

BENEFITS OF A RAIL-TRAIL IN RURAL APPALACHIA: A MIXED METHODS
STUDY OF THE VIRGINIA CREEPER TRAIL IN DAMASCUS, VIRGINIA

A Thesis
by
JOSHUA ANDREW ROE

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JOSHUA ANDREW ROE
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APPROVED BY:

Wayne E. Williams
Chairperson, Thesis Committee

Fred J. Hay
Member, Thesis Committee

John C. Whitehead
Member, Thesis Committee

Patricia D. Beaver
Director, Center for Appalachian Studies

Edelma D. Huntley
Dean, Research and Graduate Studies

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Abstract

BENEFITS OF A RAIL-TRAIL IN RURAL APPALACHIA: A MIXED METHODS STUDY OF THE VIRGINIA CREEPER TRAIL IN DAMASCUS, VIRGINIA

Joshua A. Roe
B.A., Morehead State University
M.A., Appalachian State University

Chairperson: Wayne Williams

Since the 1980s numerous abandoned railbeds have been converted to multi-use trails across the United States. These trails are commonly referred to as “rail-trails.” They accommodate pedestrians and bicyclists most frequently but may also be used for a wide range of non-motorized traffic. Rail-trails preserve cultural heritage and wildlife corridors that benefit local economies by promoting small businesses and tourism while providing a safe and enjoyable means of active recreation and transportation. Because of the subtle grade of former railbeds, rail-trails commonly provide a gentle slope that allows access to users with a wide range of physical ability.

One such rail-trail, the Virginia Creeper Trail in Damascus, Virginia, was the focus of a mixed method research project from September 2011 until December 2012. The research focused on two key components for building a case to further extend rail-trails in Appalachia. Through a wide reaching review of literature, in-depth interviews with local residents, and an economic impact survey of trail users, the many benefits of a rail-trail came to light.

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There are so many people to acknowledge as integral to the completion of this phase of my life and for helping me charge forward to the next. First are Dr. Wayne Williams, Dr. Fred Hay, and Dr. John Whitehead who served as my thesis committee and kept me on course; the people of the town of Damascus, Virginia for their constant enthusiasm and hospitality during my research, and the United States Forest Service for their constant maintenance of the Virginia Creeper Trail and permitting me to collect a portion of my data inside the bounds of the Jefferson National Forest. I would also like to thank all of the citizens of Damascus who took the time to talk with me about the Virginia Creeper Trail and the many people who took pause along the trail to share their stories with me. Without many pounds of dark roasted beans from Don at Bald Guy Brew I likely would know the feeling of eight hours of sleep, would not be addicted to coffee, and would also likely not have made it through this program. As should any Appalachian Studies student, I appreciate the continuous hard work of Dr. Patricia Beaver, Dr. Katherine Ledford, and Mrs. Debbie Bauer for always having a kind word, knowing where the form for anything can be found, and unfaltering dedication to their students. Also, thanks goes to the Office of Student Research for funding a conference opportunity through a travel grant to present a portion of my research in Athens, Georgia. My appreciation also goes to the Southeastern Regional Research committee for providing a scholarship so that I could attend their annual conference. Finally, without the encouragement, prayers, insight, friendship, and healthy laughter of Heather Christian this whole endeavor would not have been the same. Thank you.

Dedication

I dedicate this thesis to my parents who have always supported and encouraged my pursuit of education, to my loving wife who I met while pedaling across America by bicycle, my brother who accompanied me on that life-changing journey, and to everyone that has ever enjoyed the rushing freedom of the beauty, elegance, and simplicity of a bicycle. Ride on.

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Chapter 1. Introduction

Defining Appalachia

Appalachia is a land of mountains and views, hardwood and soft, evergreens, myriad creatures big and small, cold streams tumbling over rocks, towering escarpments, miles of cliffline, hidden fertile valleys, shadowy hollows, and many rolling hills. Volumes of pages have been filled in describing the innumerable qualities of this mountainous region of the eastern United States of America. Compared to younger mountain ranges around the world, the Appalachian Mountains have had millennia to erode to the softer lines seen today. In spite of their age, as pointed out in the Encyclopedia of Appalachia (Abramson & Haskell, 2006), “the complexity of the Appalachians’ geology and physical geography is as impressive as their immensity and biological diversity” (p. 3).

The Appalachian Regional Commission (ARC) has long been gathering data and engaging in economic development programs throughout the region. The ARC was founded in the 1960s at the behest of president John Kennedy after campaign trips to West Virginia and having been approached by a group of governors from the region. Per the ARC, there are thirteen states with a total of 420 counties that compose the geopolitically defined region of Appalachia seen in Figure 1 (Retrieved from www.arc.gov, n.d.). These counties cover 205,000 square miles surrounding the spine of the Appalachian Mountain chain. Based on

ARC data, forty-two percent of the region is defined as rural, or having a relatively low population density.

Rails and Trails

Whether real or imagined, Americans tend to have a fascination with the natural world. In what seems to be an unnatural manner, we seek to experience nature as something separate from humans by occasionally taking a short trip to a national park, national forest, or some other place where nature seems to be relatively undisturbed. As more and more Americans concentrate in urban areas, a temporary escape from daily life is sought for a moment of respite and clarity. Also, residents of both urban and rural areas are becoming more acutely aware of the benefits of active transportation, recreational physical activity, and alternative safe routes for human powered traffic (active transportation). Rail-trails are multi-purpose public paths created from former railroad corridors that have become inactive and have often been abandoned for many years. Most often flat or following a gentle grade, they traverse urban, suburban and rural America. This slope gradient must remain relatively low to accommodate the unassisted passage of often very heavily laden train cars pulled historically by steam engines. Still today, because of the safety risks involved with traveling on a downhill grade, the steepest main line railway that does not employ mechanical advantage by way of a cable system is known as the Saluda Grade in western North Carolina. The grade on this section of rail owned by Norfolk Southern Railway reaches its steepest officially listed grade of 4.7% south of Saluda but is now inactive (Gilbert & Jefferys, 1971; McGonigal, 2006).

A rail-to-trail conversion is exactly as the name implies; dormant railbeds, especially those that have been sequestered through railbanking, are recycled to be used as a multi-use

path. This process includes removal of the rails (if they have not already been pulled and recycled by the rail company), adding a useable surface to trestles and bridges, clearing any debris that may have fallen, and re-grading the corridor. The re-grading, or surface improvement, is often the most costly (Aaron Sizemore, personal communication, April 10, 2012). Rail-trails often use crushed stone, wood chips, or in some cases the surface is asphalted for trail user convenience.

Dormant railbeds that have been converted to rail-trails can provide this healthy and safe way to spend time in these desired natural settings, especially in rural Appalachia. Further, rail-trails can be seen to provide the benefits listed above and many others outside the scope of this research. Ideal for many uses, such as bicycling, walking, inline skating, cross-country skiing, equestrian and wheelchair use, rail-trails are extremely popular as recreation and transportation corridors. The League of American Bicyclists (LAB) and the Rails-to-Trails Conservancy (RTC) estimate that sixty million Americans ride a bicycle at least once per week and a majority of those trips occur on a greenway or rail-trail (www.bikeleague.org, n.d.; www.railstotrails.org, n.d.).

The relatively low cost of conversion and maintenance of dormant railbeds makes them a real asset to rural communities. Along with improved community health, rail-trails can help increase social, economic, and ecological benefits while being much less costly than highway construction or maintenance. This can all be seen through a close examination of the Virginia Creeper Trail in Damascus, Virginia. This trail has helped to change the state of existence of a small, rural Appalachian town. As noted by Rabl and de Nazelle (2012), “Such change can bring about significant benefits for our health and environment.”

In Appalachia there is a history of high unemployment, out migration of industry, and exodus of laborers. There are also growing health concerns regarding conditions such as obesity, cancer, heart disease, and type II (or adult onset) diabetes. The region has also long been subject to mineral and other natural resource extraction with unsustainable marginal returns. In Appalachia, as well as the nation, there exists a culture that is reliant on passive transportation. This culture has embraced the automobile as the standard mode of expedient travel. It has contributed to out migration, implicitly perpetuated poor health, and has aided in the preservation of a resistance to greater economic potential found in long-term investments such as greenways.

Motivated and directed by the issues listed, this research seeks to add to the field of research on the benefits of linear parks. A unique and appealing aspect of rail-trails is the variety of exposure and benefits they have to offer. Whether someone wants to enjoy wetlands, dense forest, rhododendron groves, or some other aspect of nature, rail-trails are often able to provide more than one of these features. Besides natural wonder, rail-trails also serve to preserve a time in the history of this country when ribbons of rail coursed through many of the hills and hollows. These railways were often used for the destructive extraction of timber, coal, various other minerals, and human capital (Eller, 1982). There is no reason today though, that they cannot be used to provide at least some measure of return to the same communities that they hauled wealth away from so many decades ago. In fact, it has been seen through many studies focused on urban regions that rail-trails and greenways provide multiple layers of benefits to the surrounding area. Some of these benefits include improved community health, increased physical health of trail users, decreased health care costs, economic stimulation, and increased real estate values just to name a few (Balish, 2006;

Mapes, 2009; Mionske, 2007; Rails-to-Trails Conservancy, n.d.; Steiner, 2009; The League of American Bicyclists, n.d.).

Damascus and the Virginia Creeper Trail

Dr. Moore was a practicing physician in Abingdon, Virginia when the Virginia Creeper rail branch was abandoned in 1977. He was an active person who wanted a safe place for residents to walk or ride bikes and also likely foresaw the health benefits for the community in having such easy access to a safe and enjoyable place to recreate. As chairman of the Washington County Planning Commission in Virginia, he had a built-in group of supporters for the Virginia Creeper Trail (VCT). After a covert action by a landowner in Watauga County, North Carolina that resulted in the dormant railbed reverting to private property, half of the trail was lost (Smith & Moore, 2009). Nonetheless, the Virginia section of the Creeper was completed and designated a National Recreation Trail in 1986. This is, of course, a gross simplification of the whole process and ordeal that took place over the course of nearly a decade of efforts. The next big event was the arrival of Phoebe Cartwright to Damascus. Phoebe's arrival to the town, as will be illustrated and explored later, laid the foundation for a business model that is now part and parcel to bicycling the Virginia Creeper Trail (VCT).

Researching the Virginia Creeper Trail

Over eighteen months from October 2011 to March 2013, thirteen interviews were conducted, many hours were spent as a participant observer, and the town of Damascus in southwestern Virginia and the VCT were thoroughly researched and examined. Many times, a loaded touring bicycle, complete with a laptop, books, food, and camping gear was pedaled

more than fifty miles one way, on a two-lane road—often with no or very little space on the shoulder—to Damascus to conduct research. Near Damascus, a primitive camp was set to have an operating location on the Virginia Creeper Trail within the Jefferson National Forest boundary. This improbable modus operandi accommodated weathering sub-freezing temperatures, pouring rain, hail storms, snow, and days of beautiful blue skies and mild Appalachian sunshine.

This project was started with the supposition that a rail-trail in a rural Appalachian town can provide social, health, economic, and ecological benefits to locals, non-locals, nature, and the economy. The goal has been to create a succinct argument for the utility, enjoyment, and benefits of promoting a growing bicycle culture in Appalachia while also painting a complete picture of the usefulness of rail-trails and bicycling as practical for both transportation and recreation. To that end, a wide expanse and deep reaching amount of literature on such topics has been reviewed. The formatting used for this work follows American Psychological Association guidelines.

A brief history of Damascus

According to Hall (1950) Damascus was incorporated in 1886 by the efforts of Civil War General J. D. Imboden. The town was previously a farming settlement known as Mock's Mill. General Imboden named Damascus after the Mediterranean steel capital that existed centuries prior in Syria. Hall (1950) notes that this was an expression of the hopes for high volume and quality steel from the surrounding area to bring prosperity to the town. While this hope quickly faded, renewed hope was found in the timber industry until those resources were also depleted by 1928 (Blevins, 2003). The Great Depression was the last straw in the heyday of the Virginia Creeper branch rail line.

In the late 1890s the Abingdon Coal & Iron Railway was extended to Damascus by Norfolk & Western. Then in 1905, the Hassinger Lumber Company would extend the rail to Konnarock and Elkland, North Carolina (Hall, 1950). Named after the creeping nature of the Virginia Creeper vine, the steam locomotives were said to creep up the railroad's steep grade from Damascus to Whitetop Station, thus rightfully earning the rail line moniker "Virginia Creeper." With such steep grades, one hundred trestles and bridges, and the requisite winding through the mountains, the Virginia Creeper line was a typical railway through the mountains that required constant diligence to maintain (Hall, 1950). The Creeper was unable to produce a profit after the Great Depression and was ultimately abandoned with its final train running on the 31st of March 1977 (Blevins, 2003).

The Virginia Creeper Trail, in its current state, has become a boon for the 1,000 residents that constitute the community and economy of Damascus, Virginia. The "Creeper" as locals refer to it, is a multi use (allowing pedestrians, bicyclists, horse back riders, and other non-motorized traffic) public access trail that connects Damascus with Abingdon, Virginia to the west and just over a mile beyond Whitetop Station to the east, ending at the North Carolina state line. The trail is 34.3 miles long and has a history reaching far into the past. According to Blevins (2003) and Hall (1950), what is now a recreational corridor was once a game trail and Native American footpath. Later, European pioneers would use the same trail before the famed explorer Daniel Boone would cross the path followed by early settlers.

The Virginia Creeper Trail is by no means unique to the region or country in its abandonment and subsequent conversion to a rail-to-trail. For example, there are also the New River Trail in Virginia, The Greenbriar Rail-Trail in West Virginia, and the Greater

Allegheny Passage in Pennsylvania that connects to the Chesapeake & Ohio Canal Towpath to create a 335 mile rail-trail from Pittsburgh, PA to Washington D.C. The common thread of all of these multi-use paths is that they travel along railroad grade corridors that were once all active rail lines.

Chapter 2. Literature Review

Introduction

Appalachia, among other regions, is experiencing a growth in sustainability efforts. These efforts include various approaches that can be seen as clear pieces in a single work in progress, and that strive toward preserving the socio-ecological qualities of Appalachia. The theoretical premises that will serve as the framework for this on-going research are rural sustainable development, participatory development, resilience, ecotourism, and bicycling culture. Rural sustainable development is critical to Appalachia because of the largely rural nature of the region. Participatory development links the people of Appalachia directly to the decisions that are being made that impact the socio-ecological system and thus, the resilience of the region. A resilient socio-ecological region should be able to absorb potentially detrimental activities while still reaping social, ecological and economic benefits from things such as tourism. Ecotourism is an emerging economic force reliant on a healthy socio-ecosystem to attract tourists who will spend money in the region. Part of a growing movement in America is the reemergence of bicycling culture both for ecotourism and practical transportation (Adventure Cycling Association, n.d.; Mapes, 2009; Mionske, 2007; Rails-to-Trails Conservancy, n.d.; Steiner, 2009; The League of American Bicyclists, n.d.).

These five themes can be grouped into three large, overarching systems of culture, environment, and economy all of which are inextricably linked to one another. There is currently a large selection of literature on these various topics. The role of each will be explored in this paper. Rural sustainable development, participatory development, resilience,

ecotourism, and bicycle culture can all fit together nicely then, as pieces of a puzzle with long-term sustainability becoming the large picture. Any of these as a stand-alone elixir will only go so far. A consilience of these and likely many other approaches that provide a deep literacy of complex systems will prove useful for sustaining Appalachia.

Sustainability

Town planners, academicians, government officials, and activist intellectuals (Fisher, 1993) are discussing rural sustainable development. The Brundtland Commission (World Commission on Environment and Development, 1987) defined sustainable development as "...development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (p. 43). This is crucial in the exploration of deficiencies associated with further development into natural biodiversity areas, which are sensitive to human encroachment. There is an inherent interdependence between rural and urban areas and also an inextricable reliance on the natural environment by both. While the natural world is rather resilient, elementary biology explains that organic systems found in rural Appalachia have a maximum carrying capacity.

Rural sustainable development is especially relevant in Appalachia where mountain top removal for coal mining, labor exploitation that leads to exodus of kin, and significant decreases in farm ownership are threatening the socio-ecological system. As pointed out by William Rees in *Rural Sustainable Development* (Audirac, 1997), "our food, that most basic of vital needs, seems increasingly dissociated from its origins in the sun and the soil" (p. 41). However, food supply is not the only concern; quality of life, community ties, economic benefits, and biodiversity are just a few other examples that repeatedly surface in literature by Farr (2008), Steiner (2009), Weaver (2006), Keefe (2009), and many others.

Community sustainability sits well within the boundaries of rural sustainable development because local people are integral to sustainability as a whole. Helen Lewis notes that the prevailing model of attracting large industry in the past was a model in which “we offered up our coal, timber, water, air, people’s labor and their health” (2009, p. 69). This is important to rural sustainable development because of the destructive nature of coal and timber extraction, exhaustive agricultural practices, the loss of water and air quality, and how all of these things are tied to the people and vice versa. Found in *Rural Sustainable Development* (Audirac, 1997) and *Participatory Development* (Keefe, 2009) is a motif of shifting away from this exploitive paradigm toward one of engaged participation by the local people. This shift to development being an inclusive process initiated and carried out by local residents will be paramount in sustaining the present and providing for the future of Appalachia (Audirac, 1997; Keefe, 2009; Fritsch & Johannsen, 2004; Martin, 2007; World Commission, 1987).

Participatory Development

In any endeavor to “improve the well-being of local people” the local people must be involved in a participatory process of decision-making. As Keefe points out in the introduction to *Participatory Development in Appalachia*, “(critiques) of the modern development paradigm in the last three decades pose unique possibilities for action in Appalachian communities” (2009, p. 1). Initiating discourse on rural sustainability so that the whole process is inclusive of Appalachian people is critical. As discussed by Wagner (2009), change to a landscape can be perceived as a threat to the beauty and cultural heritage of rural Appalachia. Additionally, it can create a feeling of loss of privacy and control by some concerned locals. To allay these concerns, greater bonding, bridging, and linking; all forms

of social capital, can help preserve the socio-ecological health of Appalachia now and into the future (Wagner, 2009; World, 1987). Furbey et al. (2006) describe “bonding” as social capital that occurs between “close-knit groups,” such as family; “bridging” as connections that occur between neighbors, colleagues, and other community members with a common interest; and “linking” as a further reaching form of social capital that creates a connection between people or groups that extends beyond normal social circles in a community (as cited in Wagner, 2009; p. 146). Rural sustainable development then, requires many kinds of participation from local peoples.

Social capital building is certainly happening in Appalachia, often around greenways, town parks, and rail-to-trails. As noted by Starnes, Benedict, and Sexton (1997) “The strategy (for developing linear parks) is built on a strong, active desire among rural citizens to seek out and recognize the value of existing land and historical and environmental resources” (p.323). Specifically, “a popular activity is the preservation of historic transportation infrastructure, often from the age of rail and river transportation, when many small American rural towns were founded as transportation hubs in these historic networks” (Levinger, Loh, Mills, Sonenklar, & Walljasper, 2012, p. 9). This is seen to develop even further in the growing use of these linear trails by the locals in rural regions around the country. Throughout their article “Beyond Urban Centers,” Levinger et al. note town after town in rural areas where the residents are increasingly making trips by bike or on foot, often along trails that they have been part of initiating (2012). With people in Appalachian communities actively engaged in participatory development, greater resilience in the present and future will be realized.

Resilience and Ecotourism

Resilience is a relatively new theory in academia but has been in practice by traditional societies and small-scale rural farmers for generations. According to Walker and Salt (2006), “resilience is the capacity of a system to absorb disturbance and still retain its basic function and structure” (p. xiii). With the emergence of resilience theory, a network of ecologists and social scientists formed what is aptly labeled the Resilience Alliance. According to Walker and Salt (2006), this alliance is the “crucible in which an entirely new paradigm for understanding and managing our environment is taking form” (p. xi). Whether or not a system can absorb a given disturbance depends on variables such as the frequency, magnitude, and type of disturbance, as well as other potential variables. The resilience of Appalachia is, thus, tied to its people.

With the great biodiversity of flora and fauna in rural Appalachia, there must be a genuine effort to increase the awareness of how complex, and often fragile, regional biodiversity is. Whether or not a community or region is resilient depends on adaptability and transformability. These qualities, in turn, depend on the people within a socio-ecological system and their ability to sustain or re-create the system in which they reside (Walker & Salt, 2006). Social capital building can provide the catalyst for empowerment of the local people to realize their own adaptive and transformative capacities (Farr, 2008; Wagner, 2009; Walker & Salt, 2006). If residents of a community that has a high potential tourist draw are serving as members of steering committees they will be directly linked to changes that can be beneficial. Further, the community members will be aware of changes that could be detrimental. Opening the dialogue and bridging the gap between local and non-local people

will help stifle a sentiment of “Not In My Back Yard” (NIMBY), a common hindrance to ecotourism (Fritsch & Johannsen, 2004).

In *Ecotourism in Appalachia*, Fritsch & Johannsen’s (2004) discussion of The International Ecotourism Society (TIES) expounds on the difficulties and disagreement about what ecotourism truly is and it is not. “Ecotourism,” “sustainable tourism,” “nature tourism,” “green tourism,” and other terms have often been interchangeably used to describe human recreation in a natural environment. According to Fritsch and Johannsen, TIES defines ecotourism as “...responsible travel to natural areas that conserves the environment and improves the well-being of local people” (p. 3). Tourism has long been part of the economy in Appalachia and likely will be into the future if the natural beauty that draws tourists is sustained (Martin, 2007; Weaver, 2006).

A region replete with natural or historical resources and citizens actively involved in sustaining and promoting those resources stands to reap long-term benefits. According to Martin (2007), “(the) natural amenities of the mountain environment have always been the foundation for tourism in the southern highlands. Since the colonial era, tourists traveled to the Mountain South to partake of the region’s healthful spring waters, beautiful scenery, salubrious climate, and natural wonders” (Martin, 2007, p. 65). A resilient Appalachia, both social and ecological, will be able to sustain these qualities for cultural, environmental, and economic health. This, in turn, will accommodate a continued capacity for the region to absorb the impacts of ecotourism (Fritsch & Johannsen, 2004). According to the World Tourism Organization, several criteria must be met for tourism to be sustainable as discussed in the foreword by Weaver (2006). These criteria include respecting the local socio-ecological system, conserving the built environment and cultural heritage of the locals, and

contributing to understanding and tolerance of various cultures. Tourists visiting an area for ecotourism should have a meaningful and satisfying experience that increases their awareness of sustainability and community while also increasing their appreciation of local culture and sustainability practices.

There can be many direct relationships between tourism, recreation, and sustainability efforts and each often supplements the other two very well if pursued responsibly with forethought and care for the local ecosystem, community, and economy (Fritsch & Johannsen, 2004). Systems, whether socio-cultural or biological, have a maximum carrying capacity. Slowing to a more human speed to be absorbed by and engaged in one's natural surroundings allows an increased awareness to this carrying capacity (Farr, 2008). Bicycling culture along with a movement known as "Slow Travel" are actively promoting slowing the pace and changing how people see the world. Ironically, the highways that are relied on to speed traffic from one town to another have their origin as a hard surface thoroughfare thanks to bicyclists' actions near the end of the Nineteenth Century (Smith, 1972).

Bicycling

It was members of the League of American Wheelmen, from New York City, who lobbied Congress to begin paving dirt roads to improve safety for cyclists (Smith, 1972). By the time Henry Ford streamlined the production of the German engineered "Motorwagen" or "horseless carriage" as it was referred to in the United States, roads were already being paved for bicycles. According to Bob Mionske (2007), legal statutes already in place for bicycles were subsequently adopted for automobiles. As illustrated throughout *A Social History of the Bicycle* (Smith, 1972) and echoed more recently by Mapes (2009), the bicycle is an enduring element capable of creating cultural change.

Actively commuting on foot or by bicycle can diminish the ‘rushed’ feeling in life created by current technologies, high speed automobile oriented infrastructure, and strivings for ever greater optimization of time. Slow travel flows counter to the fast paced, always on the go business world and urban environment. “In essence it is about slowing down, travelling shorter distances and enriching the travel experience both en route to and at the destination” (Lumsdon & McGrath, p. 267. 2011). A major issue that often arises from this suggested paradigm shift is the question of how to accomplish a migration away from an automobile dependent society. As Steiner (2009) illustrates in *\$20 Per Gallon; How the Inevitable Rise in the Price of Gasoline Will Change our Lives for the Better*, this society has become reliant on petroleum and with rising prices, America will become a nation much less dependent upon the automobile.

A problem created by rising fuel prices and a shift away from automobiles is the limited mobility associated with health issues, age, and other circumstances that may inhibit one from engaging in active transportation. Certainly, not all people could be expected to give up even a portion of their daily commutes by car, and situations can dictate that traveling by bike or on foot is not always practical. However, change need not take the form of full-scale conversion to a pedestrian and bicycle centric rural Appalachia, but could be an incorporation of multi-modal infrastructure and walkable/bikeable communities that can, in turn, be connected via a network of railroad grade trails that allow safe travel and recreation. This is already happening across the country in rural and urban areas, with rural areas showing even more use than nearby urban centers (Levinger, Loh, Mills, Sonenklar, & Walljasper, 2012). Specifically, Levinger et al. point out that trips on foot or by bike account

for up to 9.6% of trips in rural areas and Mapes (2009) notes that in cities like Portland, officials are striving for five percent.

With regional and national increases in bicycling, there will be a corresponding growth in demand for safe infrastructure. With nearly forty percent of all rural trips being under three miles and more than half of those trips being a mile or less, residents are realizing the benefits of going by bike (Levinger et al, 2012; Mapes, 2009; Steiner, 2009). Besides being more economically feasible to make these short trips by bike, safe bike lanes are much less expensive and provide quality jobs for local residents. As Dill (2009) notes, “the potential for bicycling as a transportation mode has been recognized nationally through objectives to raise bicycling rates and significant increases in funding for building new infrastructure” (p. 596). Bicycling is not just a potential mode of transportation, however. A growing number of people are taking to cycling for the practicality of avoiding the gas pump (Mapes, 2009; Steiner, 2009), but they are also realizing the health benefits, both personal health and environmental health, of cycling. As Mapes (2009) points out, a study on alternative transportation found “savings in energy, pollution, and other costs of as much as 22 cents for each mile in which a bike could be substituted for a car, and that study was done before gas prices spiked above four dollars (in 2008)” (p. 15). Also pointed out by Mapes (2009), in discussing the findings of a postdoctoral scientist at the University of California at Berkeley, “(if) everyone cycled for an hour and reduced their driving by an equivalent distance, the U.S. would cut its gasoline consumption by 38 percent...” (p. 14). With ever increasing fuel prices, this shift has already started occurring and, according to Steiner (2009) will inevitably continue to change lives for the better.

Besides the readily apparent economic and environmental benefits of shifting from driving an automobile to human powered locomotion, walking and bicycling paths can generate a means of recreation that benefits locals and tourists alike, while causing only marginal, or no further harm to a natural setting. Bicycling and walking, as a means of transportation and recreation, provide many Americans with much needed physical exercise as well. Incorporating bicycling or walking may be one of the best ways for Americans to exercise regularly. This is reflected by Mapes (2009) in his realization that the health community has now firmly adopted the view that including exercise as part of the daily routine of Americans is the only way to increase physical activity to healthy levels. Besides physical health, walking and bicycling are suggested to improve mental health as well. “Walking or cycling briskly in the outdoor environment, particularly in green spaces, has been shown to improve mood and mental well being” (Bolitho, 2011, p. 11). Improved individual mental and physical health and community members being in an overall better mood, can also help strengthen community social capital. Levinger et al. (2012) note that in recent research, active transportation has been directly linked to “improved health and social cohesiveness” (p. 12). This socio-ecological health certainly comes with many benefits. One manner of promoting a coalescing of these factors is found in ecotourism in rural Appalachia.

Much research has been conducted and is still under way. Hundreds of millions of dollars has been invested in understanding the effects of tourism on Appalachia (Fritsch & Johannsen, 2004). “Tourism is emerging as a major economic factor in Appalachia, as it is elsewhere around the world” (p. 6). One type of ecotourism is found on dormant railbeds, many of which pass through United States national forests. As noted by Siderelis and Moore (1995), “this type of recreation site is the recycling of an abandoned railroad bed into a rail-

trail, which is able to accommodate recreation activities and transportation purposes.” These dormant railbeds are often abandoned lines that are remnants of the era of timber and ore exploitation in Appalachia (Aytur, Rodriguez, Evenson, Catellier, & Rosamond, 2007; Blevins, 2003; Dill, 2009). This concept is certainly not new but still has ample room for growth. According to Levinger et al. (2012), the amount of recreation, ecotourism, and utilitarian use of bicycle pathways has increased significantly in the last decade, especially in rural areas.

While some towns and regions may benefit more than others, locals in rural communities of Appalachia are reaping many benefits from the presence of rail-trails (Levinger et al, 2012; Rabl & de Nazelle, 2012, Aytur et al, 2007). Opportunity abounds in Appalachia to expand rail-trails and even create a connected network of alternative sustainable transit corridors (Farr, 2008). This system could also provide ample healthy recreation for locals and tourists. Rail-trails afford a means of sustainable tourism, create a local shift toward a more sustainable livelihood, and might begin to wean Americans off of oil.

Across the United States and the world, dormant railbeds have been converted to multi-use pathways open only to non-motorized traffic.

Recently, the RTC published a report about the successes of an active transportation system in Portland, Oregon. This article shows that as of 2008 the city of Portland had invested \$57 million to develop a bicycle network that has saved Portlanders “\$12 Million in fuel and \$10 million in health care costs” from increased cycling (Gotschi, 2010). On a national level, Gotschi and Mills (2008) reported that bicycle and walking trips of three miles or less “amounted to \$3.5 billion in benefits (annually), and under future scenarios this figure

could increase to \$10 to \$35 billion annually.” This shows the upward trend in demand for, use of, and increased benefits implicit to rail-trails. In prior years, various economists scrutinized trails in rural areas across the country for their economic benefits. In 1985, for example, the Sugar River Trail in Wisconsin generated \$430,000 in expenditures by trail users, or about \$9.04 per person (Siderelis & Moore, 1995). In valuing individual trips to rail-trails, a common method from revealed preference theory is the travel cost method (TCM) (Betz, Bergstrom, & Bowker, 2003; Kushniruk, 1992; Siderelis & Moore, 1995). Using this method or a derivation of this and other methods, reports consistently show the positive economic impacts of rail-trails on a local and national level. In 2004 the net economic value of trips to the VCT with no opportunity cost was reported at \$2.3 million and with opportunity cost being valued, the annual net economic value increased to \$3.9 million (Bowker, Bergstrom, & Gill 2007). As the linear miles of rail-trails increase, the corresponding studies that track this data should quantify the benefits to local economies.

There is a growing number of rail-trails around the United States and a corresponding number of studies that relate the many benefits that are experienced from this sort of prudent investment. In recent news from the RTC, for example, Florida has announced that it will invest \$50 million to complete a 275-mile greenway trail that will bisect the state. This case study started with the basal knowledge of previous cases that illustrate the positive impacts of rail-trails in other areas of the United States and economic impact studies of both the Virginia Creeper Rail-trail and other similar trails both within and outside of the geographic region previously described as Appalachia. There is much hope that many similar studies will increase in frequency, depth, and media prominence. An expansion of research and literature

will fuel exploration of both qualitative and quantitative methodologies being combined to show the full spectrum of benefits realized by investing in a rail-trail or greenway.

Chapter 3. Methodology

Introduction

This research focused on the development of a rail-trail in Damascus, Virginia and was based on a combination of qualitative and quantitative data gathering. The mixed method used in this research, while not a traditional approach, is becoming more common in fields of study that are influenced by relevant qualitative and quantitative data. Before information gathering that required direct human subject interaction began, the Institutional Review Board (IRB) of Appalachian State University was solicited for approval of human subject research as being exempt due to a lack of any inherent risk to all participants. This was completed for both the qualitative and quantitative phases of data gathering. The IRB approval notice is attached as Appendix 1.

During the course of field observations and interviews to obtain qualitative data, a trend was observed among town residents and trail users that prompted the addition of quantitative research. Combining qualitative and quantitative research is not a new concept as noted by Strauss & Corbin (1998). In fact, they stress the idea that researchers “think in terms of the **interplay between qualitative and quantitative methods**” (Strauss & Corbin, 1998, p. 31, bold used by authors.) Part of the early theory of this study developed from the qualitative research centered on a response by interviewees that alluded to the economic impacts of the VCT. Because nearly all interviewees implicitly mentioned the economic impacts of the VCT, a quantitative component became a logical aspect of this research to explore the costs and benefits of the rail-trail.

Qualitative Methods

Thirteen residents of Damascus were interviewed using a purposive sampling (Bernard, 2002; Strauss & Corbin, 1998). To conduct these interviews, several consecutive days and nights were spent in Damascus. Covering the fifty-four miles from Boone to Damascus on many weekends allowed for participant observation in the town and on the Virginia Creeper Trail. Being regularly present helped to establish a deeper rapport in the town, which worked toward lessening the issue of bias commonly found in qualitative research. By being a bicyclist while also conducting research on a rail-trail predominantly used for bicycle recreation “the aim [was] to see the research setting as though the researcher were not there—untouched by the researcher’s fly-on-the-wall presence” (Holliday, 2002, p. 145).

A journal of field notes for observations regarding the town, bicycle use, sense of community, and thoughts for future research were kept in a waterproof pannier for the commute and used regularly while in Damascus and camping on national forest lands along the Virginia Creeper Trail. This method of being a participant-researcher worked toward lessening the degree of interviewee partiality. Nonetheless, the research data relies on interpretation of the information collected from interviewees that have a vested interest in a feature of the town in which they reside. The VCT is a feature that provides a boon to the economy and sense of community in Damascus, Virginia.

Reflection on this matter, or an approach of reflexivity, in analyzing the results of both the qualitative and quantitative data led to an abduction method (Alvesson & Sköldbberg, 2009) that lends well to future research on the community impact of rail-trails. In abduction, as described by Alvesson & Sköldbberg (2009), “an (often surprising) single case is

interpreted from a hypothetic overarching pattern, which, if it were true, explains the case in question. The interpretation should then be strengthened by new observations (new cases)” (p. 8). A growing number of case studies around the United States show similar results of cultural and economic impacts positively affecting local communities that have access to a rail-trail or greenway.

The interviewees ranged from twenty years in age to sixty-seven. Among those interviewed were the Chief of Police, a local lady who started the shuttle service model to carry cyclists to Whitetop Station for a seventeen mile downhill ride back to Damascus, a local church member, a restaurant owner, a hostel owner, a shuttle driver, the town manager, a bike shop employee, and local brothers who remember the railway officially closing in 1977. The education of this sample ranged from high school graduates, a current undergraduate student, and various levels of graduate study up to a Ph.D. Due to the lack of ethnic diversity in Damascus, the entire sampling is Caucasian. It should also be noted that there is a very likely bias in this project due to the vested interests of residents in Damascus. As can be found throughout town, love it or hate it, the residents in Damascus rely on the economic impact of the Virginia Creeper Trail. The survey used in the qualitative interviews is available as Appendix 2.

Quantitative Data

To gather relevant information regarding the economics of the VCT, a common method used to explore the economic impacts of recreation was employed. Through benefit-cost analysis, economists explore the implicit and explicit expenditures associated with tourism and recreation (Boardman, Greenberg, Vining, & Weimer, 2011). For the purpose of this study, a survey was developed. The questionnaire included thirty-five questions in total;

the first eleven questions related to qualities of the VCT, the next five established resident/non-resident of Damascus and travel required of trail users, then six questions dealt precisely with travel and trail-related expenditures, eight questions addressed hypothetical future activity, and the remaining four were optional general demographic questions. This questionnaire is attached as Appendix 3.

In order to distribute the form as widely as possible, it was digitized using an online survey tool that can be emailed to solicit responses. Before collecting email addresses of trail users while stationed along side the VCT, permission was requested by the researcher and granted by Jefferson National Forest personnel. The request and permission correspondence are attached as Appendix 4. After receiving permission to solicit email addresses of bicyclists while on the VCT, a combination of field notes, maps, and on-site reconnoitering was used to identify a “choke point” along the trail. This point was then used over the course of several weekends to set up a temporary station where trail users could voluntarily stop for information regarding this research, receive complimentary water or lemonade, and volunteer only an email address to participate in the study. Ultimately, 202 emails were collected over the course of several weekends of a solitary researcher being based on the VCT. Of the 202 people who volunteered an email address, eighteen emails were rejected by the online service as invalid, fifty-eight chose not to complete the survey, and 126 provided information. At sixty-two percent, the response rate is much better than the average response to similar surveys, which may have implications for future qualitative research regarding the high interest of rail-trail users. After being collected, the data was analyzed to ascertain the distances traveled by the respondents and then used to measure travel costs at two different rates. This information is discussed in greater detail later.

Consistent with applied economic theory (Boardman, Greenberg, Vining, & Weimer 2011) this study supposes that the quantity demanded, q , depends on the travel cost, t_c , but varies in that it assumes the VCT is preferred over a substitute good as the primary data was gathered from individual users at the target location. To calculate the net present value of increase in trail miles (NPV) this study made several assumptions. First, this study estimates the demand would increase with an increase in trail miles. Next, the current estimated number of annual trail user visits is assumed to be accurate and thus reflects a demand increase from the Bowker, Bergstrom, & Gill study conducted in 2007. It was also assumed that the price of related expenses and substitute goods would remain constant and thus not affect net outcomes.

Chapter 4. Findings: Benefits of the Virginia Creeper Trail

As the railroad grade is already present and much of the labor and regular maintenance is taken on by trail clubs or non-profit organizations, there is a general consensus among town officials and residents of Damascus that a rail-trail provides benefits that far outweigh the costs of such a trail (personal communications, January-April 2012). Among the town residents interviewed for this research were the chief of police, the town manager, local brothers, a college age student, business owners, past business owners, church members, and a bicycle shuttle driver. Phoebe Cartwright and her husband Jim were the genesis of the business model that exists in Damascus today. Phoebe is originally from a town nearby Damascus. She moved to Damascus and started Blue Blaze, a bicycle shuttle service for tourists wanting to ride along the VCT from Whitetop down to Damascus. After years of successful business Phoebe and her husband passed the business on to enjoy their retirement. Bill Nunley has now been the chief of police in Damascus for several years. He heads a department of six full time police officers and has one of the few departments in the state of Virginia where all officers are also medically certified as EMTs. Katie is a local church member, vocalist for the church band, a student at Virginia Tech, and a barista at the local coffee shop. Ron Blevins, the owner of a diner in Damascus, graduated just a couple of years before the Virginia Creeper railway was abandoned. He has retired from the military and returned to his hometown to enjoy being near family and the VCT. Ron's brother James graduated from Holston High School in 1977, the year the rail line was abandoned and recalls all the controversy surrounding the rail-to-trail conversion. He now works as a bicycle

shuttle driver and occasionally at his brother's restaurant. Aaron Sizemore is the city manager of Damascus and also owns a small business in the downtown area. When he can find the spare time he enjoys walking, running, and cycling on the VCT. Paul and Lee Lewis moved from the piedmont of North Carolina to Damascus to start a small hostel near the VCT. The trail is now at the edge of their back yard. "Wild Bill" moved from a local Tennessee town that recently blocked the progress of a rail-trail. After the trail was proposed he had high hopes that were soon dashed by local land owners so he packed his things and moved to Damascus to be on the VCT.

"Without the trail, Damascus wouldn't be here"

"Oh, I love the trail, its why me and Paul moved here." This was the first response to the first interview conducted in late February 2012, with Lee Lewis, the co-owner (along with her husband Paul) of a hostel in Damascus. Every response after that first interview came with the same enthusiasm and sentiment. As Phoebe Cartwright told me "Well, I think it's just gorgeous, I wouldn't be here, the town wouldn't be here without the Creeper" (personal communication, March 2012). Katie, the youngest of my interviewees, might have been the least concerned with the economic benefits but they surfaced in her statement none the less, when she said, "I love the Creeper, I go out and run or bike on it three or four times a week. Especially on the mornings that I'm not serving coffee for people getting ready to ride down from Whitetop." Katie went on to explain how the trail brings vitality to the town and she feels everyone currently in Damascus would move away to Abingdon, Mountain City, Boone, Knoxville or some other larger town if not for the Creeper Trail (personal communication, March 2012). Another illustration of connection to the Creeper and the locals is found in the opinion of Aaron Sizemore, the town planner. When asked his opinion,

his response was more pragmatic: “Well, of course I like the trail, it’s part of my job since it comes through town, and if it didn’t come through town, well...town might be a whole lot different if it were even a town at all.” Ron Blevins, owner at “In the Country,” a “mom and pop” style diner on the east of town and just a couple hundred feet from the Creeper echoed these sentiments as well: “Well, I graduated a couple years before James, and I remember when he graduated, the trains stopped running that year. If they hadn’t made this into a trail for people to use we wouldn’t be back here. I wouldn’t own this place” (personal communication, March 2012). Another great example surfaced in an informal interview with Mike, a local bike shop owner, while we were discussing the Creeper and his bike shop. “Well, I don’t even cater to the regular trail riders,” Mike said, “and I don’t run a shuttle service at all. The only reason my shop works here with selling high-end bikes is because people go and rent a decent bike at the other shops where they don’t really sell them so they come to me if they’re local” (personal communication, April, 2012). Mike went on to tell me about how his real connection to the Creeper is that whenever there is a lull in his day or he wants to get his heart rate up during lunch, he can simply grab a bike and go because the trail is basically out the door from anywhere in town.

Echoed by every interviewee, Damascus as a town would likely not exist without the presence of the Creeper. Aaron went on to hypothesize that “I mean...I guess if the Creeper wasn’t here, we’d be a ghost town, a boom and bust place kinda like the old west gold rush towns. Especially since the people hiking the Appalachian Trail (which runs nearby) don’t really stop to spend a lot of money.”

Negative qualities or harsh opinions of a rail-trail coming through a rural community like Damascus seem difficult if not impossible to find. As Bill Nunley, the Chief of Police,

said without hesitation, “[W]hat’s the good and the bad with the Creeper? The good definitely is revenue for the town. It supports the businesses. We wouldn’t be here if it wasn’t for our tourists. There’s really not much negative.” This same sentiment was resounded at “In the Country” by Ron Blevins: “Well, yeah the bad I reckon is that you wouldn’t even be sittin’ here talkin’ to me if not for the Creeper. I wouldn’t have bought this restaurant, like I already said, and it sure wouldn’t be open.” And James, Ron’s brother, chimed in with “besides all that, it’s just a great way to get out, have good healthy fun, exercise, and maybe see a deer or turkey. Other than not bein’ able to hunt on it because of the families on bikes, I can’t see no bad in it.”

Impacts of the VCT

When asked about the presence of the Virginia Creeper and how it affects the town the chief of police spoke about how, as a police department, they very rarely have issues related to the Creeper. “Most of the problems,” he said, “come with accommodating the volume of vehicle traffic and related automobile incidents when we have trail days—but that’s with the AT (the Appalachian Trail)—so again, not really a negative for the Creeper.” All of the interviewees said that they had not seen any kind of drug use, vagrancy, or other problems on the trail or because of it. In an informal interview with an older man at Cowboy’s, the local coffee and breakfast place, it was related that “really, the only bad things I can think of is if it ever goes away, most of the town’ll go away with it. Of course, you do have to deal with all the extra traffic on weekends and kids laughing and buzzing by when you’re trying to catch a few trout.” This was the most negative report to be found. This very same sentiment was resounded by Lee Lewis, the hostel owner, and Phoebe Cartwright, the genius behind the genesis of a shuttle service to Whitetop Station for tourists to then coast

back to Damascus on bicycles (personal communications, March 2012). “The relative ease of cruising along seventeen miles of nicely graded, almost all down hill, gravel trail through idyllic National Forest Service (USFS) area is rather appealing to the outdoor adventure-seeking tourist. Other than the occasional crash where someone has to be carried out, I can’t think of a bad thing about it” was Phoebe’s reply. Lee Lewis also noted that “there’s no real downside to it because people do get the health benefits, it benefits the town, it provides people with work, it gives kids a safe and fun place to play instead of just video games or TV in the summertime...I just can’t think of any real bad things about it.” Katie did have a slightly different outlook on the matter, though:

Well, I guess it’s a good and bad thing, I mean, it’s great that we have it here but like you saw earlier [referencing my stop at the local coffee shop], there just seems to never be a slow time where I can get out and enjoy it. Unless I’m not working but then if I want to run, I have to watch for all these people that don’t know which side to be on so they just take up the whole trail. (personal communication, March 2012)

These same things were said time and again in every interview. Aaron Sizemore had almost the same sentiment about his personal use of the trail. “Yeah, you know, when I go out and run the biggest thing is I have to watch out for the families if I don’t get out there real early. They’re just all across the trail so you have to go off to the side or maybe get hit by some kid who’s on the wrong side.” Gary, the local church member, pointed out that “except for the occasional foul language I don’t see no bad in it. I’ll take the kids out there on the weekend to play and walk or bike and we just have a great time” (personal communication, March 2012). As more and more people in Damascus were interviewed, it seemed as though they were calling to make sure everyone was reporting the same thing. After multiple trips and informal interviews it

was found that some of those interviewed were not familiar with other interviewees so this theory was laid to rest.

The future of the Creeper and rail-trails

After asking interviewees about their personal opinions on the trail and how they felt it impacts the town, questions were asked about the future of the Creeper and if it could work as a model for other towns in Appalachia. Ron, the diner owner, had this to say:

Well sure, I don't see why not. I mean, other places might not have a nice down hill ride like we do here but this kind of trail...it can be good for anyone. I mean, this trail is part of the future of Damascus, you see how it affects [the] town now; just imagine if they decide to close the trail. They'd have to put a going out of business sign on the sign out there [referring to the Welcome to Damascus sign]. (personal communication, March, 2012)

When asked if trails like this are sustainable in the long term, all of the interviewees gave a resounding "Yes!" Mrs. Cartwright responded, "Sure, the Creeper has been here since, what, the late seventies or early eighties? And it ain't goin' nowhere from the looks of things. I mean, it might not be the same for all towns, they might not have a seventeen mile hill to coast down but yeah sure, I don't know any reason rail-trails aren't sustainable." James Blevins, a local shuttle van driver who graduated from Holston High School the same year the rail line was abandoned, was sure these trails are sustainable and that the Creeper is a great model. "Yeah, take our trail, it's been around as long as you are old [referring to the interviewer's age] and it's just been gettin better. Native wildflowers have started growing along the trail, the forest recovered from the stripper (sic) cutting that happened decades ago and it don't take much to keep it in good shape" (personal communication, March 2012). Bill Nunley summarized the current state of the trail, the future of the trail, and how it can be used beyond Damascus as a model for a sustainable trail system:

Well, as an example, use ours. It's been here for years and has a minimal, minimal upkeep. The maintenance that has to be done on those...most of the time you're in an area where you don't have to take care of mowing and things like that, but even that provides a few jobs. Repair on the trail, your committees and clubs usually take care of that. They do a wonderful job and that's why it's important to get the community involved. It makes community bonds even tighter. We have the opportunity to work together. Everybody depends on the trail. If you look at Appalachia, we've got the most beautiful country around. And that's a matter of opinion and a lot of people will support that. This is the best way to see and enjoy God's good work. And like I said, you've got that resource, if you can implement it then definitely do because it's a win-win situation all the way around. (personal communication, March, 2012)

As stated by the chief of police in Damascus, rail-trails are indeed providing a boon to small towns and communities across America. These linear parks are not providing just peaceful green space to ride a bike or go for a walk, though. Indeed, as seen in the literature review in this work and through a growing number of studies around the country and in Canada, rail-trails are helping to stimulate local, state, and regional economies and political involvement. The potential economic benefits reaped from the presence of a rail-trail are explored in the following section.

A Benefit-Cost Analysis of the Virginia Creeper Trail

A benefit-cost analysis (BCA) works on a notion of demand existing for a particular good or service. Demand, or the willingness to pay for a service or purchase a good, assumes that a market exists that provides the good or service. In this case study for example, there is an implied demand for a rail-trail as demonstrated by the presence of people who have chosen to spend their time and money to travel to and use the VCT. This is further demonstrated in the purchase or rental of bicycles and shuttle services to the eastern terminus of the trail for a one-way ride. A demand curve can be established based on the quantity demanded, which is affected by the price of the services provided in this case. For example,

visiting the VCT will require longer travel time for those who live farther away, thus increasing their cost in travel time and fuel used. This matter can become more complex with the exploration of substitutes for the VCT but for the sake of simplicity this study has assumed that the VCT is preferred over substitutes for reasons to be discussed later. According to Boardman, Greenberg, Vining, and Weimer (2011), once a market for a recreational site is established, one can employ the travel cost method to value a recreational site by establishing a demand curve.

Boardman et al. note that “the clever insight of the travel cost method is that although... fees are usually the same for all persons,” in this case, the rental and shuttle fees, “...the total cost faced by each person varies because of differences in travel costs” (2011, p. 358). Thus, the travel cost method (TCM) provides a more holistic approach to valuing the costs and benefits of a recreational site such as the VCT. The strength of using the TCM is the comprehensive approach of measuring factors such as travel to and from a recreational site, cost of meals, lodging, fees associated with access and use of the site, and other location specific features that incur costs. The valuation of these priced and non-priced goods using the TCM provides an estimated average of the net economic value to individuals (or consumer surplus) who choose to use the VCT and coupled with qualitative data paints the economic benefits to local residents as well.

Analysis

Used as a measurement of consumer surplus, benefits, and costs; the following tables show three major components of the economic impacts of the VCT and are described in greater detail below. First, the consumer surplus at two estimates of travel cost shows the willingness to pay of trail users for goods and services above what the individual must pay.

This table also shows the corresponding coefficient of the demand slope for the low and high travel cost estimates. Second, the potential benefits of extending the VCT are presented in a worst and best-case scenario extrapolated over a twenty-year period. These benefits are illustrated in Table 2 with a market standard discount rate of seven percent. Third, the costs of building and maintaining a rail-trail in the region are mapped. For the sake of clarity and to provide an overview, Table 4 provides a quick view of the potential benefits, costs, the benefit-cost ratio, and the net present value (NPV) of the 34.3 mile long VCT.

The information in Table 1 illustrates two sets of benefit calculations.

The first is based on a travel cost of \$0.17 and represents the estimated lower limit of current rates per the American Automobile Association (AAA). The second presents the same manner of calculations using \$0.60, which is the upper limit of per mile travel cost also reported by AAA. The demand models were estimated using a linear regression model implemented in SPSS, which is commonly used data analysis software. The demand models help to visualize the stated trips preferences given an increase or decrease in linear miles of rail-trail and a variable travel cost. In this study, as trail miles increase, the stated preference (demand) of annual trips increase and as cost increases preference decreases, which creates a negative slope demand curve. This information was used to then determine the consumer surplus (CS) per trip using the following equation:

$\text{OC}/t = \text{CS}$ where OC is consumer surplus divided by stated number of trips (t) by each respondent annually.

This resulted in a CS of 51.50 per day trip to the VCT, which is very close to the estimated average value of an outdoor recreation day per Boardman, Greenberg, Vining, & Weimer (2011) at \$52.88. The stated change in average trips taken (∂t) given the policy change

(extending the VCT by thirty four miles into North Carolina) was 0.93 or an approximate twenty percent increase of ninety percent of the annual trips taken. Per the data collected, the majority of annual visits by non-local trail users (those living further than fifty miles from the local zip code) would increase from four to five trips annually. This value was used to calculate the change in CS per trip as follows:

$$\partial CS/t = CS/t \cdot \partial t$$

Thus, the change in consumer surplus (∂CS) results were \$47.90 for the worst-case scenario where the cost per mile equals \$0.17 and \$174.16 where the cost per mile equals \$0.60.

Next, to find the value of annual trips and extending the VCT by thirty-four miles into western North Carolina, a current estimated range of 150,000-200,000 annual trips on the existing thirty-four-mile trail was used (www.railstotrails.org, n.d.; Bowker, Bergstrom, & Gill, 2004). To show the range of potential benefits of extending the VCT, the low and high estimates of annual visitation were used to calculate a worst and best-case value of trail visits. For the base-case, an average of the high and low estimates was used. After finding the above, the values for the worst and best-case scenarios were discounted at 7% over the course of twenty years. This process used the lower AAA travel cost estimate of \$0.17 at 150,000 annual trips for the worst-case scenario and the highest travel cost estimate of \$0.60 at 200,000 annual trips in the best-case scenario.

There are three categories of costs that have been accounted for in this research. First is the fixed purchase price of the right-of-way to the derelict railbed between Whitetop Station, Virginia and Todd, North Carolina. This cost in 1982 was \$56,000 dollars for the same linear distance of rail in southwestern Virginia and is assumed to be of the same value as the North Carolina section given the regional proximity. This assumption is based on the

circumstances that existed in the late 1970s and early 1980s before the railroad right-of-way reverted to the adjacent landowners. Under current conditions, the legal fees, land acquisition, and right-of-way have been at a stalemate for more than twenty years. Future qualitative and quantitative research should consider exploring the qualities of opposition to rail-trail conversion and costs of renovating derelict railbeds.

Besides the right-of-way there was also \$98,000 spent on preserving trestles, which has been included in initial costs. These values, totaling \$154,000, were inflated from 1982 to 2012 using a power purchase calculator available online (<http://www.calcxml.com>, n.d.). This inflation estimate came to \$359,000 as a one time initial cost. Second, the cost of reclaiming and converting a dormant railbed was gathered for the state of North Carolina from the North Carolina Department of Transportation (NCDOT). This information provides a per linear mile cost that was extrapolated for the thirty-four dormant miles of railbed. Third, a project of this nature requires annual maintenance. The cost of annual maintenance from literature that averaged the costs of 100 rail-trails nationwide was estimated at \$1,478.00 per mile, which was also calculated for thirty-four miles. This value was used over a lower limit value to generate a more conservative NPV. These figures and calculations can be seen in Table 2.

Finally, Table 3 provides a simple overview of the worst, base, and best-case aggregate benefits, aggregate costs, the benefit-cost ratio, and the net present value of a rail-trail conversion. This helps to illustrate that the expansion of the VCT would be a very worthwhile investment by Damascus and Abingdon, Virginia as well as West Jefferson and Todd, North Carolina.

To isolate results of the benefits to non-local tourists of extending the VCT into western North Carolina, the questionnaire solicited zip codes from respondents and then limited the data to those traveling more than fifty miles for their visit. This limitation on the data shows that some ninety percent of visitors to the VCT prefer to make five or fewer trips per year. In the hypothetical case of extending the rail-trail the length of the now derelict section of rail from the Virginia/North Carolina state line to Todd, North Carolina; the trail length would double and provide a similar downhill gradient to West Jefferson, North Carolina. The benefit in this is that visitors expressed that their annual visits would increase by at least twenty percent. In the worst-case scenario this would result in a \$1.7 million increase of consumer surplus in the first year and over \$8.4 million in the best-case scenario. Even when discounted at a rate of seven percent to account for inflation, the extended VCT could experience a consumer surplus increase of \$660,000 to \$2.6 million in twenty years. The average distance traveled by trail visitors was 167 miles while the greatest distance traveled was 1,082. The nearest non-local distance traveled was fifty-six miles. Ninety percent of the people in this range expressed an interest in increasing their visits if the trail were to double in length. A future study might consider closely examining the actual present day costs involved in reacquiring the North Carolina section of the Virginia Creeper rail line given the opposition to such development.

Table 1. Revealed Preferences, Travel Cost \$0.17 and \$0.60

Revealed Preference Data							
	Linear, TC17				Linear, TC60		
	Coeff	SE	t-stat.		Coeff	SE	t-stat.
Constant	6.573	1.613	4.074	Constant	6.573	1.613	4.074
Travel cost	-0.04	0.019	-2.073	Travel cost	-0.011	0.005	-2.073
R2	0.071			R2	0.071		
F-stat	4.296			F-stat	4.296		
Trips	4.12			Trips	4.12		
CS/trip	\$51.50			CS/trip	\$187.27		
∂ trips	0.93			∂ trips	0.93		
∂ CS	\$47.90			∂ CS	\$174.16		
Annual user visits	μ			Annual user visits	μ		
Annual trips w/ TC \$.17				Annual trips w/ TC \$.60			
Worst	\$7,184,250.00			Worst	\$26,124,545.45		
Base	\$8,381,625.00			Base	\$30,478,636.36		
Best	\$9,579,000.00			Best	\$34,832,727.27		

Table 2. Costs of Rail-Trail Conversion

				NCDOT Cost Estimates	
	Initial Costs		PPI*30	If Paved	\$561,000.00
		56,000.00	131,000.00		
		98,000.00	228,000.00	Per Mile:	
	Total		359,000.00	Worst	\$132,000.00
				Base	\$110,000.00
				Best	\$88,000.00
	Annual Maintenance Costs			Total:	
	Per Mile	34 additional miles	Total Trail Miles	Worst	\$4,488,000.00
\$1,478.00		\$50,252.00	\$100,504.00	Base	\$3,740,000.00
				Best	\$2,992,000.00

Literature Estimate of Cost

\$25,237.00

Table 3. Summary of Benefits & Costs

	Aggregate Benefits	Net Costs	Benefit-Cost Ratio	NPV
Worst	\$22,574,548.53	\$32,383,353.96	0.70	\$(9,808,805.43)
Base	\$72,364,572.85	\$27,129,714.96	2.67	\$45,234,857.89
Best	\$99,580,048.64	\$21,876,075.97	4.55	\$77,703,972.67

Chapter 5. Analysis

From the formal and informal interviews conducted in Damascus, three significant themes emerged in the responses. There was a unanimous sentiment observed during interviews and observations that the residents of Damascus enjoy using the VCT as a stress reliever, to exercise, and simply for recreation. This became a distinct reality after many of the locals were regularly spotted walking, running, or bicycling along the trail during the week and on the weekends. The interviewees' comments continually reinforced this notion, which illustrates the intrinsic worth and social benefits of having ready access to a rail-trail.

Besides the leisure value of the VCT, most of the interviewees returned multiple times to the notion of how practical the trail is for commuting back and forth across town. The city is only about two miles from end to end and the VCT spans the whole distance east to west. North to south, the downtown area of Damascus stretches less than a mile. Given these traits, almost every civil building and most businesses can be found within three or four blocks from the trail. All of these conditions coalesce to provide a pragmatic method for leaving the car at home and walking or bicycling to the public library, the grocery store, post office, or a local restaurant.

Harmonious with the idea of most businesses being very proximal to the VCT, interviewees invariably mentioned how the trail is the major boon to the town's economy. From the town manager acknowledging his doubt as to whether the town would endure without the VCT to a college student knowing that her job exists

because of it, the townspeople recognize the economic stimulation provided by their tourist attraction. Retired business owners worked toward their golden years with income from this stimulus and young entrepreneurs are moving from as far off as Holland to reap benefits as well.

The monetary benefits of a rail-trail are established in the benefit-cost analysis of the Virginia Creeper. This study found that the average consumer surplus value per day trip to the VCT is \$51.50. The significance of this number becomes apparent when multiplied by the current estimated annual visitors of 150,000-200,000. Using a conservative 175,000 visits, midway between the high and low estimate, the annual consumer surplus would be \$9 million. Besides the current annual visitation, in the hypothetical circumstance of doubling the length of the VCT to the Jefferson area of North Carolina, questionnaire respondents said they would likely increase their annual trips by twenty percent, which would increase the consumer surplus to \$10.8 million. Besides the value of a recreational day, forty-three percent of the visitors to the VCT stayed overnight in the Damascus area thereby providing direct income to people like Paul and Lee Lewis who operate a business in town that provides lodging.

It has been seen that the VCT works well because of the symbiotic relationship between the locals and visitors. Many people from both groups regularly use the trail for reasons such as exercise, enjoying the idyllic setting, family time, a meditative escape, the morning commute to work or a coffee shop, seasonal recreation, and to enjoy the “quaint rural countryside setting” of the rail-trail and the town as observed by several trail users. Besides these attributes, there are measurable factors that contribute to the success of the VCT. For example, monetary benefits

from the high volume of tourist visits provide a significant boon to the local economy. The soft downhill gradient from Whitetop Station to Damascus and logistics that provide a distance and time that is feasible for families and less physically active people makes the VCT appealing and possible for a broad range of potential trail users. These assets and related qualities provide insight to why rail-trails can work so well in rural Appalachia.

Genesis of the Virginia Creeper Trail's Success

Damascus and the Virginia Creeper Trail, in some ways, are unique but paradoxically share many qualities with other Appalachian communities. First, the town is virtually surrounded by the Jefferson National Forest, which provides a well-managed forest area for the VCT to pass through. The iron ore that was hoped for never materialized at a volume substantive enough to bolster the economy so the timber was stripped away decades ago but has now had time to recover. In the early Twentieth Century, local forests were depleted so the Norfolk & Western branch rail line from Abingdon to West Jefferson that passes through Damascus struggled to turn a profit but failed. Not long after the abandonment of the branch rail that travels from West Jefferson to Abingdon, a physician and Abingdon town council member, Dr. French H. Moore Jr., petitioned to convert the dormant railbed to a rail-trail (Moore & Shafer, 2001). What catapulted the Creeper to success and national recognition, though, was the arrival of an Appalachian born entrepreneurial woman. A mixture of timing, beautiful scenery, a growing number of people with enough disposable income for adventure recreation, and an easy and safe way to enjoy the outdoors has created an ideal recipe for success.

Phoebe Cartwright was an entrepreneur whose visionary work ultimately revolutionized the Virginia Creeper Trail. Starting with rather simple means and a loan of just a few thousand dollars in the early nineties, Phoebe bought a fifteen-passenger van, had a custom trailer built by a friend for hauling bikes, and started offering rides to Whitetop Station. Before long, people were showing up without bikes and asking where they could rent one for the ride. Though initially reluctant, Phoebe invested in a small fleet of bicycles and started the first bike rental/shuttle service in Damascus, Blue Blaze. Before long, she was adding to her fleet of bikes until her business was booming. Even with a large fleet, Phoebe and her husband Jim were unable to keep pace with the high demand for an idyllic downhill bicycle ride through the country to a quaint Virginia town.

Economic Influence

By the spring of 2012, there were eight bicycle shops, all but one providing shuttle services. The fact that a small, rural Appalachian town of less than 1,000 residents supports eight bicycle rental/shuttle services that also function as bicycle shops plus an outdoor gear store and multiple bed & breakfast establishments and restaurants clearly paints a picture of economic stimulation. In fact, this study shows that a consumer surplus (or money spent) to visit the VCT is more than fifty dollars. Using this conservative number extrapolated with a moderate annual visitation estimate of 200,000 trail users, the gross revenue generated annually falls in the vicinity of \$10 million. This calculation and the tax revenue generated by multiple businesses providing meals, lodging, and bicycle service provides strong validation to

the claim made by many locals that “Damascus wouldn’t be the same town without the Creeper, it puts food on the table and keeps a roof over our heads.”

Nature and Exercise

Why has this worked so well? Phoebe mused that “people like to feel like they’ve done some real effort at the end of the day. I suppose if they didn’t have a shuttle to the top we wouldn’t have eight shops in town and there would only be a few thousand people instead of who knows how many” (personal communication, March, 2012). A key part of this statement is “to the top” which implicates the nature of the seventeen mile section of trail from Whitetop Station to Damascus. As seen in Figure 4 the elevation profile is ideal for providing a bicycle ride that is almost entirely in a downhill aspect. As is common with all railroad grades in Appalachia, the gradient is 4% or less, the majority of which are often not steeper than 2.5%. A low angle of slope is necessary so that coal or timber laden trains could both climb and descend the railways safely while traversing the rugged mountains of Appalachia. The topographical feature from Whitetop Station to Damascus, specifically, is mostly downhill for 15 miles then becomes level approximately two miles from the town, which requires pedaling effort and thereby provides a sense of having pedaled a bicycle seventeen miles.

The average rider takes just under three hours to complete this journey and this leaves ample time for several stops in the Jefferson National Forest along the way to enjoy a stream that flows over exposed rocks covered in moss (Figure 5) and forests of rhododendron (Figure 6). With the protection afforded by the Jefferson National Forest, approximately twelve of the seventeen miles of the VCT between

Whitetop Station and Damascus provide a leisurely downhill ride through this sort of idyllic setting. Families and bicycle enthusiasts alike pass through intermittent small farms and Christmas tree operations that add to the picturesque nature of the experience. Besides the omnipresence of flora, trail users often have the opportunity to glimpse wildlife such as a flock of turkeys, whitetail deer, foxes, grouse, trout (in a stocked stream), and even an occasional black bear. That all of this is easily accessed from a major interstate highway (Interstate-81, as seen in Figure 3) may also play a substantial role in non-local tourist visits.

Local Residents' Trail Usage

Beyond the same qualities enjoyed by non-local tourists (those outside the Washington County, Virginia area) and the economic remunerations previously discussed, local residents of Damascus regularly profit from a rail-trail passing through their town. For example, the local high school athletic teams are sometimes seen running on the trail to increase their athletic endurance. Many non-student residents also use the trail for running and bicycling to stay in good physical condition, which decreases their likelihood of paying future medical bills. Multiple studies available through the RTC, Centers for Disease Control, and American Heart Association show that healthy individuals help to create a healthier community that results in money saved in healthcare costs in the long-term. Through field observation, many local families were seen using the trail for an afternoon or after church stroll. On many occasions, local business owners and employees were encountered commuting to or from work on their personal bicycles. When asked about how they use the trail, many locals who wished not to be formally interviewed

stated that they love to use the trail as a brief escape from daily routine, for exercise, to recreate with their family or friends, and to commute to various places in town while avoiding traffic.

This gives rise to the question of whether or not other towns could expect to benefit in all the same ways that Damascus has. Certainly, there will be degrees of varying success from town to town. It is likely that not every town with a dormant railbed passing near or through it also has a steady downhill grade from a location within fifteen to twenty miles. The railbed may also not pass through managed resource areas and thus be provided with an extra means of financial support for maintenance and repairs.

As Aaron Sizemore pointed out, “this type of trail probably won’t be a cash cow for every town in Appalachia but what you have to realize are all the other benefits. People get on the trail and walk with their husband or wife, kids or grandkids, friends, boyfriend or girlfriend. And you have the people that bicycle or run on it every day to stay healthy” (personal communication, March 2012). So, maybe not every town in Appalachia will be saved from urban migration or economic disparity. Many Appalachian people may never see the economic impacts of a rail-trail coming through their town. What any town in rural Appalachia or beyond could expect is a safe, enjoyable way to get in shape and stay fit, a place to recreate or decompress and commune with the natural world at a natural pace, and a place to build stronger community ties.

Conclusion

As established, the residents of Damascus, Virginia appreciate the intrinsic value of being able to use a trail for recreation, stress relief, spending time with family or friends, and the utility of an enjoyable commute. They are keenly aware of the multitude of benefits the town has experienced for more than two decades since folks started shuttling to Whitetop and riding bicycles back to town and then seeking food and drink. As the trail currently exists, it supports eight bicycle shops in a rural Appalachian town of less than 1,000 people. Extended by double its current distance, there could be a twenty percent or more increase of trail users annually, providing more income to Damascus as well as communities in western North Carolina. Increased trail miles would also likely increase the number of overnight stays so that the trail could be ridden in sections, thus providing even more revenue in both southwestern Virginia and western North Carolina.

This research included conducting thirteen qualitative study interviews and collecting email addresses on every weekend for more than two months to gather data for the economic impacts of the VCT. The researcher bicycled the trail multiple times, spent days in town talking to residents in the local coffee shop and diners, and spent the nights typing and writing field notes at a campsite. The qualitative data led to the justification and incorporation of a quantitative assessment of the VCT to show the corollary between how the residents of Damascus perceive the trail and the actual economic benefits of the rail-trail.

There are benefits beyond personal enjoyment and compounding economic dividends. With the ease and safety of a rail-trail, children of all ages can discover the joy of riding a bicycle or taking a walk while “accidentally” exercising (P. Cartwright, personal communication, March 2012; Mapes, 2009). This incremental move toward more physical activity can provide a catalyst to move away from the sedentary lifestyle of Americans. According to Farr, in America “...today we walk as little as an average of four minutes a day” (2008, p. 19). This could change with increasing oil prices. As seen in 2008 with record high fuel prices, Americans drove 100 billion fewer miles than they did in 2007 (Mapes, 2009). With gas prices now reaching those highs again, and likely to exceed them, there may yet again be drastic reductions in the billions of road miles driven annually in America. With this reduction in miles driven, people will still need to travel locally for food and other items.

As long as logging, mineral extraction, and cheap labor have been part of Appalachia, railways have served as a significant portion of the arterial transport infrastructure for the region (Fritsch & Johannsen, 2004). Since 1916, more than half of the nation’s 270,000 miles of railway has already been abandoned with activity ceasing on more miles on a regular basis (Ferster, 2006). Throughout Appalachia, there are numerous abandoned railbeds that were once used to export the timber, minerals, and coal used to fuel, shelter and serve the region and country (Fritsch & Johannsen, 2004). Railways, many of which are branch lines that pass near, or directly into rural communities, small towns, and urban areas of Appalachia, are abundant. Many of these once active railbeds now lie dormant, laden with potential for increasing not just the versatility of transportation infrastructure, but also the physical activity level of community members of all ages. Other benefits include increased property value, more local jobs, and a greater ability to attract employers. With a larger and more

versatile active transportation infrastructure, Appalachia can become a national leader in a reduced carbon dependent lifestyle. By promoting bicycling (and walking) through the reclamation and improvement of dormant railbeds to a usable state, this region stands only to benefit from a more active populace, a healthier youth, lower medical costs associated with obesity and heart conditions, and a greater sense of community. Further, the promotion of safe cycling and walking corridors can help reduce greenhouse gas emissions, diesel sulfates, automobile related injuries and death, and acid rain that are destroying the region's biodiversity, while also reducing global carbon dioxide levels.

Challenges of Future Rail-Trails

Major hurdles that stand in the way of extending the VCT and securing other abandoned railbeds across the nation are local landowners, politicians, and state and federal laws. When Congress passed the National Trails Systems Act, commonly referred to as the Railbanking Law, in 1983, the potential to preserve land easements previously held by railroad companies was made significantly easier. This fact is demonstrated in the increase of rail-trail linear mileage from some 200 miles in the mid 1980s to the current 21,300 miles with another 9,000 miles proposed and projected to be complete in the coming decade (RTC, www.railstotrails.org, n.d.). Many thousands of miles of railway were forfeited before this legislation and during a time when the Interstate Commerce Commission's (now the Surface Transportation Board) regulations made for easy abandonment of non-profitable branch rail lines such as the Virginia Creeper in western North Carolina and southwestern Virginia. If not for the provident actions of a few residents of Abingdon and Damascus, the entire railway would have likely reverted to adjacent landowners and the railbed would have gone derelict in both states. In western North Carolina, from the small community of Todd, to

West Jefferson, and on to the Virginia state line, the Virginia Creeper railway remains only as a few dilapidated relics and Todd Railroad Grade Road.

In many informal discussions during this research, two common themes with local landowners and politicians surfaced. First is the red herring fear espoused by landowners that the creation of a rail-trail through their land will undoubtedly bring a rise in crime and illicit activities. Currently available research, while not directly in the scope of this project, points toward just the opposite. In fact, the chief of police in Damascus, when asked repeatedly, denied any increase in crime due to the VCT and further stated that the biggest demand on his staff is going to the rescue of bicycle crash victims to provide first aid and evacuation for medical care if needed. The other refrain is that local politicians see investing their constituents' tax dollars into rail-trails and greenways as an imprudent investment of funds. This notion, too, is dispelled by this study and others such as the economic impact survey by Bowker, Bergstrom, and Gill (2007) that clearly show such investments provide substantial dividends through direct, indirect, and induced financial returns.

Future Research

The rush of clean mountain air while pedaling along is reason enough to justify the conversion of more dormant railbeds into useable trails like the Virginia Creeper, but consider all the added benefits pointed out by the people of Damascus. These are just a few of the benefits to be realized on a network of easy to bicycle trails in Appalachia. As seen in the literature, rural communities around the country are realizing economic and personal health benefits. Along with health benefits and a reduction in obesity and heart disease, a decrease in healthcare costs regionally and nationally can be expected. Bicycling and walking are certainly not a cure all or the only answer in a complex socio-ecological system

but they do seem to help the cause. Future researchers may wish to explore quantifying the savings directly linked to healthier lifestyles; the comparatively fractional cost of developing rail-trails over building new roads; or a comparative study of healthcare costs versus the costs of acquiring, repurposing, and maintaining a rail-trail.

Another factor that sees strong improvements is social capital. In Damascus, one can observe locals using the Creeper and stopping to discuss the week's events, planning for an upcoming event, or to discuss sports. From the library to the police department, in churches and the local breakfast diner, the Creeper was often mentioned and frequently referred to as "our trail." There is a clear sense of pride in the VCT as a resource that was established so many years in the past and is providing many benefits in the present. Through the actions of the community, the increasing vitality of the town, and strong "Friends of the Creeper" membership, one can see the sense of community is strong in Damascus. This pride in a hometown can be a real benefit for many rural towns in Appalachia. To strengthen this research, future investigation could focus on similar case studies of rail-trails such as the Greater Allegheny Passage in Pennsylvania, the Greenbriar Trail in West Virginia, the nearby New River Trail in Virginia, or the Chief Ladiga Trail in northeast Alabama.

How this Study Might Impact Future Rail-Trail Development

As stated previously, there are more than 9,000 miles of dormant railbed that have either been slated for conversion or are under proposal to be repurposed as rail-trails in the United States. Many adjacent landowners fear this could adversely affect their right to property and endanger their privacy or livestock. Local politicians often concerned with their reelection fear the fallout of making choices that are touted as lacking in prudence. This research, then, will hopefully serve as a small part of the large picture that will work toward

dispelling unfounded fears of landowners and politicians alike. As a case study, the Virginia Creeper Rail-trail has proven to be not just an economic boon to a small rural community in Appalachia, but also a thread that ties the community together. While rail-trails are not a silver bullet, or panacea to all of the woes of Appalachia, it is the belief of the researcher that they can serve as part of a proactive solution to at least some of the economic, individual, and community health challenges faced by the region and the nation.

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FIGURES

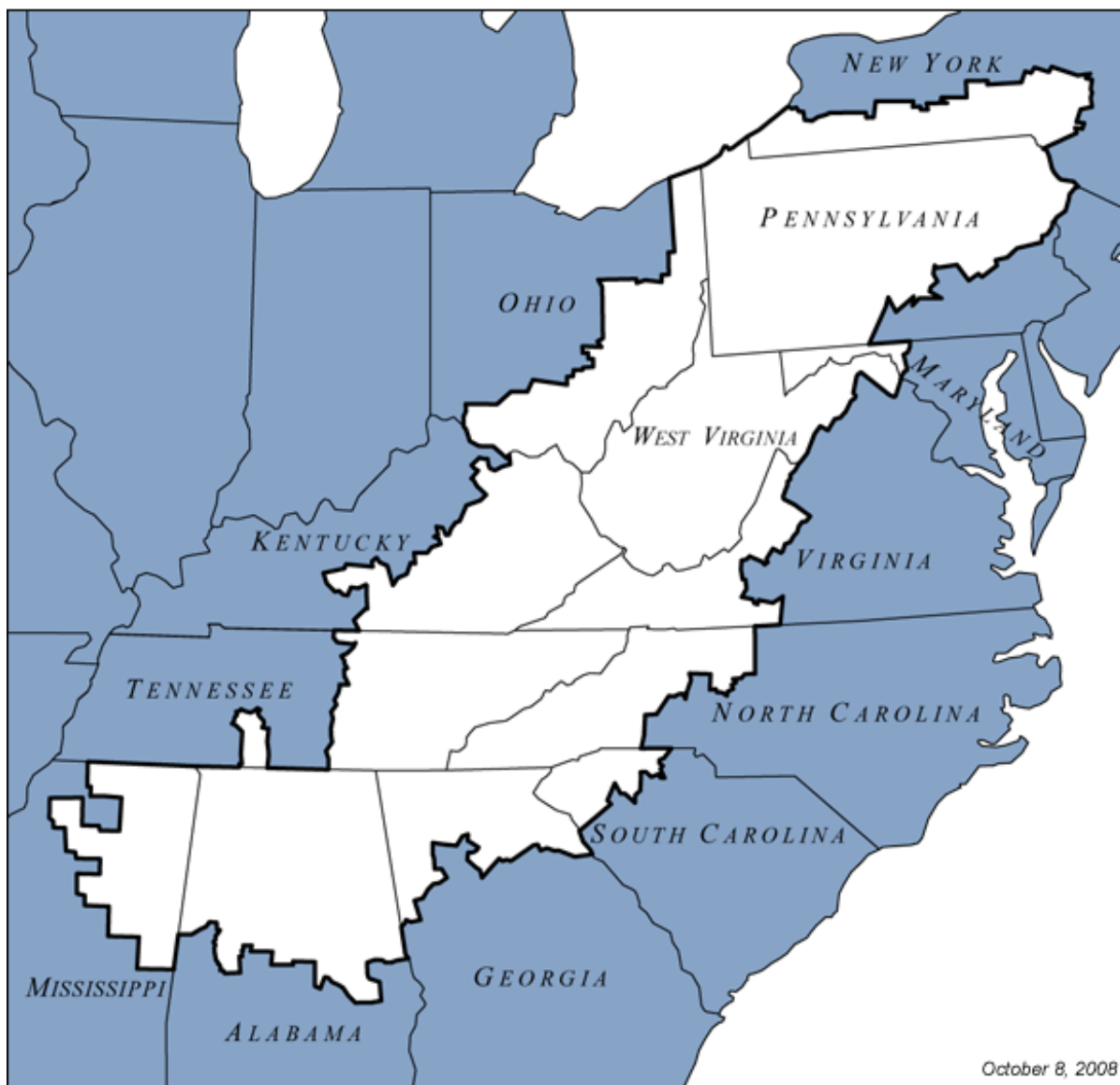


Figure 1. Appalachian Regional Commission map of Appalachia



Figure 2. Virginia and the Virginia Creeper Trail. Retrieved from www.vacrepertrail.org



Figure 3. Virginia Creeper Trail with Damascus in the middle. Retrieved from www.HawkinsRails.net

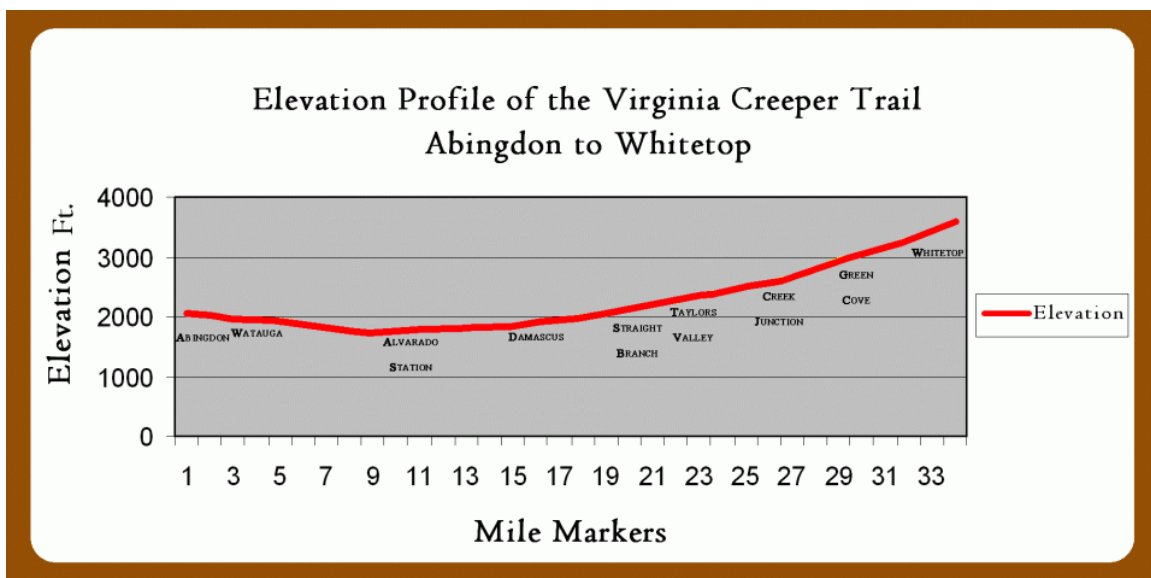


Figure 4. Elevation of VCT Whitetop Station at Mile Marker 33 to Damascus at mile marker 16. Image retrieved from www.vacrepertrail.org, n.d.



Figure 5. A view along the Virginia Creeper Trail in the Jefferson National Forest



Figure 6. The Lush Flora alongside the Virginia Creeper Trail

APPENDICES

Appendix A. Institutional Review Board Exemption

From: Julie Taubman, Institutional Review Board

Date: 10/29/2012

RE: Notice of IRB Exemption

Study #: 12-0287

Study Title: Ecotourism & Sustainability: How the Virginia Creeper Trail has Benefitted Damascus, Virginia.

Exemption Category: (2) Anonymous Educational Tests; Surveys, Interviews or Observations,(3) Identifiable Subjects in Special Circumstances

This submission has been reviewed by the IRB Office and was determined to be exempt from further review according to the regulatory category cited above under 45 CFR 46.101(b).

Should you change any aspect of the proposal, you must contact the IRB before implementing the changes to make sure the exempt status continues to apply. Otherwise, you do not need to request an annual renewal of IRB approval. Please notify the IRB Office when you have completed the study. Best wishes with your research!

CC:

Wayne Williams, Health, Leisure And Exercise Science

Appendix B. Qualitative Interview Questions

Interviewee Involvement with VCT:

1. What is your opinion of the Virginia Creeper Trail?
2. How does the VCT impact your line of work? [If it does]
3. How has the VCT impacted the economy here in Damascus?
4. How has the VCT impacted the community life?
5. Have you walked on or bicycled the trail? What did you like most about it?
 - a. Why? [Or]
 - b. Is there a particular reason that you haven't used the trail?

Regarding Trail Users:

6. Have you seen changes in Damascus because of the trail? Like what?
7. What was town like before the VCT opened?
8. How has the population changed? Increase in diversity? The economy? Major infrastructure changes?
9. How do you think other people feel about the trail coming through Damascus? And why do you think that?
10. How often do you see returning trail users? Why do you think they come back?
11. From your point of view, how does the VCT affect the community here in Damascus?
 - a. Why does the trail not have much effect on the community? [Or]
 - b. Why does it impact the town in that way? [for elaboration]

Historical Information:

12. Were there any major hurdles to overcome in order for the trail to be built? Can you elaborate on those?
13. Was there any controversy?
14. [If relevant to interviewee] How was the VCT project started? Who were the leaders that developed the VCT?
15. What were the steps taken to develop the trail?
16. What concerns did you have when the trail was proposed?
17. Were your concerns confirmed or appeased? How? Why?
18. Did the community help construct the trail?

19. What was the most difficult part of completing the VCT?
20. What things should have happened during the development but didn't?
21. Would you like to change anything about the VCT?

Impacts of the VCT:

22. What is your vision of the future of Damascus? The VCT?
23. Is the VCT generally good or bad for Damascus?
24. In what ways has the rail-trail been a success or failure?
25. What would you say to other communities considering a rail-trail or greenway?
26. What changes, if any, have you seen in the relationship between Abingdon, Damascus, and Whitetop since the VCT was constructed?
27. How has the VCT impacted views of fitness and health in Damascus?
28. Have there been any issues or conflict related to the trail? Why do you think that is?
29. What kind of environmental policies are in place pertaining to the VCT?
 - a. How do they affect current and future business in and near Damascus? i.e. Water mitigation, construction of new facilities, infrastructure, etc.
30. How has the VCT affected the local views on environmental issues?

Future of the VCT/Sustainability of Rail-Trails:

31. Would you like to see more rail-trails in Appalachia? Why or why not?
32. Do you know of other rails-to-trails or rails-with-trails in Appalachia? Which? Where? Have you used them?
33. Are trails like this sustainable long term? Why or why not?
34. What does sustainable tourism mean to you?
35. Sustainable tourism has been suggested as a strategy for economic development in Appalachia, what do you think about this idea?
36. Could Damascus and the VCT be a good model for other towns with a dormant rail bed? Why?
37. What would it take for biking/walking corridors to be used for more than just recreation?

Demographics:

38. Age?
39. Ethnicity?

40. Years of education?

41. Occupation?

42. Birthplace?

43. How many years have you lived in Damascus?

Appendix C. VCT Economic Impact Survey

Virginia Creeper Trail User Survey

This research study is being conducted by Joshua Roe, a graduate student at Appalachian State University.

Please take a few minutes of your time to answer the following questions. The information gathered in this study will potentially improve the amenities near the Virginia Creeper Trail and help promote more rail-trails in the region. By participating you may also learn something new about the topic.

Before I go on, I would like to assure you that your participation in this survey is completely voluntary. If there are any questions you don't wish to answer, please go on to the next question. You, of course, have the right to end this survey at any time. The information that I am requesting will be used only for research purposes. By completing the survey you are providing your consent to participate in this research.

No one will be identified in any reports coming out of the survey. No identifying information will ever be associated with your answers. All responses are confidential. If you have any questions about this study, please contact Joshua Roe (roeja@appstate.edu, 606-465-9555) or Wayne Williams (willwe@appstate.edu, 828-262-6335) or the Appalachian State University Institutional Review Board (irb@appstate.edu, 828-262-7981).

By continuing to the survey, I acknowledge that I am at least 18 years old, have read the above information, and provide my consent to participate under the terms above.

1. How did you learn about the Virginia Creeper Trail?

A. www.railstotrails.org

- B. Internet search engine
 - C. Flyer at another destination
 - D. Newspaper article
 - E. Club website
 - F. Friend, Relative, or word of mouth
2. Have you used other rails-to-trails?
- Y/N
- 2a. If you answered yes above, how many other trails have you used in the past twelve months?
- [open ended response]
3. How many times did you visit the Virginia Creeper Trail during the past month?
- [open ended response]
4. How many times did you visit the Virginia Creeper Trail during the past 12 months?
- [open ended response]
5. During which season do you prefer to visit the Virginia Creeper Trail?
- a. Spring
 - b. Summer
 - c. Fall
 - d. Winter
 - e. Doesn't matter
6. On your most recent trip to the Virginia Creeper Trail, how many miles did you ride?
- [open-ended]
7. Did you ride the section between Whitetop Station and Damascus?

Yes

No

8. Did you ride the section between Abingdon and Damascus?

Yes

No

9. About how long did you spend on the trail?

a. less than 1 hour

b. 1-2 hours

c. 2-3 hours

d. 3-4 hours

e. 4+ hours

10. Overall, were you satisfied, somewhat satisfied, neither satisfied or dissatisfied, somewhat dissatisfied, or dissatisfied with the Virginia Creeper Trail?

a. satisfied

b. somewhat satisfied

c. neither

d. somewhat dissatisfied

e. dissatisfied

11. Was your Virginia Creeper Trail experience about what you expected, better than expected, or worse than expected?

a. Much better

b. somewhat better

c. about what was expected

- d. somewhat worse
 - e. much worse
12. Are you a local resident of the Damascus, Virginia area?
- a. yes
 - b. no
13. Did you travel away from your home and stay overnight in Damascus because of the Virginia Creeper Trail?
- a. yes
 - b. no
14. How many nights did you stay in the Damascus area?
- a. 1
 - b. 2
 - c. 3
 - d. 4
 - e. 5
 - f. 6+
15. What type of lodging did you use during your stay?
- a. camping
 - b. hostel
 - c. bed and breakfast
 - d. house/condo rental
16. How many family members or friends came with you to bicycle the Virginia Creeper Trail?

- a. 0
- b. 1
- c. 2
- d. 3
- e. 4
- f. 5
- g. 6
- h. 7+

17. Did you visit other area attractions during your visit to the Virginia Creeper Trail and Damascus?

- a. yes
- b. no

18. About how much did you (and family/friends) spend on food during your entire visit to the Virginia Creeper Trail?

- a. \$0-10.00
- b. 10-20
- c. 20-30
- d. 30-40
- e. 40-50
- f. 50-60
- g. 60-70
- h. 70-80
- i. 80-90

j. 90-100

k. 100+

19. About how much did you (and family/friends) spend on travel to and from Damascus?

\$0-10.00

10-20

20-30

30-40

40-50

50-60

60-70

70-80

80-90

90-100

100+

20. If you (and family/friends) rented bicycles to ride the Virginia Creeper Trail, about how much total did you spend on rentals?

a. \$0-10.00

b. 10-20

c. 20-30

d. 30-40

e. 40-50

f. 50-60

g. 60-70

h. 70-80

i. 80-90

j. 90-100

k. 100+

21. About how much did you (and family/friends) spend on lodging while visiting the Virginia Creeper Trail?

a. \$0

b. 10-50

c. 50-100

d. 100-175

e. 175-200

f. 200-250

g. 250+

22. About how much did you (and family/friends) spend on other tourist attractions while visiting the Damascus area?

a. \$0

b. 10-50

c. 50-100

d. 100-175

e. 175-200

23. About how much did you (and family/friends) spend on things other than food, travel, lodging, rentals, and other attractions?

a. \$0

- b. 10-50
 - c. 50-100
 - d. 100-175
 - e. 175-200
24. Do you plan on visiting the Virginia Creeper Trail again in the next 12 months?
- a. yes
 - b. no
 - c. not sure
 - d. maybe
25. About how many times do you think you will visit the Virginia Creeper Trail during the next month?
- [open ended response]
26. About how many times do you think you will visit the Virginia Creeper Trail during the next 12 months?
- [open ended response]
27. Suppose the Virginia Creeper Trail was extended into North Carolina for 30 miles to West Jefferson. Would this increase or decrease the number of times you think you would visit the Virginia Creeper Trail?
- Increase
- Decrease
- Stay the same
28. Why would you take more trips (check all that apply)?
- In order to ride more miles

Because it would be closer to my home

Being to ride a different route

etc

29. About how many times do you think you would visit the Virginia Creeper Trail during the next 12 months if it was extended into North Carolina for 30 miles to West Jefferson?

[open ended response]

30. Did you attend Damascus Trail Days in May?

Yes

No

31. Suppose there is a weekend festival in Damascus during the Fall to celebrate the changing leaves and the heritage of the Virginia Creeper Trail. The festival would feature arts and crafts, music, bike demos and history of the old railway. How likely is it that you would attend such a festival?

Very Likely

Somewhat Likely

Somewhat not likely

Not likely at all

32. What is your age?

[open-ended question]

33. Of what race do you consider yourself to be?

[open-ended question]

34. What is your gender?

[open-ended question]

35. What is your current zip code?

[open-ended question]

Appendix D. USFS Permit Request

Project Title: Economic Impact Survey of the Virginia Creeper Trail and how it Benefits Damascus, Virginia.

I am planning an economic impact survey of the Virginia Creeper Trail (VCT) that will serve as part of a class requirement for ECON 5660 Benefit Cost Analysis [BCA] and a portion of my thesis research. To gather needed information I plan on making weekly trips to Damascus to solicit participants in an online survey. While on the Virginia Creeper Trail [I am purposefully excluding all other nearby trails] I propose to station myself and a drink cooler of lemonade [which will be offered free of charge] to collect email addresses from trail users who choose to volunteer this and no other information after I have described my graduate project in brief. This survey will be used as a tool to gather information about the spending habits and demographics of visitors to the Virginia Creeper Trail and the town of Damascus in southwestern Virginia. I will be very glad to make this information available to the United States Forest Service and the town of Damascus. Dr. John Whitehead, the Chairperson of the Economics Department at Appalachian State University, who is also on my thesis committee and the instructor for the above-mentioned BCA course, is guiding this project. He may be contacted at whiteheadjc@appstate.edu or 828.262.6121.

To this end, I am formally requesting any needed permit and/or express written permission to be stationed in a safe location along the Virginia Creeper Trail during every weekend of October and concluding after the first weekend of November.

Appendix E. USFS Permit

File Code: 1900

Date: October 5, 2012

Joshua Roe
990 NC Hwy 194 N
#2
Boone, NC 28607

Dear Mr. Roe:

This letter will serve as your “permit” from the George Washington and Jefferson National Forest for a research project to examine the economic impact of the Virginia Creeper Trail. Your research will involve requesting information from users of the trail.

This letter of permission is subject to the following terms and conditions:

- A ‘pack it in, pack it out’ and leave no trace ethic will be followed; do not leave any of your materials at the site after you have completed your inquiries.
- You are only authorized to use the area near the Straight Branch parking lot. You will station yourself off the trail tread, but not blocking access to the bench or kiosk at Straight Branch.
- You will wear something that identifies you with Appalachian State University.
- At the conclusion of your project, submit a copy of your report to this office.
- Any publications resulting from fieldwork done on the George Washington and Jefferson National Forests should acknowledge the Forest.
- This letter of permission expires December 1, 2012.
- You should carry a copy of this letter with you when you are on the Forest.

If you have any further questions, please contact W.J. Cober at 276-783-5196.

Sincerely,

/s/ Kenneth Landgraf
KENNETH LANDGRAF

Planning & Forest Ecology Staff Officer

cc: Beth Merz

Vita

Joshua Andrew Roe was born in Texarkana, Texas on 08 January 1982, the son of Terry Andrew and Debora Lynn Roe. After earning his diploma from Greenup County High School in Lloyd, Kentucky he attended Morehead State University in Morehead, Kentucky from August, 2001 to December, 2004. While at Morehead State University he was inducted into Sigma Delta Pi, the collegiate Spanish honors society and Phi Kappa Phi, the collegiate social sciences honors society before completing his Bachelor of Arts in Spanish and Minor in International Studies. Throughout his academic career, Joshua has lived in multiple countries on four continents, worked as a linguist, taught English as a Second Language, volunteered as an emergency medical technician, and has worked as a backcountry guide in Alaska, Arizona, Kentucky, and the Republic of Korea.