involvement. One volunteer discussed the safety and protection needed to be provided to the goats on site, while another volunteer suggested the project lacked involvement from key stakeholders. Hands and Hooves volunteers also recalled the difficulty of getting large numbers of volunteers to help on work days. This same challenge was discussed by a OFPC volunteer. OFPC stated drawbacks also shared by Hands and Hooves volunteers such as goats not being able to remove all invasive plants and the uncertainty of their effectiveness or ecological impacts they may have on the site. Johanna, a board member of the Oakland Forest Park Community organization listed a few questions she had about using goats. She wanted to know how young trees were impacted, the long-term impacts of using goats in the areas, and best practices when employing goats for invasive plant species removal.

Oakland Forest Park Community volunteers were among the only group to discuss potential drawbacks to the restoration project relating to socioeconomic factors. OFPC volunteers thought noise, the removal of natural privacy barriers that large areas of invasive plants might have served for neighboring properties, and a slight increase of traffic in the area resulting from people using the park might all be potentially negative outcomes of the restoration project. No negative impacts to individuals were noted by either restoration group participants.

For all groups participating in goat-assisted restoration projects in this study, many more participants relayed positive impacts and benefits occurring as a result of the restoration project than negative effects or impacts of the projects. Even the drawbacks of the projects given by respondents were almost entirely hypothetical or speculative negative impacts.

DISCUSSION AND IMPLICATIONS

The results of our study indicate that personal values dominate the motivations that lead many volunteers and organizers to participate in goat-assisted restoration projects. Although volunteers and organizers involved in the Oakland Forest Park Community restoration initiative attributed personal values to driving their motivations toward involvement, they were equally likely to report motivations related to cultural/community values. Our study also revealed that volunteers and organizers tended to maintain and/or develop their importance on personal values, while several volunteers who were unable to experience or observe the use of goats in the projects also developed or assigned greater importance to experiences relating to ecological values. Volunteers and organizers who witnessed the use of goats in the restoration project or worked alongside them frequently reported importance on experiences involving aspects of cultural/community values. Volunteers and organizers may realize these values since goats may facilitate community interest and therefore encourage members from the surrounding community to become involved in the project. Finally, our interview results suggest that volunteers and organizers perceived few actual negative outcomes, and instead recognized a diverse number of positive impacts for the environment, individuals, and the surrounding community involved in these goat-assisted restoration efforts.

Initial Motivating Values

The motivating factors leading to informant's participation in goat-assisted restoration across cases were most often related to personal values but differed considerably within sub-categories of that value. Student volunteers were largely participating for personal gains influenced by the incentive to earn extra credit. Hands and Hooves volunteer motivations were also closely linked to educational opportunities. Similarly, the Hands and Hooves organizer's initial involvement was due to his role as the advisor of the student who initiated the restoration project. Educational incentives, interests, or sense of responsibility may serve as an advantage for restoration projects located on or near educational institutions, especially projects seeking volunteers.

Although personal values motivated student, Hands and Hooves, and OFPC volunteers, OFPC participants discussed their individual need to respond to distress in their local environment, as opposed to being motivated by personal values related to education (e.g., gaining knowledge, professional development, and academic achievement). Several of the OFPC volunteers were motivated by an environment crisis response value which led to the preservation of a threatened urban green space.

The few natural spaces that can be found in urban settings are often considered extremely important to local residents (Ryan, 2005). The attachment urban dwellers might have to these spaces influences people's concern about protecting nature within cities (Ryan, 2005). Concern for natural areas within urban areas is exemplified by the Oakland Forest Park Community initiative. However, people's perspectives of natural environments within urban areas depend on their experiences which in turn influence the qualities people become attached to within these places (Ryan, 2005). Facilitating connections between urban residents and their environments is

considered key to the protection and survival of these natural spaces (Ryan, 2005). Researchers have suggested that restoration can be used to help develop attachment to natural urban places.

Goats can also help support these practices by initiating interest and engagement from community members, which then in turn garners their support throughout the restoration process. This was evident when a number of OFPC participants indicated that because of the goats not only drew attention from the community towards their use and the project, but also led to community members making many more donations to the restoration efforts than typical. Goats also led some restoration participants to gain a better appreciation of the land, as exemplified by the Hands and Hooves restoration project, whose volunteers and organizer became more attached to the restoration sites and made it a part of their routines to visit the sites apart from work days.

It appears that these projects may enable the participants to become more familiar with the project site, and by understanding values of willing participants, this may shed light on how best to facilitate people's attachment to the restoration sites in which they are involved. These understandings can help organizers and managers incorporate various community and volunteer perspectives when making management decisions (Ryan, 2005). Ultimately, by better understanding the values of the participants involved in the projects, managers can ensure they are not compromising the values of the people who are attached to the areas being restored.

Value Development and Transitions

For Hands and Hooves participants, transitions in value importance appeared to be influenced by the level of involvement and whether participants were present while goats were used in the projects. Student volunteers who did not have experiences with the goats and were participating for the first or second time placed greater importance on ecological and personal experiences after reflecting on their experiences. One possible reason that student volunteers

were not as likely to consider experiences relating to cultural or community values is because they may not have witnessed how goats may have facilitated greater community and student turnout leading to experiences that demonstrated community engagement and interest. Although volunteers who had participated several times over a longer period of time were as likely to maintain or place greater importance on personal values, they also discussed experiences that related to a greater overall variety of values unlike student volunteers. Across cases, volunteers and organizers that showed positive changes in their values toward culture and community also were those who had participated in the projects while goats were used. This suggests that the presence of goats at restoration project sites provide opportunities for participants to experience and develop values that are a result of or emphasized by using goats in restoration projects, specifically cultural and community values.

In this study, some participants appeared to develop an attachment to the land being restored. One reason this attachment may have developed is through the incorporation of routine visits to the site. Another explanation for what appeared to be gained appreciation of the restoration site, is that long-term or experienced volunteers were able to teach new participants about the work and local natural settings. Although most participants of either site were not considered children, research has implicitly assumed that providing information to children about their local flora and fauna leads children to form attachments to their local landscapes (Nabhan & Trimble, 1994; Ryan, 2005), which we may be true for adults as well. Furthermore, attachment to local landscapes and knowledge about it is considered to be necessary for environmental stewardship, which in turn could promote further restoration projects (Ryan, 2005).

In addition to initiating community interest and potentially attachment to urban green spaces, goat-assisted restoration projects can strengthen bonds among volunteers indicated by the common shift within cultural and community values among participants to subcategories such as community togetherness, which in turn can play a beneficial role in the outcomes of the restoration efforts. Geitz and Johnson and Johnson (1999; 1982) suggest that development of cohesiveness among project participants lead to deeper commitments toward group goals, enhance motivations and accountability, long-term group involvement, better tolerance toward frustration, and greater communication—all of which can increase the likelihood of groups to achieve long-term restoration project goals.

Participants discussed experiences indicating enhancement of importance in personal values. Specifically, volunteers recounted feeling empowered, a sense of belonging, and increased self-esteem. Oakland Forest Park Community organizers and volunteers involved in solving the initial challenges faced by the natural urban space felt empowered when the development of the green space was successfully prevented. Sense of belonging was exhibited in both cases, but Hands and Hooves volunteers especially had experiences relating to self-esteem. Hands and Hooves volunteers had opportunities that allowed them to lead work sessions, help new volunteers, and exhibit the knowledge they gained since their involvement in the project, all of which Geller (1995b) explained increased self-esteem. Goat-assisted restoration initiatives provided participants with opportunities that fostered the development of these qualities, which may strengthen relationships between people and their environment (Geller 1995a, 1995b). Miles (1998) reports that involvement in restoration work results in some immediate benefits that provide satisfaction for participants such as engagement in meaningful work or physical

enjoyment of the work, which may explain why personal values were consistently important between cases and volunteer and organizer groups.

A retrospective pre-post evaluation method was used to determine changes in the levels of importance participants placed on specific aspects of their experiences that were related to personal, community, ecological, socioeconomic experiences or experiences with the goats. In the case of the surveys, this method provided participants a relative frame in which they could reflect on and compare how they would have ranked particular aspects of the project before their participation to the way in which they ranked the same aspects in importance upon reflecting on their experience. However, the reported value changes were considerably different between informants' responses during interviews and the answers they recorded on surveys. This may be due to surveys having fewer options which may not have included the experience, or a similar experience, a respondent felt was most important to them.

Goat-assisted Restoration Project Outcomes

Among the two restoration projects studied, volunteers and organizers recognized increased community and public awareness as a key benefit of using goats. This in turn was reported to increase volunteer participation, provide educational opportunities for children, and even increase financial support for the Oakland Forest Park Community restoration project. Though goats appeared to be less important to those involved in the projects, they were significant to the projects as a whole. Goats were pivotal to the projects by serving as community engagers, entertainment for volunteers, and ecological drivers in the removal of invasive plants. These factors led participants to experiences that shaped their view of the project outcomes, which in turn may have shaped their values. This was particularly evident for cultural and community values.

The experiences noted by participants within their interviews in comparison to their survey value rankings may be somewhat misleading with regards to the impacts goats had on volunteers and organizers. Several volunteers noted their enjoyment from working and being around the goats. One Hands and Hooves volunteer even felt that her experience was not complete unless she was able to organize events that had traditionally occurred in the past such as throwing the goats a welcoming party. Goats may have also aided in the development of some participants' attachments to the land. In a narrative from a Hands and Hooves volunteer and another from the organizer, both participants discussed visiting the sites regularly while the goats were present and even incorporating this into their routines, and as a result they recognized changes in the land and developed an appreciation for it.

Negative outcomes were few, and most were based on uncertainties or hypotheticals. However, volunteers and some organizers who had participated in the restoration projects on several occasions or over longer periods of time were typically the respondents to provide either actual or speculative negative effects. Fewer student volunteers provided potential negative impacts of the restoration project most likely due to their short-term involvement and lack of interaction with goats. Many more Hands and Hooves volunteers were able to ponder potential negative impacts that may have occurred as a result of using goats in the restoration projects likely due to their many experiences working at the sites over a long period of time.

LIMITATIONS AND SUGGESTIONS

Time constraints were a considerable limitation of this study. Samples of volunteers were gathered in a short period of time and therefore may not have been representative of all volunteers' or organizers' views over the course of the projects. Additionally, the researcher examined two cases, in similar geographic locations, which may provide results less

generalizable to other goat-assisted restoration efforts occurring outside of the studied locations. Recent studies have also made this consideration specifically regarding how values may differ depending on geographic location, implementation, and monitoring (Hagger et al., 2017).

In order to better understand what motivates restoration volunteers and community participants, researchers should compare the values and motivations of those who participate to those who choose not to participate. Since goats in these projects tended to attract younger crowds, as observed in these cases, researchers might find that restoration or specifically goat-assisted restoration may have different impacts on various age groups. We also suggest that impacts of goat-assisted restoration projects should be compared across larger geographic locations as suggested by Hagger et. al (2017) who found that motivations toward ecological restoration participation differed by region in Australia. This may also serve to be similar for goat-assisted restoration projects taking place throughout the U.S. We also suggest that studies being conducted on this or a similar topic compare results from rural and urban areas.

Due to inconsistencies between what participants stated in their interviews as the most important part of their experience in comparison to the rankings provided by participants when asked to rank order different aspects of the project based on their importance to the volunteer or organizer's experience, we highlight the need to develop an instrument which can uniformly measure the values of participants involved in restoration projects, with or without the use of ruminant species. This also leads us to the discussion of the interpretation of and use of Clewell and Aronson's model to holistically categorize restoration participants' values. First, it appears that Clewell and Aronson's model may have been developed to evaluate the values of those individuals who seek careers or professional work within the field of ecological restoration, and therefore do not necessarily address how their frame or lens of values may differ for others

involved in restoration work such as student or community volunteers, nor does it address the larger motivations behind the initiation of the restoration projects themselves. It also appears that because they may have been addressing the values of career- or professional-seeking restoration practitioners they have assumed that these values would be positioned around the ecological impairment or degradation of a site. We suggest that there may be an array of lenses in which values emerge from in relation to the context of the development and geographic placement of restoration efforts. Since not all restoration projects are solely facilitated and run by restoration practitioners or professionals, considering the lens in which communities or volunteers may view these types of projects can help to develop a more comprehensive model in which to determine restoration participants' values.

While we make these suggestions, we also recognize there are numerous ways in which Clewell and Aronson's four-quadrant ecological restoration model can be interpreted that may lead to different processes in which to examine participants' values. For example, some researchers might examine values using the four value categories provided and based on how they are operationalized by Clewell and Aronson, while also viewing the upper divisions of their model as characteristics of those values that fall beneath it, as we have done in this study with some additions to those value meaning. Others might first determine whether an individual's reason for participating is focused on the subject or object of their motivation. In other words, the focus of a person's motivation may be based on the subjects, I or we, so that they are participating for their sake or sake of others, or on the object-focused hemisphere. Alternatively, they may focus on the non-human objects such as the Earth or ecosystem function, participating for the sake of those objects and not for oneself or the sake of others. Among these considerations are many more complexities that one must consider if trying to create a holistic

model to determine values and motivations of participants, and by realizing these intricacies we can understand that the development of such a model will be a challenge undergoing constant development.

We hope our case study findings will provide practitioners and professionals within ecology, landscape management, restoration, and urban planning to both consider and better understand the potential benefits of employing domesticated ruminant animals within their projects. Furthermore, these findings can serve to potentially help inform, support, and nudge governments to change and clarify (Salter et al., 2013) regulations that would support these practices, especially in light that continued support and commitment are crucial to the longevity and effectiveness of these projects.

CONCLUSION

Goats play a complex role in influencing people's values and contributing to the outcomes of restoration projects that use them. Currently, research has studied the ecological and best management practices of prescribed-grazing. However, research has yet to study, at-large, the use of goats within urban restoration projects and their impacts on the participants and communities that employ them. By studying the values of participants who are involved in goat-assisted restoration, we can begin to understand the motivations that bring volunteers or organizers to participate in these types of projects as well as identify the types of audiences that would be willing to engage in goat or livestock-assisted restoration efforts. While using both semi-structured interviews and retrospective pre-post surveys, our results indicated that goats are not considered a motivating factor leading individuals to participate in goat-assisted restoration projects. However, as inconsistencies between participants' survey and interview data emerged regarding informants' most important experiences, a need for the development of a broader and

more nuanced approach to identify restoration participants' values involved in goat-assisted restoration projects is apparent. Despite this, goats appeared to also influence value transitions of restoration participants as they become more involved in goat-assisted restoration initiatives. Ultimately, one of the greatest perceived outcomes indicated by participants of these projects, were goats' ability to ignite interest from the communities where they were used, which in turn leads to greater community awareness of the projects, interest, and engagement that may serve to be necessary for sustaining these projects.

CHAPTER 5

CONCLUSION

Goats have provided many services to humans throughout history. These services reach far beyond their utility as goods or products. There are several ways in which goats can impact the social dimensions of our own lives that can also lead to the enhancement of our personal, educational, and ecological practices.

From the examination of children's interactions with goats during a summer farm to school program, we have gained a better understanding of the types of interactions children engage in with goats, and how these animals might influence students' interest and engagement with the natural environment. Furthermore, we observed how goats can provide children opportunities to develop their social skills, academic knowledge, and practical abilities. These findings suggest that goats and other farm-related animals can encourage students' interest more broadly in the outdoors, but the presence and use of these types of animals can also help facilitate interest in other educational programs including and in addition to farm to school programs. The broad interest and numerous interactions that students had with the animals also highlights the opportunity that having and using goats and other farm animals at the school can benefit all students, and specifically children who are afforded few or no opportunities to interact and engage with animals, typically minority students or students from low-income families, but also generally children living in urban areas. Examination of the impacts goats and other farm animals used in urban versus rural schools might lead to the development of knowledge regarding the potential benefits these animals can provide to students living in less farm animal-

friendly, urban areas. Additionally, researchers should consider how children from different socio-demographic backgrounds, including race/ethnicity, differ in their interactions with goats in school settings and examine how their engagement with the animal and attitudes toward it change over time or throughout a program.

By examining how parents perceive the use and presence of goats within their child's school and their own community, we find both overwhelming positive attitudes and acceptability toward the use and presence of goats in these settings. Noteworthy, we also saw that parents perceive goats to be a highly positive influence on their children's educational and outdoor experiences. These findings suggest that goats would not only be an acceptable species to find throughout our urban communities, but they additionally would enhance the lives of our children and their educational and outdoor experiences. To increase support for the use of goats or other farm animals in school settings, future research might consider examining students' attitudes toward the animals through interviews or focus groups with the students to learn more about their experiences with the animals and to understand the potential impacts or benefits children perceive the animals have on their own well-being and schooling experience.

Finally, the examination of two cases of restoration projects utilizing goats revealed that participants involved in goat-assisted restoration projects did not have motivations relating to the use of goats within these projects, nor did they indicate that goats were an important part of their experience. Despite these findings, when asked about the perceived outcomes of these projects, participants unveiled benefits and outcomes occurring from the project directly related to the use of goats. Most common among these were statements regarding goats' ability to gain community interest and engagement within the projects. However, interview responses and surveys used to measure participants values showed disjointed results, highlighting the need for a more holistic

instrument that can accurately measure the values of participants involved in goat-assisted restoration projects and ecological restoration projects in general.

Goats appear to be an effective and influential educational and ecological tool. As their use throughout our communities becomes increasingly popular, continued development of our understanding of their impacts on our children, projects, and communities will be important to gaining and sustaining support of their presence and use within urban settings. These studies will hopefully serve as the foundation of a long exploration into the social implications and benefits of using goats within our urban communities.

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APPENDIX A: FARM TO SCHOOL SUMMER PROGRAM FIELD NOTE PROTOCOL

Field Notes/Participant Observation Focus:

Field notes are a record of observations broadly focused on children's interactions with the farm animals present at the school. Observations will more specifically focus on interactions between children and the goats present at the program site. Observations will also note children's involvement in other program activities such as morning introductions and warm-up/ice-breakers, gardening, enclosure maintenance, and meal preparation for the weekly pop-up community kitchen. Observations will be recorded anonymously.

Summary of Observations:

Hours: 60 hours of participant observations

Topics:

Child(ren)-goat interactions; child(ren) interactions with other animals; child(ren) engagement in FTS-related activities; child(ren) involvement in food preparation and cooking

- What are children doing/saying?
- How are individuals reacting/responding to the animals?
- How are groups of children reacting/responding to the animals?
- Are children interacting with the natural environment outside of tasks?

APPENDIX B: PARENT AND GUARDIAN SURVEY INSTRUMENT

Parent & Guardian Attitudes and Acceptability of Goats at Woodland Middle School and in the Community



**University of Georgia
Odum School of Ecology
Destiny Loyd**

The purpose of this research study is to evaluate parent and guardian attitudes toward the use of goats at Woodland Middle School and within their broader community.

Your involvement in the study is voluntary and should take no more than 15 minutes. Your decision to participate or not will have no bearing on your child's grades or class standing. You may choose not to participate or to stop at any time without penalty or loss of benefits to which you are otherwise entitled. If you decide to stop or withdraw from the study, the information/data collected from or about you up to the point of your withdrawal will be kept as part of the study and may continue to be analyzed.

The findings from this project may provide insight on the perceived usefulness of goats as an engaging educational tool for students. There are no known risks or discomforts associated with this research. No financial compensation will be provided.

If you have any questions about this research project, or wish to receive updates on the results, please contact Destiny Loyd at 770-688-4680 or e-mail dloyd909@uga.edu. Questions or concerns about your rights as a research participant should be directed to The Chairperson, University of Georgia Institutional Review Board; telephone (706) 542-3199; email address irb@uga.edu.

By completing and submitting the survey, you are agreeing to participate in the above described research project. Thank you for your consideration and time!!

Section A: Student Involvement & Awareness

1. Please select the activities your child/ren have participated in: *(Select all that apply)*.
 - Agricultural Science and Family Consumer Science as a 6th grader
 - Agricultural Science and Family Consumer Science as a 7th or 8th grader
 - Afterschool programming that involves school garden and/or farm animals
 - Summer programming that involves school garden and/or farm animals
 - My child has not participated in any of these activities.
 - Prefer not to respond.
2. Are you aware there are farm animals present at your child's middle school? *(Please select one)*.
 - No
 - Yes
 - Prefer not to respond.

****If you responded with the answer 'No' to the previous question (Question #2), please skip questions 3 and 4.***

3. Please choose all animals you are aware of at the school:
 - Goats
 - Hens/Chickens
 - Rooster
 - Other (Please indicate): _____
 - Prefer not to respond.
4. Please indicate how you learned about the animals at the school: *(Please select all that apply)*.
 - School event
 - Your child
 - Clarke Middle School Newsletter
 - Community Member
 - Another Parent
 - Other *(Please indicate)*: _____
 - Prefer not to respond.
5. Which of the following activities/topics have you heard about from your child/ren? *(Please select all that apply)*.
 - Garden Market
 - Gardening
 - Goats
 - Composting
 - Hens/Rooster
 - None
 - Prefer not to respond.

6. Among those selected in the previous question, rank order them 1-5 according to your child's/ren's level of enthusiasm or excitement (1 indicating the highest excitement/enthusiasm and 5 being the least excitement/enthusiasm):
- _____ Garden Market
 - _____ Gardening
 - _____ Goats
 - _____ Composting
 - _____ Hens/Rooster
 - _____ Prefer not to respond.
7. Is the outdoor coursework (gardening, animal care, composting, etc.) a new experience for your child? *(Please select one).*
- No
 - Yes
 - Prefer not to respond.
8. Since taking Agricultural Science or Family and Consumer Science, has your child shown increased interest in farming, gardening, or animal care activities outside of what is offered at the school? *(Please select one).*
- No
 - Yes, other interests or activities my child has expressed interest in include:

 - N/A (My child has not taken Agricultural Science or Family and Consumer Science.)
 - Prefer not to respond.
9. When my child talks about the goats it is because.... *(Please choose all that apply).*
- ...my child brings it up.
 - ...I ask how their day was.
 - ...I ask about specific classes.
 - ...my child does not talk about the goats.
 - Prefer not to respond.

Section B: Benefits and Concerns of Goats

10. Is the presence of goats at school a positive or negative influence on the following:

	Extremely Negative (1)	Slightly Negative (2)	Neutral (3)	Slightly Positive (4)	Highly Positive (5)	Prefer Not to Respond (6)
acting as an engaging educational tool	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
increasing children's interest or enthusiasm for school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
increasing children's time spent outdoors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
teaching children responsibility through animal care	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
increasing children's interest in gardening	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
increasing children's interest in farming	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
increasing children's interest in animal care	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
increasing children's awareness of environmental problems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
overall contribution to the school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. Do you have any concerns regarding the presence and use of goats at Clarke Middle School? (*Please select one*).

- No
- Yes. Please list/describe your concerns: _____
- Prefer not to respond.

14. Since your child has attended this school, have **you** learned anything new about any of the following?

	A little	A lot	Nothing	Prefer not to Respond
Goats	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hens	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Roosters	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other Farm Animals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Composting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gardening	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
School	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Awareness of Environmental Issues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Section C: Acceptability of goats within Athens-Clarke County community

15. Which best describes where you live: *(Please select one)*.

- Rural area with farms, woods, and/or open land
- Residential neighborhood with single family homes with individual yards
- Densely populated area with homes or apartments without individual yards
- Prefer not to respond.

16. Where have you seen goats within the Athens area? *(Please select all that apply)*.

- in your neighborhood or in neighboring yards
- on residential property, other than in your neighborhood
- on non-residential, private property (e.g. farms and business properties)
- on public property (e.g. parks and state forests)
- I have not seen goats at any of these locations, but I know they are being used.
- I have not seen goats at any of these locations, and I did not know they were being used.
- Prefer not to respond.

17. Please indicate on a scale of 1-5 (where 1 = “strongly oppose” and 5 = “strongly acceptable”) your response to the following statements regarding your **acceptance to the idea of goats in Athens**. *Please indicate your level of acceptance with the following:*

Please indicate your level of acceptance with the following...	Strongly Oppose	Slightly Oppose	Neither Acceptable nor Oppose	Slightly Acceptable	Strongly Acceptable	Prefer not to respond
...people owning goats on residential property	1	2	3	4	5	6
...people owning goats on private, non-residential property.	1	2	3	4	5	6
...people having rented goats on residential property.	1	2	3	4	5	6
...people having rented goats on private, non-residential property.	1	2	3	4	5	6
... rented goats on public property.	1	2	3	4	5	6
... <i>businesses</i> that rent out goats for landscaping.	1	2	3	4	5	6

18. Please list any potential benefits of owning/renting goats:

Potential benefits of owning/renting goats:

Prefer not to respond.

19. Please list any potential risks/drawbacks of owning/renting goats:

Potential risks/drawbacks of owning/renting goats:

Prefer not to respond.

20. Please indicate an acceptable number of **owned** goats to have on a private residential property. (*Please select one*).

0

1-5

6-10

11-15

15-20

21+

Prefer not to respond.

21. Please indicate an acceptable number of **rented** goats to have on a private residential property. (*Please select one*).
- 0
 - 1-5
 - 6-10
 - 11-15
 - 15-20
 - 21+
 - Prefer not to respond.
22. Please indicate an acceptable amount of time for rented goats to be on private residential property given your answer to the previous question. (*Please select one*).
- Less than 1 week
 - 1-3 weeks
 - 1-3 months
 - 4-6 months
 - 7-9 months
 - 10 months-1 year
 - 1+ year(s)
 - N/A
 - Prefer not to respond.
23. Have you ever owned or rented goats? (*Please select one*).
- Owned
 - Rented
 - Never owned or rented goats
 - Prefer not to respond.
24. If you currently or have previously rented or owned goats what purpose did you have for them? (*Please select one*).
- Purpose: _____
 - Prefer not to respond.
25. Have you considered **owning** goats while living in Athens-Clarke County? (*Please select one*).
- No
 - Yes
 - Prefer not to respond.
26. Have you considered **renting** goats while living in Athens-Clarke County? (*Please select one*).
- No
 - Yes
 - Prefer not to respond.
27. What is your opinion on the effectiveness of goats clearing out overgrown areas of vegetation? (*Please select one*).
- Very Ineffective
 - Slightly Ineffective
 - Neither ineffective nor effective
 - Slightly Effective
 - Very Effective
 - Prefer not to respond.

28. Do you believe goats cause damage to the environment?

(Please select one).

- Definitely yes
- Probably yes
- Might or might not
- Probably not
- Definitely not
- Prefer not to respond.

29. Based on your answer to the question above, how do goats damage the environment? *(Please select one).*

Goats cause damage to the environment by:

Prefer not to respond.

Section D: Demographic Background

This information is completely confidential and will ONLY be used to determine if we have satisfactorily represented the Clarke Middle School student body and Athens-Clarke County residents.

30. What is your age?

_____ years *(Please fill in number).*

_____ Prefer not to respond.

31. What is your gender? *(Please select one).*

- Male
- Female
- Prefer not to answer
- Other, please indicate _____

32. What is your race/ethnicity? *(Please select all that apply).*

- American Indian or Alaska Native
- Asian
- Black or African American
- Hispanic or Latino
- Native Hawaiian or Other Pacific Islander
- White

33. Please indicate your highest level of education:

- Less than high school
- High school degree or equivalent (e.g. GED)
- Some college but no degree
- Associates degree
- Bachelor's degree
- Graduate degree
- Prefer not to respond.

34. Which best describes your income level:

- Less than \$20,000
- \$20,000 to \$34,999
- \$35,000 to \$49,999
- \$50,000 to \$74,999
- \$75,000 to \$99,999
- \$100,000 to \$149,999
- \$150,000 to \$199,00
- \$200,000 or more
- Prefer not to respond.

Thank you for your participation! We appreciate your time. Please return your survey to the researcher as you leave.

APPENDIX C: GOAT-ASSISTED RESTORATION PROJECT INTERVIEW QUESTIONS

Participant Interview Questions

A. What restoration values do people have that use goats for restoration?

- a. Have you volunteered with this restoration project before? How many times have you participated with this group?
- b. Why did you initially participate in goat-assisted restoration?
- c. What do you think are the organizers' envisioned goals for the project?

B. How do people's goals or values change over the course of a restoration project that utilizes goats?

- a. Once you got involved, what did you find to be the most important part/parts of your experience?
 - i. Is that something you felt before you started?
 - ii. If not, was it surprising, or not really surprising?
- b. Did your views on anything change as a result of your participation?

C. What are the outcomes of using goats in restoration projects?

- a. What, if anything, do you see as the benefit or benefits of the project?
- b. What, if anything, do you see as the negative effect/effects of the project?
- c. How would the project be different if it used some method other than goats?
- d. How would your experience have been different if goats weren't involved?
- e. If you were organizing a restoration project with goats, what would be your top priority/priorities? (OR how would you measure the success of the project?)

