USERS' PERCEPTIONS OF THE DESIGN AND VALUE OF HIKING TRAIL SYSTEMS: A COMPARISON FROM NATIONAL, STATE AND REGIONAL PARKS

by

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ABSTRACT

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Hiking trail systems are added to many park plans by today's landscape architects. Hiking trails are defined in this thesis as paths and trails, improved or unimproved, in park areas where nature is the primary environment, rather than of an urban environment in which sidewalks are the main areas that the public uses to walk and exercise. This thesis examines how the users of hiking trails perceive existing trail system designs and the value users acquire from well designed trails. Hiking trail users are motivated by improving physical health, relieving mental stress and enjoying scenery.

This study looks at three different-sized parks: national, state, and regional. The hiking trails for these parks vary in type and construction. The study also supports the notion that public input is needed in the renovation of hiking trail systems. It suggests that public input on the renovation of older parks with hiking trails is needed to guide landscape architects toward the connection between hiking trail systems and better physical and mental health of the users.

Increasing the public use of the hiking trails gives the landscape architect more opportunities to educate the public on environmental issues in the park.

> "The more visitors understand a park's features, the more they appreciate them, the more likely they will care for them and by caring, and the chances of the park as a whole being protected are greatly enhanced. Human appreciation is, therefore, "value added" to parks "(Harmon and Putney, 2003).

This research uses a combination of participant observations and quantitative surveys conducted on-site. The study identifies the users of the trail systems, and key elements of a well-designed trail system that can guide future design. These include structures, trail surfaces, signage, maintenance of landscape, and the health, safety and welfare of the public. Showing the connection between parks with hiking trails and a healthier population encourages the city and national planners to create more trail systems in green space areas. Every city and state has ongoing efforts to improve and expand the amount of their green space. Getting the public to back these initiatives is more easily accomplished by publishing studies that indicate the value to the public.

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CHAPTER 1

INTRODUCTION

1.1 Trails

Research has shown that in the last twenty years hiking and backpacking activities have increased one hundred and ninety-four percent (Cushman, Veal, Zuzanek, 2005). This increase suggests that hiking trails are a park attribute that the public looks for when they have free time. Hiking trails are defined in this thesis as improved or unimproved paths and trails in park areas where trees and open space are primarily an unbuilt environment. Urban environments in which sidewalks along buildings are the main areas that the public walks and strolls are not included in this study. This thesis investigates the users' perceptions of hiking trail design features and identifies their impact on trail users, physically and mentally.

Trails have been used as transportation corridors on the North American Continent for hundreds of years. The difference in the use of trail systems today is that they are used mainly for recreation (Dahl and Molnar, 2003). Trails and adjacent open spaces allow ample room for hiking, running, skating, and non-vehicular travel around parks (Dahl and Molnar, 2003).

National Recreation and Park Association (NRPA) classifies parks by size, from the small neighborhood parks up to the regional park size. The regional park size is two

hundred acres or more. State parks are typically larger than regional parks and national parks are the largest in acreage. This study will look at a regional park of two hundred acres, a state park which has nine hundred eighty-five acres, and a national park which has five thousand four hundred acres. Larger parks commonly contour hiking trails to match the terrain, and they are often linked to other parks and cities by linear parks, often with trails. Hiking trails in the larger parks usually feature trailheads used as starting points. The trailheads have more room for facilities such as restrooms, parking areas and food concessions (Dahl and Molnar, 2003). How the trails and trailheads are designed impacts the number of users and the success of the trail system. For example, Rocky Mountain National Park in Colorado has multiple trailheads, allowing the users to access the trails at numerous points with amenities at the different trailheads.

Trails provide scenic views, allowing users to experience nature up-close, and provide access to recreational zones within a park. They also account for a large number of regular visitors to park (Cushman, Veal, Zuzanek, 2005). High visitation impacts the economy through the sale of hiking, backpacking, and related sports equipment. The increase in hikers has fueled a growth in the companies that make and distribute equipment and clothing to this portion of the public (Malitz, 2005). Recreation Equipment Inc. (REI) has increased their sales to five hundred eighty-five million in 1998, which is an increase of approximately ten percent a year (Dolan, 1998.).

The issues facing landscape architects who design hiking trail systems are studied in this thesis. Among these are:

- Determining what groups of individuals are using the hiking trails.

- Analyzing whether landscape architects design by only a set of guidelines given them by cities, states or federal governments or by incorporating ideas based on public input.
- Exploring opportunities landscape architects have to work with the users of the trail systems and the park systems to create better maintained trails and additional design projects.

The profession of landscape architecture exists to benefit the general public by providing for the health, safety, and welfare of the public by working with the natural environment and the built environment. Improving hiking trail design is an opportunity to impact millions of people. It is one of the ways in which landscape architects can influence the protection of the environment. Identifying public concerns and areas of interest surrounding the trail systems by the actual users helps further the design process. This study shows ways to protect the environment and to enhance the hiker's experience, through the use of practical design principles and public input into design where appropriate, are goals of this thesis. The comparison of users' perceptions of hiking trail systems used in national, state and regional parks shows how the landscape architect can add value to a hiking trail systems and increase usage by addressing some of the concerns of the public.

1.2 Trail Types

Landscape architects continue to incorporate a variety of trail systems into the park planning programs. The type of trail system designed for a particular park depends

on the terrain, activities in and adjacent to the park, and the users of the trail. "There are nine commonly identified trail types: hiking, biking, equestrian, cross-country skiing, water (canoe), all terrain vehicles (ATV), motorcycle, off-road vehicles, and snowmobiles" (Fogg, 1990). This thesis focuses on hiking trails because the growth in the number of people hiking increased one hundred ninety-four percent in the last ten years, which equates to seventy-six million hikers in a twelve month period in 2000/2001 (Cushman,Veal, Zuzanek, 2005). Due to this growth in trail system use, landscape architects are in an excellent position to provide services that will benefit millions by designing trail systems with the user input of this study as a guideline.

1.2.1 Hiking Trails

The term "hiking trails" is described in this thesis as improved or unimproved paths and trails in park areas where trees and open space are the primary environment. There are three major types of hiking trails designed for different groups of users, which include hikers, joggers, and bikers. These include unimproved trails, semi-improved trails, and improved trails (Fogg, 1990). Some parks use one type and some a combination types, such as in Rocky Mountain National Park.

Construction of the different types of hiking trails varies across parts of the country based on available materials, cost and aesthetics. Hardscape trail materials for a park located in east Texas will be different than in a park in New Mexico. Research in this study determines the type of trail users prefer, which indicates current trends that are helpful in design of trail projects.

Fig. 1.1 Unimproved trail

1.2.1.1 Unimproved Hiking Trails

Unimproved hiking trails are those used by animals and hikers that cut paths across the landscape that, at times, are almost invisible to those not familiar with this type of trail (Hart 1984, p.233). Backpackers mainly use these trails that can go for miles into the backcountry. They travel to the remote areas of the park to camp by using maps, GPS (Global Positioning Satellites) and common sense to navigate their way around mountains, streams, and forests. These trails are laid out on maps with a few landmarks for navigational aids. This allows the individual to pick their own way though the countryside. These individuals go into the backcountry for a day or for

weeks. They are usually required to notify a park ranger or someone else as to when and what area they are going in case of an emergency. These trails can include small stream crossings, logs to climb over, large boulder formations, and very steep slopes to navigate up and down.

1.2.1.2 Semi-improved Hiking Trails

Semi-improved hiking trails are those that cut a path across the landscape following the contours of the land. Many of these trails lead to waterfalls, lakes, spectacular views, or other landscape features. They follow the edges of lakes and scale the slopes of mountains, using switchbacks to climb steep hillsides. These trails have different levels of construction. Many are not smooth; they can contain rocks, roots, natural soil or decomposed granite walking surfaces and stone and rough timber stairways to navigate. In some cases bridges are constructed over water features using rustic timber native to the area. These trails connect the hiker with landscape along a defined path to protect the ecological systems along the trail. Hikers are not permitted off these trails, and the trails are rated according to difficulty. These ratings are based on the gain in elevation and the length of the trail, which give the hiker a general explanation of the trail's rigor (Malitz, 2005.) These ratings allow hikers to choose which of the trails hikers feel comfortable with based on their health concerns and time available.

Defined trails protect ecosystems. Signage is provided along these routes to provide orientation for the hiker, to mark or direct hikers to special views and vistas, and to provide additional information relevant to the site. Trailheads sometimes lead to

several different trails. These trails are in three lengths; short trails, long loop, and cross-country (Fogg 1990, p.34). Short trails are generally one to three miles long. Visitors to parks that have several of the shorter trails can take advantage of them in the same day. Many of these connect with other parks, special natural features or other public facilities and trailheads.

Fig. 1.2 Semi-improved trail in Hot Springs National Park

These trails are sometimes connected, allowing for continued hiking without moving a vehicle. Long loop trails are seven to fourteen miles in length. These are

considered an afternoon hike or a one-day hike for most people. Cross-country trails are twenty miles or longer (Fogg, 1990, p.34). There are few road crossings and one or more overnight stops. Hikers carry tents, sleeping bags and food to travel these longer distances. Many hikers use GPS units to navigate the longer trails.

Fig. 1.3 Improved trail in Arbor Hills Nature Preserve

1.2.1.3 Improved Hiking Trails

Improved hiking trails are generally one-tenth of a mile to ten miles long. They connect to other parks, specific sites to view that are close to parking areas, or other public facilities. Some of the trail sections allow people with disabilities or small children to visit certain sites in a very safe environment based on federal regulations such as the Americans with Disabilities Act. The biggest difference is in the surface of the trail, which allows for wheelchairs, crutches, and strollers. Many of these have concrete, brick, treated wood or compacted materials that resist weathering and do not become impassable. This is the style most often used in city parks. Improved trails in city parks are designed to be much wider in order to accommodate skaters, bikers,

runners and walkers. Some are wide enough for emergency and maintenance vehicles as in River Legacy Park in Arlington, Texas. Some parks have common parking at the trailhead for the semi-improved trails that branch off the improved trails. This allows for the amenities to be located at one trailhead.

1.3 Hypothesis

Landscape architects do not routinely administer follow-up surveys or receive users' input after completing projects, although some projects seek uses' comments at the beginning of a project. Software and manufacturing companies, such as HP and Closetmaid, seek feedback from the users about their finished products, their on-going maintenance programs, and scheduled future improvements that are associated with their products. They do this in order to improve their finished product for a small niche market or the general public. They learn from these studies what the users want changed to make a better product for their particular use. Landscape architects should be following up after their projects have been completed to see how well they function for the users. Checking with the public or the users of the project after they have time to utilize the facility should be routine as it is in other professions and companies.

Landscape architects have been designing trail systems for public use in the United States since Central Park in New York was first conceived. Trails and trailheads are designed using the best construction methods, materials and computer programs available. The knowledge of construction, safety and public well-being are the top priorities in our designs. Landscape architects have met most of the needs of the trail

users, even though trail systems are different in different size parks and in different parts of the country. Each trail system should be designed for the users of that park. This study compares the basic elements and ranks them by percentages to show how high a priority they are to the users of the parks studied. This study shows landscape architects which elements should receive more attention and development in that specific park setting.

1.4 Limitations of the Study

This research collects survey data to explore the trail users' perceptions of the design and personal value they receive from using the trails, and to understand the demographics of the trail users. Three sites were selected of different size parks with different types and lengths of trail systems. Conditions at these parks have common design features with other parks of similar size. Users rank their responses to forty-two closed-ended questions and have the opportunity to answer in their own words additional open-ended questions. Surveys were taken home, filled out and returned by mail. This study used consistent times and days of the week to conduct the research. This study focused on the trail users and not everyone in the park who may have been involved with other activities. This study's intent is to identify elements that are of major importance to the trail users. Positive and negative comments are studied, and later this thesis will be passed along to the different park systems to use as a guide for future projects in the areas studied.

1.5 Summary of Introduction

The methodology used in this research benefits new park projects as well as park renovation projects because the data analyzed shows what the trail users want in the hiking trail systems of different sized parks. Knowing what the users look for in a well designed trail system gives the landscape architect statistical information to support their creative designs for additional hiking trails and amenities, and their requests for additional funding for the projects. New projects may mean renovating existing parks to their full potential, which makes good use of taxpayers' money.

Trail systems need to be designed with the conclusions of this study in mind, in order to raise the participation level of the users and ensure hiking trail system success. A successful hiking trail system draws the maximum use from the public, thereby benefiting the whole park and the other activities and features unique to that park. User participation in the design of trail systems provides a feeling of ownership in the park, thereby ensuring the survival of the park, along with protection of the ecology in the park and the maintenance of the park benefits as well (Dahl and Molnar, 2003).

Identifying the benefits to the individuals using the hiking trail systems gives new information to encourage the general public to participate and greater influence on the general public in the bond programs that require their approval. Contact with nature along the trails is as essential to our well-being as are close personal relationships with others, and contact with nature helps us create benefits that lower stress and aid in healing and in relieving mental fatigue (Harmon and Putney, 2003).

CHAPTER 2

LITERATURE REVIEW

This chapter explores the role of hiking as one of the leading leisure activities around the country as described by a national survey that ranks leisure activities in the United States. Examining hiking trail guidelines that have shaped our trail systems over the years and the foundation of hiking trail plans of today's park system.

2.1 Leisure Activities and Hiking

Max Kaplan proposes that leisure has many different definitions (Kaplan, 1975). The classic definition is that leisure is a concept of humanity and requires freedom from necessity. Another is that some people are less healthy and that leisure is good for them. Leisure as time, leisure as activity, and leisure as experience are the three main ways to approach questions about leisure (Kelly, 1996).

One myth that came to the surface in this research was concerning the "declining workweek." In the early 1990s the "conventional wisdom" of leisure studies predicted that the average work week would continue to be reduced. This would bring the average work week to a four day work week with thirty hours of work. This would increase the number of leisure hours an individual could spend in outdoor recreational activities. This myth has not come into reality, but the number of hours spent away from work experiencing outdoor recreation is viewed as more important than ever to maintain our health and allow us to have an escape from everyday stress (Kelly, 1996).

Research has shown that cities can attract more businesses to their area if they have taken into consideration the role they have in the quality of life of the work force. In the decision making process of small companies, the highest priority was "recreation/ parks/ open space" when deciding on moving a company or starting up a new company (Crompton, 2001). The quality of life of the employees has taken the top spot in the thinking of management when looking at retaining employees for the long term (Crompton, 2001). Cities must be proactive in their park planning in order to acquire the land in advance of the population growth in the area. Providing for future park and open space for the citizens is key to adding value to their city (Crompton, 2001).

Mental fatigue is a fact of our everyday life. Internet, cell phones, and live television news constantly bombard us, creating stress and mental fatigue. Getting away from this undue stress is important to our overall health. Fortunately, areas have been designed and managed in natural environments that can encourage our recovery from this fatigue such as parks and trail systems (Kaplan, Kaplan, Ryan, 1998).

In reviewing literature about trail systems and parks, two main areas of focus emerged. The first is that hiking is a popular way of spending leisure time. The second is that trail systems have had some guidelines for design for many years. Providing hiking trails in our parks contributes to the health of our communities and the environmental health of our parks. The number of people enjoying this activity is increasing (Cushman, Veal, Zuzanek, 2005). The statistics show that the American public is coming outdoors to hike more than ever. These two main areas of interest are connected by human involvement in the process of design and human participation. The

long-term success of a trail system is improved by positive experiences of the users on the trail and having appropriate amenities available.

A variety of studies have shown that more adults are concerned about their health (Cushman, Veal, Zuzanek, 2005). More people are exercising to improve their health and appearance. Some people are resisting the effects of aging, while others are trying to gain or maintain certain body shapes and contours effectively (Kaplan, Kaplan, Ryan, 1998). Some people exercise just to feel better, and socialize with others with similar interests. Views of nature have been proven in studies to be related to greater physical and mental health. Nature related activities have been proven to encourage people to pursue other things in life more effectively (Kaplan, Kaplan, Ryan 1998). Trails through natural areas bring people into close contact with nature (Kaplan, Kaplan, Ryan, 1998). Will Rogers stated:

> "The good Lord is makin' more people, but he ain't
> makin' no more land." (Dahl, Molnar, 2003, p.8)

There are thousands of trails in the United States, and very few are exactly alike. That is as it should be, because no two areas are just alike. Developing a master plan for park trail systems is one of the first considerations when identifying activity zones within the park boundaries. Identifying the variables of the park, which will be the users of the trails, and the circulation patterns of the park, are a few of the design basics. A trend toward renovating old parks as opposed to the development of new sites from scratch is also on the increase (Dahl, Molnar, 2003).

Landscape architects use many variables existing in parks to influence the trail design; some are natural and some are man-made (Kaplan, Kaplan, Ryan, 1998). Landscape architects cannot design trail systems to protect the hikers from all dangers since this is a natural environment with wildlife and naturally occurring events like floods, rock slides and forest fires. Common sense and hiking experience must be used.

The hiker's general health and physical condition must be taken into account when selecting a trail (Malitz, 2005). Hikers are always encouraged to experience the landscape and to respect the landscape around the trail, allowing it to grow for other generations to enjoy.

2.1.1. Leisure Time

Some Americans have an ongoing romance with the outdoors. For some it is walking along the beach, looking over a jagged rock outcropping or a horizon of snow-capped peaks, or the fragrance of the piney woods. Something happens inside a person when they come in contact with nature. People do not experience the same sensations in every setting (Kelly, 1996). Some are attracted to certain types of nature, at certain times of year or particular seasons.

The range of outdoor activities that people can most commonly participate varies from decade to decade and state to state. The National Survey on Recreation and the Environment (NSRE) is conducted every five years in the United States to study people and their outdoor activities. Similar studies have been conducted overseas by the World Tourism Organization (Cushman, Veal, Zuzanek, 2005).

2.1.1.1 National Survey on Recreation and the Environment (NSRE)

The NSRE has conducted nationwide research as a general overview of the public's participation in outdoor leisure activities. It is a very wide look at seventy-four different activities that people can do by themselves or with a group. The major reason for these surveys is to describe current patterns in outdoor activities according to the activities themselves, the regions in which people live, the percentages of people that participate, and by the percentages of each gender and age group that participates (Cushman, Veal, Zuzanek, 2005).

This assessment is required by the federal Forest and Rangeland Renewable Resources Planning Act of 1974. Data from the NSRE surveys are also used by National Forest recreation planners and managers, and other federal and state agencies involved with evaluating recreation-related land and water management issues. Data also identify the new trends in recreation demands on local, state, federal and private providers of outdoor recreation activities. Data from the survey provide an opportunity to evaluate alternative methods of financing for future needs of outdoor recreation services. These surveys are conducted as an in-the-home telephone survey (Cushman, Veal, Zuzanek, 2005). In the survey done in 2000-2004 over 80,000 people age sixteen or over and all ethnic groups throughout the USA were interviewed. These surveys had a number of different versions, with each version given to at least five thousand people. Questions about activities and demographics were the core of the surveys. Some special issues were asked such as disabled people's recreation participation and access to recreation opportunities, special fees, and safety.

Concerning the wilderness studies, the American public has been studied very little regarding their opinions and awareness of protected wilderness areas (Cushman, Veal, Zuzanek, 2005). The NSRE has compiled the most comprehensive information available. Identifying the public's favorite activities establishes trends from generation to generation and decade to decade, and gives insight to the future needs of the public.

These surveys were completed over the telephone in approximately fifteen to twenty minutes. People were not always willing to participate in a survey that required that amount of time, unless they felt it was important to them specifically. All who participated in the survey were asked two questions: what is your gender, and have you participated in outdoor recreation in the last twelve months. Based on the November 1999 to July 2001 interviews, ninety-seven percent of the people who participated engaged in an outdoor recreation activity in the last twelve months. The highest ranked activities were: walking for pleasure at eighty-three percent; attending family gatherings at seventy-three percent; viewing natural scenery at sixty percent; visiting nature centers at fifty-seven percent; picnicking at fifty-five percent; and hiking and backpacking at forty-three percent. In the hiking and backpacking category, males were fifty-one percent and females thirty-seven percent. Males were higher percentages in all categories that were considered more strenuous, but over the years the numbers are moving closer together (Cushman, Veal, Zuzanek, 2005).

Participation in an outdoor recreation activity by age group showed that all age groups participated at a very high percentage. The percentage ranged from ninety-eight point nine for the age group of sixteen to twenty-four down to ninety-three point one for

the over sixty-five age group. The percentage stayed about ninety-seven point six until age of fifty-five. In the category of hiking and backpacking, participation by the younger groups was much higher, due to the more strenuous activity. In the sixteen to twenty-four age group the participation percentage was fifty-three point nine. The age group of twenty-five to thirty-four the percentage was fifty-four point three. The age group of thirty-five to forty-four the percentage was fifty-three. The age group from forty-five to fifty-four the percentage dropped to forty-three point six. The age group of fifty-five to sixty-four it dropped to thirty-one percent. The over sixty-five group dropped down to twenty-three point two percent. But as the strenuous activities were on the decline they chose other activities they could do with less physical demands such as bird watching (Cushman, Veal, Zuzanek, 2005).

In general, Caucasians had the higher percentages of participants, with African-Americans coming in second and Hispanics coming in last of the three groups identified in the survey. Looking at the income levels of the participants, it was noted that the higher the income levels the higher the percentage of participation in all of the activities.

2.1.1.2 Trends

Over the past twenty years surveys have shown that some activities have remained steady such as cycling, while some have grown, such as hiking. Some have dropped, like hunting (Cushman, Veal, Zuzanek, 2005). The number of participants has increased significantly due to population increases, especially in the older age groups. The fastest growing activity in 2000/2001 was bird-watching at two hundred thirty-one

percent growth. The number two activity was hiking at one hundred ninety-four percent growth, which equates to seventy-six million hikers in 2000/2001 (Cushman, Veal, Zuzanek, 2005). Some of the growth in hiking can be attributed to the advances in the clothing and personal gear available to the public from companies such as REI and other sports clothing suppliers.

Fig. 2.1 Fallen log among dense undergrowth

2.1.2 Hiking Trail Design Guidelines

Trails are designed to give the hiker an immersive experience by allowing the natural surroundings to inspire the individual to learn from the geology, flora, fauna

Fig. 2.2 Unusual tree growth

and history of the region. "There is no better way to enjoy the scenery than on foot, strolling through a meadow awash with wildflowers, walking across the sun-drenched alpine tundra, or hiking through some shady forest up to timberline and then onto some grand summit with a view over thousands of square miles." (Malitz, 2005)

Different areas of the country have trail systems in their parks which have completely different topography and history. Trails are walkways within natural areas (Kaplan, Kaplan, Ryan, 1998). Each park is unique in wildlife and vegetation. Each park has its own character, as well as its own set of precautions that need to be followed

Fig. 2.3 Hole in tree trunk

in order to be safe and receive to best experience possible. Trails in different parks are constructed to meet the conditions of a particular area and climate

Thousands of hikers of all ages enjoy the great outdoors by way of the trail systems in our parks. Just as hikers must be aware of the dangers in hiking and come prepared, so must the landscape architect be in tune with the local area. The same list of problems for hikers is the list of opportunities for the landscape architect. The next nine sections detail the main opportunities for design (Kaplan, Kaplan, Ryan, 1998).

2.1.2.1 Natural Hazards

The natural features in the landscape that are hazardous are the very same features that park visitors come to see. Examples of these features would include hot geysers, steep rock formations, and natural caves. The landscape architect must decide if the natural feature can hold up to constant contact by visitors. If it is too fragile, then visual access is all that can be given. The opportunity then becomes for the landscape architect of the trail system to grant visual access to the natural feature without endangering the hiker or the delicate balance of the environment around the natural feature (Kaplan, Kaplan, Ryan, 1998). The landscape architect must also give protection to the hiker without compromising the natural view. Natural hazards can be wildlife such as snakes, spiders, bears or skunks. Thorns, poisonous plants, falling branches, creeks or slippery rocks are also natural hazards. Many areas that draw hikers are also the most ideal places for wildlife to exist.

Fig. 2.4 Snake on trail

Trails are designed to be in areas where the wildlife can be seen from above or in the distance such as across a meadow or creek. Some wildlife may be encountered along the trail; it is the responsibility of the landscape architect to acknowledge this and prepare the hikers with this knowledge by way of written information and warning signs (Malitz, 2005). Many parks are also wildlife preserves.

Fig. 2.5 Bridge over creek

2.1.2.2 Weather

Weather patterns in various parts of the country provide different opportunities for design elements that benefit the safety of the hikers. The bottom of the mountain may warm with a slight breeze, while the other side of the mountain or the upper slopes

of the mountain may be very cold, with freezing rain and gusty winds. Trail designs are developed with the weather conditions in mind. In areas that can become very harsh weather-wise, small shelters are built to give refuge to hikers. If hikers are caught out in really bad weather the shelters can have fresh water, shelter from the rain, or a place to build a fire for heat to keep from getting hypothermia (Malitz, 2005).

Fig. 2.6 Rest station adjacent to trail

In some parks, providing shelters to keep the rain off of the hikers for a short rest stop or having a first aid kit available is important for the safety of the hikers (Christiansen, 1977). The materials for benches are selected based on availability along the trail and durability in local weather conditions. The slopes of the trail are designed to drain water off to the side of the trail. Piping runs underneath the trail in areas which streams flow regularly. The edges of the trails are supported by materials that are natural to the area, such as split logs or stone (Kaplan, Kaplan, Ryan, 1998). Building steps into the slopes in very steep areas is important for safety, especially where rain

and snow may make the trails slippery. High winds and wet conditions may make hand-rails necessary in some areas if natural elements such as trees or rock ledges are not available for hiker stability.

2.1.2.3 Hiking Trail Surface Materials

Trail surface materials vary by the type of trail. Improved trails are concrete, asphalt or a compacted mix of liquid soil solidifiers which blends with existing soil forming a hard surface such as PolyPavement™. Some improved trails are given a hard surface with the slopes of the trail less than five percent slope to encourage the physically disabled to experience the trails. Un-improved trails have thick forest, rock formations, streams, and heavy vegetative undergrowth on and along them. They can be small animal trails or no trail path at all through meadows or up slopes of hills (Hart, 1984, p.287). Semi-improved trails are mulched, decomposed granite, wooden bridges or cleared natural soils with some roots and stones still in the trail path (Christiansen, 1977). Trails that are up and down slopes of hills and mountains are semi-improved trails and in many cases use switchback trails to go up a steep slope to decrease the erosion effect and make it less strenuous on the hiker. These trails are maintained periodically by workers clearing away trees and underbrush, and compacting the trail surface and repairing washed out areas from water running down the trails. Trail surface materials are part of the experience of the hiker. Many hikers prefer concrete surfaces due to physical limitations. The selection of surface material brings up many questions that must be answered by the landscape architect such as who will use the trails, but what seasons it will be used.

Fig. 2.7 Unimproved trail

Fig. 2.8 Semi-improved trail

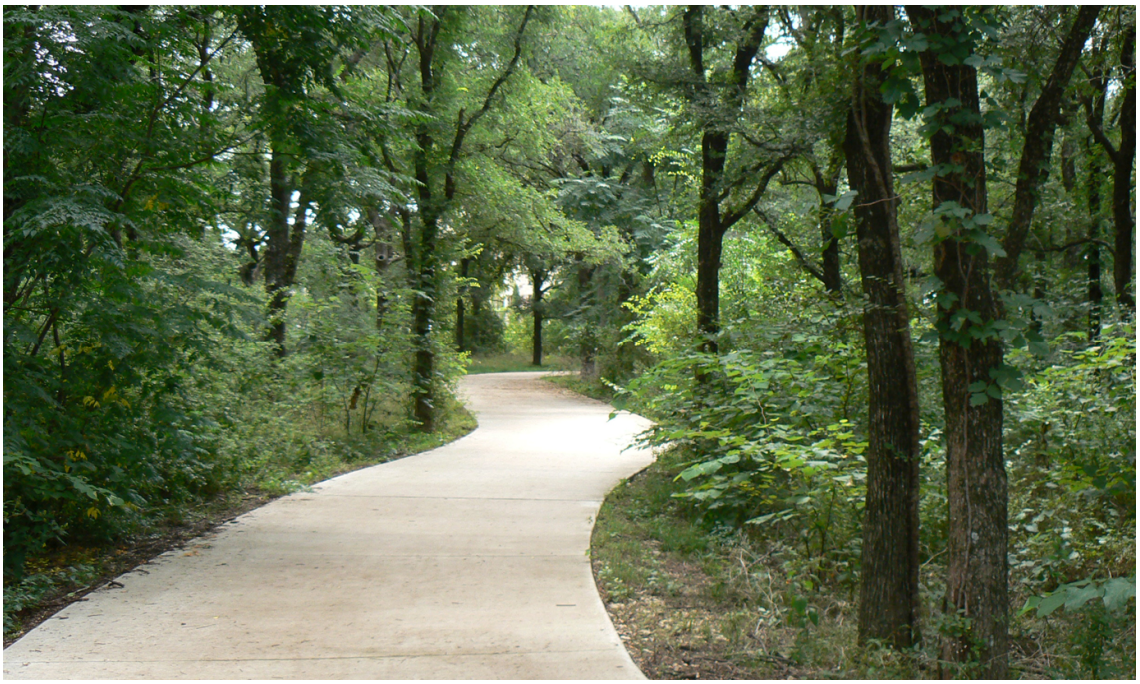


Fig. 2.9 Improved trail

The character of the materials used should be consistent with the surrounding environment. The trail may have to be designed for maintenance or emergency vehicle use. Many considerations such as the user, width, slope, and drainage of the trail also impacts the selection of the surface material (Christiansen, 1977).

2.1.2.4 Signage

Trailheads have maps to show location of the trailhead in relation to the trail and surrounding areas. Fixed maps along the trail are an opportunity for the landscape architect to enhance the experience for the user and give the user a sense of safety by describing their location. The materials from which these signs are constructed are of major importance for maximizing the life of the sign and fitting into the landscape along the trails. Trailhead signs are larger signs of the park showing trails, restrooms, mile markers, landmarks and distances. These signs are covered by a structure to protect them from the weather. This type of signage giving approximate distances allows users to pick the trail best for them based on time to complete the trail and their physical ability. Signage marking trails and facilities keeps the visitors from being frustrated about which way to go (McCurdy, 1985).

Fig. 2.10 Trail sign - trail connection

Fig. 2.11 Trail sign - distance marker

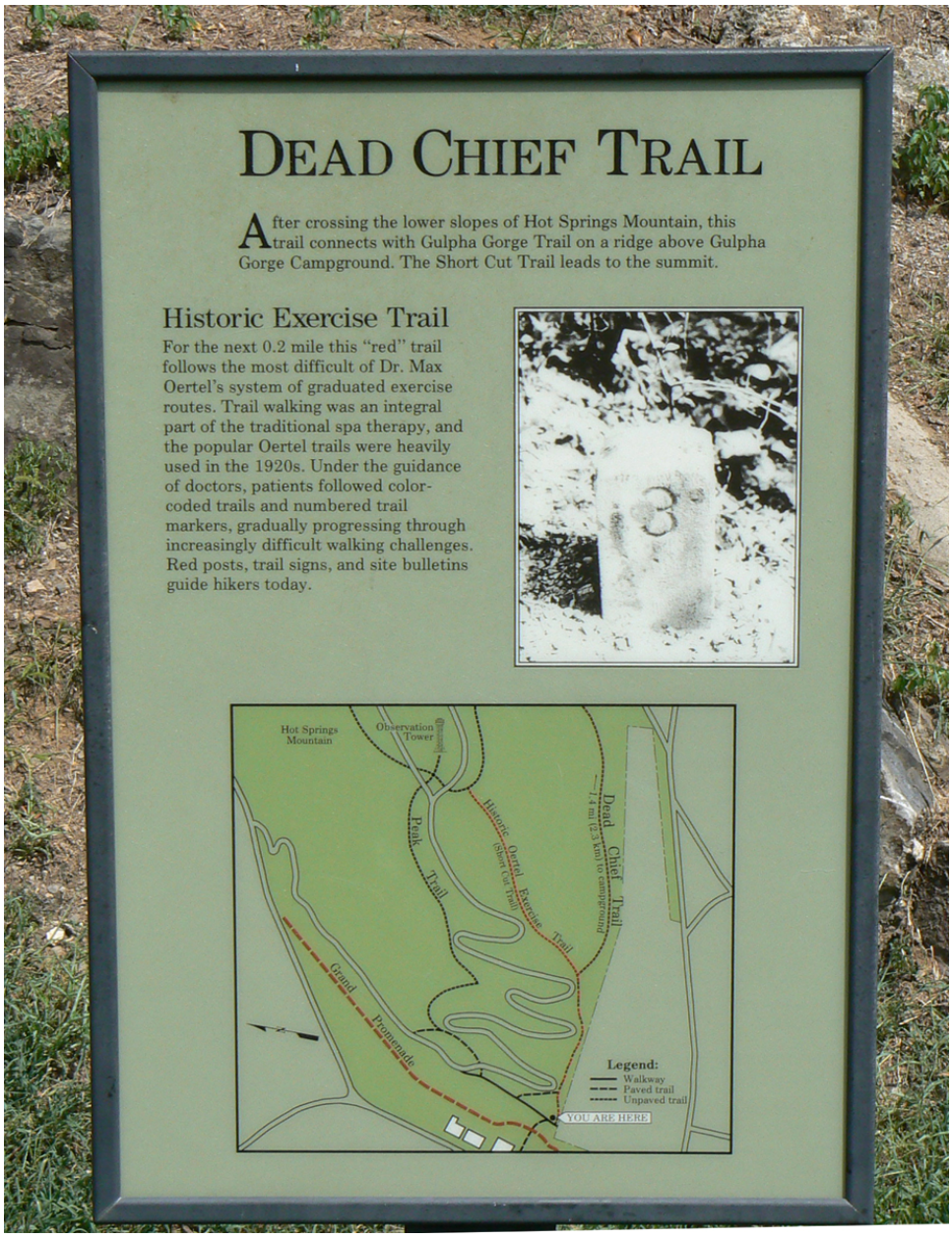


Fig. 2.12 Trail sign -"YOU ARE HERE" sign

The "YOU ARE HERE" signs are helpful when several trails are connected. Giving out maps of the trail systems to the hikers to carry with them showing a few landmarks gives the hikers a sense of direction and safety. When hikers are worried about where they are, they are not enjoying the trail. Special signs along the trail

concerning special views or pointing out special plants enhance the experience for the hiker. Orienting the fixed maps to the hiker's perspective makes it easier than always having north to the top of the map (Kaplan, Kaplan, Ryan, 1998).

2.1.2.5 Views and Vistas

Views and vistas are resources that have been documented to have positive implications for health and well-being, especially those views with vegetation. Views from park benches along the edge of the lake may be the preferred view if dense trees surround the area. Views can include groves of trees, mountain peaks, meadows, areas with consistent wildlife, or water features such as water falls, lakes or streams. Trails can create views that are hidden by curving trails or natural features like rock formations until the hiker reaches just the right spot in which to reveal what was a mystery. These are the opportunities for special views (Kaplan, Kaplan, Ryan, 1998).

Fig. 2.13 Observation tower

Gateways suggest to the hiker that something special is ahead. Some spectacular views and vistas are set up by gateways where the hiker can also see maps or information describing what the hiker can see from that vantage point.

Fig. 2.14 View of City of Hot Springs

2.1.2.6 Landmarks

Major landmarks are unique structures or natural features that can be seen from some distance away. Landmarks are most useful when they are distinctive and there are not very many in one area. Along trails, landmarks can be smaller such as a fallen log, odd grouping of trees or old discarded machinery. Designing views of major landmarks is a great opportunity (Christiansen, 1977). Major landmarks are noted on fixed maps

along the trails and on maps that can be carried by the hikers. Orientation by landmarks helps the new visitors navigate to the trails and through the park.

Fig. 2.15 Rest stop at trailhead

2.1.2.7 Peaceful Areas

Hiking trails can be noisy if there are many people hiking together. Hiking is normally a more quiet activity, enjoyed by individuals or groups smaller than four. Along the trails, special areas are set up as resting spots where you can view a quiet waterfall, dense forest setting or small pool of water where you might see wildlife. These quiet areas permit the hikers to reflect on one's thoughts, sketch the scenery or take photographs. The amount of time spent in the quiet zones and the time hiking the trail enjoying all the natural elements are both important aspects of health improvement to the public. Observing nature without the everyday noise of traffic and equipment

makes the experience one that the hikers come back and experience again by themselves or with a friend. Hikers listening to the sounds of nature, the water flowing in a stream, the wind in the trees, falling braches in the woods, sounds of wildlife, all serve to calm the hiker, which lowers his stress level. Designing trails that have these peaceful areas increases the use of the trails (Kaplan, Kaplan, Ryan, 1998).

Fig. 2.16 Parking area adjacent to trail

2.1.2.8 Transportation Areas Adjacent to Trails

Park roads and parking lots are the framework of any park. In large parks separate roads or trails are used for maintenance and by emergency workers. Hiking trails are separate systems. Circulation of visitors to the trails is a major design opportunity (Dahl and Molnar, 2003). All parks have the same issues concerning keeping the vehicle traffic close to the trails but far enough away so as to not harm the environment or the views. Designing the parking areas in and around the existing

vegetation helps maintain the natural ecosystem. Hikers coming from the parking areas are experiencing the trail system starting in the parking area. Careful design of these parking areas is an opportunity to keep these areas from becoming an eyesore of wide open parking lots without vegetation (Christiansen, 1977).

Fig. 2.17 Direction sign for the disabled

2.1.2.9 Hiking Trails for the Disabled

Improved trails that have hard surfaces and are designed with slopes less than five percent have been built in recent years to accommodate the disabled (Dahl and Molnar, 2003). These trails are usually close to the parking areas, allowing the disabled visitors some of the experience of the nature trail system. Many hikers enjoy these trails

along with the disabled visitors, which gives the disabled visitor the experience of hiking the trail system with those without disabilities. A large portion of the population is now from the “Baby Boomer” age group which is of retirement age. People are living longer and more people are able to get out and enjoy nature with the help of others and special wheelchairs and walkers. Designing with the disabled in mind gives numerous opportunities for creative planning.

Fig. 2.18 Arbor Hills Nature Preserve entrance signage

Fig. 2.19 Semi-improved trail in Hot Springs National Park

2.2 Summary of Literature Review

The literature reviewed for this topic revealed that people have a number of options available to them in which to spend their free time. People of all age groups have activities upon which they are willing to spend their extra money and what little free time they have away from their jobs for entertainment and stress reduction. Therefore research has shown cities looking to improve the quality of life for their citizens should take a look at additional park areas or improving the park areas currently available to the public. In the last twenty years research has shown, hiking and backpacking activities have increased one hundred and ninety-four percent which brings the number of hikers to seventy-six million in 2000/2001. With such a large number of

participants, landscape architects are looking at the hiking trails as a great opportunity for design that can impact the participants physically and mentally, and provide safeguards for the environment. The trail guidelines established over the years have given definitions of three different types of trails: un-improved, semi-improved, and improved. Construction of these different types of hiking trails varies across parts of the country based on available materials, cost and aesthetics. The literature gives landscape architects the basics of trail design from the design and engineering point of view.

CHAPTER 3

RESEARCH METHODS

This chapter describes the three park sites selected for this research. All three parks are within six hours travel time of the Dallas-Fort Worth area and have trail systems that are used every week by hikers. Written permission to do the research in the parks was acquired during the months of May, June and July of 2007.

Permission was granted from the United States Department of the Interior, National Park Service, Hot Springs National Park, Acting Superintendent Dale Moss and Superintendent Josie Fernandez to hand out the surveys in Hot Springs National Park. Permission was received from the Texas Parks & Wildlife, Tyler State Park, Park Superintendent Bill Smart to conduct research in the Tyler State Park. City of Plano Parks & Recreation Department, Director Don Wendell gave the permission to hand out surveys in the Arbor Hills Nature Preserve. This chapter gives a short description of the three sites selected, and also describes the two methods used in research, and it shows ways of summarizing the data into design specific conclusions.

3.1 Sites Selected for Research

The three sites were selected were Hot Springs National Park, Tyler State Park, and Arbor Hills Nature Preserve.

3.1.1. Hot Springs National Park

Located at 101 Reserve Street, Hot Springs, Arkansas, the headquarters and visitor center is in the middle of downtown Hot Springs, Arkansas. The park is roughly 300 miles from Dallas, Texas.

This national park was not the first national park, but it was designated the first national preserve in 1832, forty years before the national park system was started with Yellowstone National Park. It later was changed to a national park in 1921 and became the eighteenth national park. This is a 5,400-acre national park in Hot Springs, Arkansas. This national park draws visitors from all parts of the country and some from other countries. The hot springs bubbling up from a mile deep in the earth have been a draw for people to come see ever since they were discovered by an expedition in 1804. The bathhouses that were erected in this area were known to have had presidents and other dignitaries visit them from time to time. Most of the trails were laid out in the early to mid 1890s. The trails were actually built in the 1920s and improvements finished by 1933 by the Civilian Conservation Corps. Trail information is available online with details and maps. It has 32.5 miles of hiking trails; some are paved trails, some are semi-improved trails with crushed granite, and some are unpaved hiking trails. Mountain bikes are prohibited in the park. Trails vary in elevation change, but there are 23 trails of varying length and difficulty. The park is unique in that the city limits of the town of Hot Springs extends into to the park and has all types of amenities. The city has a population of approximately 33,000. This park is covered with pine, oak and hickory

trees and has wildlife roaming the woods including snakes, deer, wild turkeys, squirrels, raccoons, opossums, and numerous bird species.

3.1.2. Tyler State Park

Located at 789 Park Road 16, Tyler, Texas, just north of the city of Tyler, Tyler State Park is a 985.5-acre state park in Smith County, Texas, which draws visitors from an area reaching from the Houston and Austin areas to all of the east Texas counties. The original improvements were made by the CCC in the mid to late 1930s. The park opened in 1939.

It has 2.5 miles of unpaved hiking trail, a .75 unpaved nature trail, and 13 miles of unpaved hiking/cycling trails as well as pavilions, restrooms, playgrounds, a store, a 65 acre lake for fishing and swimming, day-camping areas and overnight-camping areas. This hilly area is covered with pine trees and has wildlife roaming the woods including snakes, deer, squirrels, raccoons, opossums, and numerous bird species. The lake has crappie, bass, perch and catfish.

3.1.3. Arbor Hills Nature Preserve- Regional/Community Park

Located at 6701 W. Parker Road in Plano, Texas, on the western border of the city of Plano, Arbor Hills Nature Preserve is a 200-acre community park within the Plano Parks and Recreation Department system which draws visitors from a wide area inside and outside the limits of Collin County.

The park has 4.4 miles of paved trail, some unpaved trails and .2 miles of unpaved cycling trails, as well as pavilions, restrooms, playgrounds and an observation tower. Signage for the vegetation and the sites through out the park were donated by

REI. This park has some elevation changes, but not a great deal. Wildlife in the park includes fish in the creeks, snakes, squirrels, opossums, raccoons, and several bird species.

3.2 Data Collection

Data gathering included observing the public and collecting information with user surveys. Field notes that were made while observing the trail users are in Appendix A. Survey data is charted in Chapter Four comparing the three different parks on demographic and trail questions. Photographs were taken of some areas to document examples of positive and negative issues that are in the field notes with the hikers and the survey questions.

3.2.1. Qualitative Research

Qualitative data collection involved meeting with the hikers and key informants regarding the hiking trails. Hiking the trails provided unique opportunities to talk with others along the trails. Key informants familiar with the specific areas in the parks were used to gain insight into trends in the past and information on renovations already completed. Ethnography research was conducted to further understand the public that uses the trails and to observe the body language and understand what can be learned about those who use the trails (Taylor and Bogdan, 1998). Some of the participant conversations were completed on the trail and others at the end of the trail at the trailhead area. During conversations with participants five questions were asked.

- What is your age?
- How many times a year do you hike on trails?

- Do you hike in other parks?
- What would you like to see changed concerning the trail system?
- Would you fill out a survey about hiking trails?

The participants were given a list of questions to answer in survey form.

3.2.2. Quantitative Research

Surveys were handed out to the trail users as they were leaving the trail in order to receive their impressions. This research studied the users of the trail systems in the three different parks: A national park, a state park, and a regional/community park. All were within six hours drive time from the Dallas-Fort Worth area of north Texas. The surveys were handed out between six thirty a.m. and seven p.m. on the weekends during the period of time from end of July to the beginning of September 2007.

Mail-back surveys have been known to have a small return rate, between twenty-five percent and forty-five percent (Dillman, 2000). Therefore in order to receive back the seventy-five surveys needed to have enough data to compare, three hundred surveys were handed out (Parten, 1966). Conversations about the research with the users at the time of handing them a survey was necessary to get overall public opinion of the research and judge their willingness to contribute to the data. The survey population or universe for this study is the users of the hiking trails only, not users of the entire park. The more homogeneous the population, the smaller the sample size needs to be in order to reliable (Parten, 1966). This study focuses on the hiking trail users during the weekends.

This study is designed to determine what groups of people are more likely to use the hiking trails and to obtain comments from them on the hiking trails and the amenities that are associated with a hiking trail system. The surveys are a combination of open-ended and closed-ended questions (Peterson, 2000).

Closed-ended questions allow for the comparisons of specific answers by giving only certain choices to pick from. Ten questions were demographic in nature such as age, race, gender, income, and education level to learn more about the users of the hiking trails. The surveys also asked forty-two questions that were rated from strongly disagree to strongly agree concerning the trails and user's perceptions of the design of the trails (Peterson, 2000). The answers to the closed-ended questions use the Likert Scale which is a scale from strongly disagree to strongly agree with the statement (Peterson, 2000). These surveys were used to gain additional information on the types of trails preferred, trail surfaces, facilities along trails, why they hike, and their perspective on overall health benefits.

Open-ended questions allow the users to give information concerning any other thoughts and suggestions they may have for the trail design and amenities. These answers were grouped together in the overviews to give added weight to some important topics suggested by the users that have not been included in the survey or they wanted to reemphasize.

In order to receive complete and truthful answers, the surveys were tracked by number only. No names, addresses or phone numbers were included on the surveys. Therefore, further contact to encourage the return of the surveys was not possible.

Every participant had to be eighteen years of age or older to be in compliance with the Internal Review Board (IRB) at The University of Texas at Arlington. No incentives were used to persuade hikers to fill out the surveys; they were filled out voluntarily. These were completed and returned in the self-addressed, stamped envelope. This survey was used in all three parks with the same procedures.

Samples of the survey pages, including the cover letter, are on pages forty-four through fifty-nine.

3.3 Summary of Research Methods

The three sites were selected were Hot Springs National Park, Tyler State Park, and Arbor Hills Nature Preserve. Permission was received from each of these parks' administration department to hand out the surveys. The surveys were handed out to the trail users between six thirty a.m. and seven p.m. on the weekends during the period of time from end of July to the beginning of September 2007. The surveys are a combination of open-ended and closed-ended questions (Peterson, 2000). The surveys were tracked by number only; no names, addresses or phone numbers were included on the surveys. These surveys were used to gain additional information on the types of trails preferred, trail surfaces, facilities along trails, why they hike, and their perspective on overall health benefits. These were completed and returned in the self-addressed, stamped envelope.

PARK: _____

RESEARCH #: _____

May 2007

Dear fellow hiker,

Thank you for taking a few moments to help in my research. In conjunction with a master's thesis for The University of Texas at Arlington, School of Architecture, Program in Landscape Architecture, I respectfully request your assistance in completing the attached questionnaire in order to better understand the design quality of the trails that you hike. **Please do not put your name on the survey.** Each survey has a number that will be tracked, instead of your name.

The first section of the questionnaire asks how much you agree or disagree with a statement, and the relative degree of importance of those statements to you. The second section asks for information for stastical purposes only, to determine which groups form the majority of the trail users.

Your personal input is critical to the accomplishment of the study. It will take approximately five to ten minutes to complete the questionnaire and all replies will be held in confidence. For your convenience a self-addressed, stamped envelope is attached. Your assistance and quick return are greatly appreciated. If you are interested in reading the final thesis, please email me in mid 2008. My email address is rhooker1@yahoo.com and I will direct you to an online source. You may keep this sheet with my email address, but please return all pages of questionnaire.

Thank you for your help and
Enjoy your hiking,

Rick Hooker
Master of Landscape Architecture Student,
Program in Landscape Architecture

Fig. 3.1 Cover letter of survey

Questionnaire : Trails in Parks

PARK : Tyler State Park

RESEARCH # :_____

	Statements	Please circle the number that describes how you agree or disagree with the statement.					Please circle the number that describes the relative importance of the statement to you.					
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Not Important	>>>>>>>>>>>>>>				Very Important
	Example: I prefer parks that have trails.	**-2**	**-1**	**0**	**(+1)**	**+2**	**0**	1	**2**	**3**	**(4)**	**5**
1	I hike in regional/ county parks.	-2	-1	0	+1	+2	0	1	2	3	4	5
2	I hike in state parks.	-2	-1	0	+1	+2	0	1	2	3	4	5
3	I hike in national parks.	-2	-1	0	+1	+2	0	1	2	3	4	5
4	I prefer concrete surfaced trails. (Improved Trails)	-2	-1	0	+1	+2	0	1	2	3	4	5
5	I prefer natural soil trails. (Semi-Improved trails)	-2	-1	0	+1	+2	0	1	2	3	4	5
6	I prefer decomposed granite trails. (Semi-Improved trails)	-2	-1	0	+1	+2	0	1	2	3	4	5
7	I prefer wood chip trails. (Semi-Improved trails)	-2	-1	0	+1	+2	0	1	2	3	4	5
8	I prefer going into the backcountry (Unimproved Trails)	-2	-1	0	+1	+2	0	1	2	3	4	5
9	There are adequate written descriptions about this trail in books and pamphlets for this park.	-2	-1	0	+1	+2	0	1	2	3	4	5
10	Advertising describing the trails attracted me to this park.	-2	-1	0	+1	+2	0	1	2	3	4	5
11	The trails are why I come to this park.	-2	-1	0	+1	+2	0	1	2	3	4	5
12	I hike in order to view the scenery and vegetation.	-2	-1	0	+1	+2	0	1	2	3	4	5
13	I hike to improve my health.	-2	-1	0	+1	+2	0	1	2	3	4	5
14	My stress level is reduced by hiking on the trails.	-2	-1	0	+1	+2	0	1	2	3	4	5
15	Hiking on the trails makes me feel better (In general- REFRESHED) during the week after hiking.	-2	-1	0	+1	+2	0	1	2	3	4	5
16	I hike in order to view the wildlife.	-2	-1	0	+1	+2	0	1	2	3	4	5
17	Advertising (books, pamphlets, TV ads) of the trails in other parks compels me to visit other parks.	-2	-1	0	+1	+2	0	1	2	3	4	5
18	There are enough informational signs along this trail.	-2	-1	0	+1	+2	0	1	2	3	4	5
19	Hiking is not the primary reason for coming to this park.	-2	-1	0	+1	+2	0	1	2	3	4	5
20	The trailheads are accessible to nearby parking.	-2	-1	0	+1	+2	0	1	2	3	4	5
21	There is adequate parking at the trailhead.	-2	-1	0	+1	+2	0	1	2	3	4	5

Fig. 3.2 Page one of survey

Questionnaire : Trails in Parks

PARK : Tyler State Park

RESEARCH # :_____

	Statements	Please circle the number that describes how you agree or disagree with the statement.					Please circle the number that describes the relative importance of the statement to you.					
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Not Important	>>>>>>>>>>>>>>				Very Important
22	There is enough signage in the park to the trailheads.	-2	-1	0	+1	+2	0	1	2	3	4	5
23	There is enough signage along the trails ("YOU ARE HERE" signs).	-2	-1	0	+1	+2	0	1	2	3	4	5
24	I pick up litter along the trail when I see it.	-2	-1	0	+1	+2	0	1	2	3	4	5
25	I feel safe hiking the trails.	-2	-1	0	+1	+2	0	1	2	3	4	5
26	There are adequate amenities at the trailhead and/or along the trail (such as benches, drinking water, restrooms, shade).	-2	-1	0	+1	+2	0	1	2	3	4	5
27	Landscaping by the trailhead parking areas is adequately maintained.	-2	-1	0	+1	+2	0	1	2	3	4	5
28	The existing restroom facilities in conjunction with the trails are adequate.	-2	-1	0	+1	+2	0	1	2	3	4	5
29	I would like to see more picnic areas in the park.	-2	-1	0	+1	+2	0	1	2	3	4	5
30	I prefer trails one to three miles long.	-2	-1	0	+1	+2	0	1	2	3	4	5
31	I prefer trails three to six miles long.	-2	-1	0	+1	+2	0	1	2	3	4	5
32	I would like to see more trailheads with parking areas.	-2	-1	0	+1	+2	0	1	2	3	4	5
33	I would like to see more written information in the form of pamphlets about the trails.	-2	-1	0	+1	+2	0	1	2	3	4	5
34	I would like to see more signage along the trails describing the vegetation and wildlife.	-2	-1	0	+1	+2	0	1	2	3	4	5
35	The vegetation along the trails is maintained adequately.	-2	-1	0	+1	+2	0	1	2	3	4	5
36	The trail surface is adequately maintained.	-2	-1	0	+1	+2	0	1	2	3	4	5
37	There are enough resting places along the trails.	-2	-1	0	+1	+2	0	1	2	3	4	5
38	I would like to see more trails in the park.	-2	-1	0	+1	+2	0	1	2	3	4	5
39	I would like to see the existing trails improved.	-2	-1	0	+1	+2	0	1	2	3	4	5
40	I have been on other trails that are better.	-2	-1	0	+1	+2	0	1	2	3	4	5
41	I hike in all kinds of weather.	-2	-1	0	+1	+2	0	1	2	3	4	5
42	I hike alone.	-2	-1	0	+1	+2	0	1	2	3	4	5

Fig. 3.3 Page two of survey

Questionnaire: Trails in Parks

PARK : Tyler State Park

RESEARCH # :__________

This survey does not ask your name.

Strict confidentially is maintained. This information is for stastical purposes only.

1 How many times a year do you hike on trails?
- ☐ Less than 2 times
- ☐ 2 to 5 times
- ☐ 6 to 10 times
- ☐ 11 to 20 times
- ☐ 21 or more times

2 The trail you hiked today, how many times have you hiked it before?
- ☐ Less than 2 times
- ☐ 2 to 5 times
- ☐ 6 to 10 times
- ☐ 11 to 20 times
- ☐ 21 or more times

3 What is your age? **MUST BE AT LEAST 18 YEARS OLD**
- ☐ 18 - 20
- ☐ 20 - 29
- ☐ 30 - 39
- ☐ 40 - 49
- ☐ 50 - 59
- ☐ 60 or more

4 Which one of the following best describes your race or ethnic origin?
- ☐ Hispanic/Mexican American
- ☐ Black/ African American
- ☐ White/ Anglo
- ☐ Asian
- ☐ Other (please describe)__________

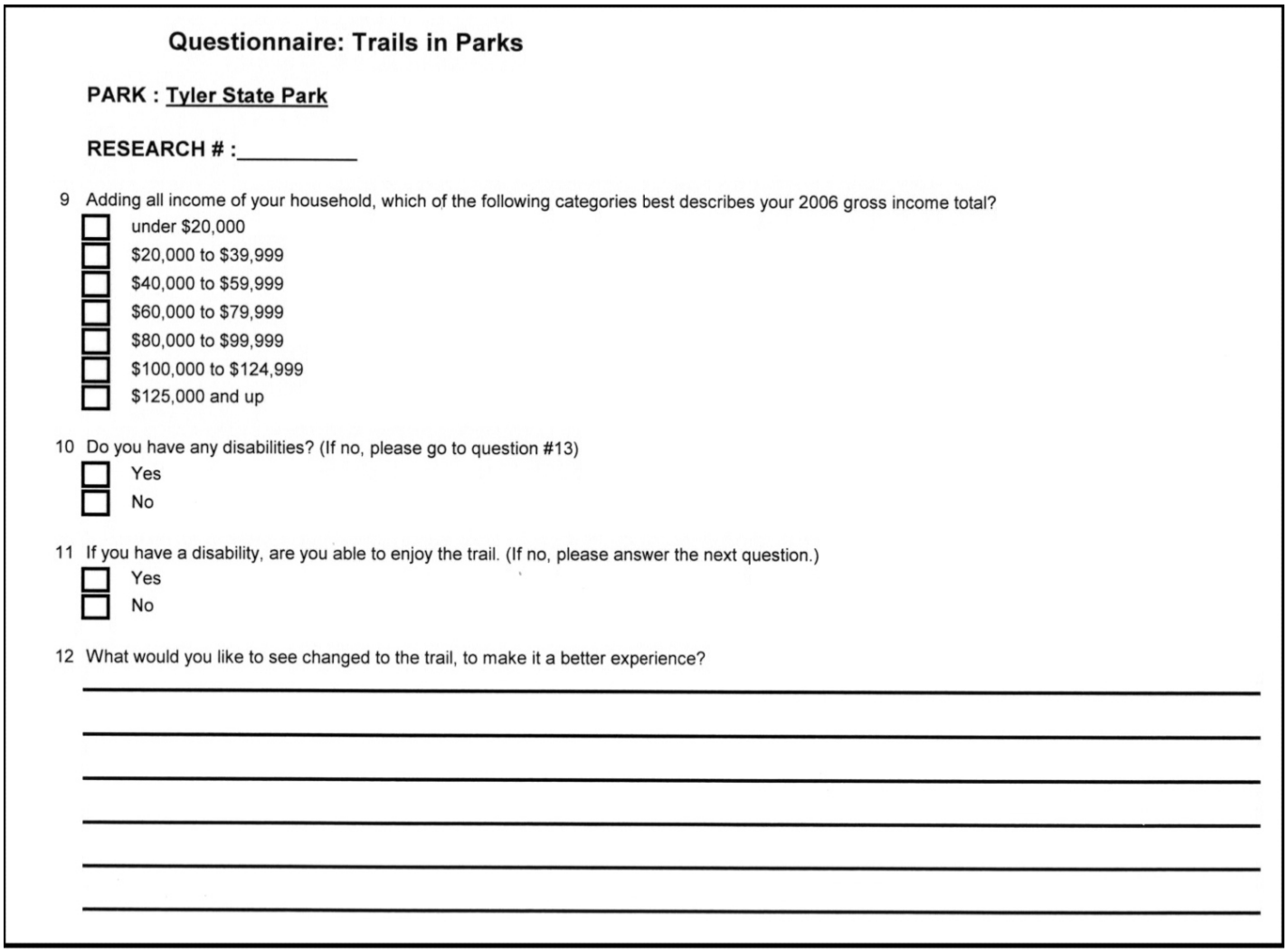
5 What is your sex?
- ☐ Male
- ☐ Female

6 If there are children living at home, do you bring them on the hikes?
- ☐ Yes
- ☐ No

7 Which of the following best describes your household?
- ☐ Live alone
- ☐ Single parent with children
- ☐ Couple
- ☐ Couple with children
- ☐ Multi-family
- ☐ Other (please describe) __________

8 What was the last level of school completed?
- ☐ High school diploma
- ☐ Junior college or partial college
- ☐ Technical college or business school diploma
- ☐ Bachelors degree
- ☐ Masters degree
- ☐ Ph.D.

Fig. 3.4 Page three of survey



Questionnaire: Trails in Parks

PARK : Tyler State Park

RESEARCH # :_____

9 Adding all income of your household, which of the following categories best describes your 2006 gross income total?

- ☐ under $20,000
- ☐ $20,000 to $39,999
- ☐ $40,000 to $59,999
- ☐ $60,000 to $79,999
- ☐ $80,000 to $99,999
- ☐ $100,000 to $124,999
- ☐ $125,000 and up

10 Do you have any disabilities? (If no, please go to question #13)

- ☐ Yes
- ☐ No

11 If you have a disability, are you able to enjoy the trail. (If no, please answer the next question.)

- ☐ Yes
- ☐ No

12 What would you like to see changed to the trail, to make it a better experience?

Fig. 3.5 Page four of survey

Questionnaire: Trails in Parks

PARK : Tyler State Park

RESEARCH # :_____

13 Have you hiked on better trails in this park or another park?

☐ Yes
☐ No

14 What would you like to see added to the trail, to make it a better experience?

15 Is there anything you wish to comment on, that was not addressed previously?
Please, comment below concerning improvements to the trail systems in the park.

Thank you very much for completing this survey. I certainly appreciate your time and effort.
Please return the completed survey in the enclosed addressed postage-paid envelope. Thank you for your cooperation.

Fig. 3.6 Page five of survey

CHAPTER 4

RESEARCH DATA

The survey data mailed back to the researcher within five weeks of the surveys being handed out in that particular park is compiled into spreadsheets. All of the surveys are tracked by park and a tracking number.

The quantity of acceptable surveys mailed back exceeded the minimum expected range of 25% for this type of survey (Dillman, 2000). The percentage of acceptable surveys received from each park varied. The Hot Springs National Park percentage was 27%. The Tyler State Park percentage was 40%. The Arbor Hills Nature Preserve was 52%. Based on the percentage of surveys received there was more enthusiasm about the research from the people in the Arbor Hills Nature Preserve and The Tyler State Park. Some of the people in The Hot Springs National Park were not as interested in the research about the hiking trails in that particular park, since they did not come there as often, but they were interested in the overall topic of hiking trails.

4.1 Qualitative Research

The qualitative research was two–fold; the conversations with key informants and site observations made at the different parks.

4.1.1 Key Informants

Diane East with The National Park Service was very helpful getting the proper special use permit to conduct this research. The National Park Service wants to receive a copy of this thesis when it is published. They were interested in the demographics of the users of the trail systems. They felt that they had built trails for everyone to enjoy. The National Park Service is always looking to receive current data on park use. This information is useful for planning future projects. Park rangers in the park were very helpful by discussing the best place to hand out the surveys.

The Tyler State Park superintendent, Bill Smart, gave current information on the trails being used by both the hikers and the bikers, and maps showing the trail systems and the direction each group should follow. His information helped determine where to hand out the surveys. He gave special permission to hand out the surveys in the park and notified the other park rangers that this was going to be happening in the park. All of the park rangers at the entrance to the park knew about the research after visiting with Mr. Bill Smart the first time. The other park rangers said they looked forward to reading the thesis. They have also requested a copy of the thesis to keep at the park office as reference material for future projects.

Ron Smith with the Plano Parks and Recreation Department had conveyed that the city had tried to get surveys completed at some of the parks before. After discussing with him that these surveys would be mailed back instead of having them filled out on the spot, he thought that might work better. He was very interested in seeing just how well the mail-back surveys worked. The City of Plano made an exception to their

ordinance to hand out the surveys in the park. Thanks to Mr. Smith for getting the paperwork though the system. It was obvious the paperwork was done properly because the Plano Police called in checking to make sure someone was supposed to be handing out surveys in the park and some one from the Park and Recreation Department checked as well. After they found out it was okay to be in the park, they drove by and waved. The parks department is interested in the demographic results as well as the trail questions. They said the results of this survey could affect future trail projects.

4.1.2 Site Observations

Hikers are some of the friendliest people you will ever meet. They love the outdoors and want to make it better for everyone to enjoy. Everyone appeared to be glad they were there.

Fig. 4.1 Hot Springs National Park – Family hiking

Observations at the three parks were similar, since the activity was the use of hiking trails. People have all kinds of reasons to come out and enjoy the trails. Hiking is exercise which requires a certain amount of endurance, sweat, and time. Many hikers were ready for a long hike by taking backpacks, walking sticks and plenty of water. Most had on hiking boots and were carrying their maps. Most hikers on the trail would stop and just look into the woods trying to see any wildlife moving around or looking into a stream. Hikers did not talk very much on the trail; they just listened to the sounds of the woods. Sometimes hikers would help other hikers trying to read their map and determine where they were. If someone had a wildlife sighting they would always share that information with other hikers as they approach an area. Many brought their cameras. The observation at the different parks that really stood out was the balance of male and female hikers. That does not mean that each couple that was hiking had one male and one female. Some groups had three females, or there were three separate male hikers. Overall the balance was pretty even. A few people that refused to take the survey did not speak English very well or at all. For some that were jogging strictly for the exercise, they would keep going as in a world of their own, and the iPod plugged in their ear. A couple of new mothers that were pushing strollers said they just had to get back outside, because they were tired of staying inside with the baby. They expressed that they felt safe on the trails because there were enough people around.

4.2 Quantitative Research

Quantitative research was conducted using a five page survey and an introductory cover sheet describing the research. The cover sheet and survey pages are in Chapter 3, starting on page 44. Analysis from surveys yields specific results that can be charted, so it was chosen to be the best approach for comparing the results from the three parks. The surveys were changed three times before a version was accepted for pretesting. Pretesting with a group of individuals that are similar to the targeted study participants answered that the questions on the survey were relevant to the topic of hiking on trails in the parks, easy to understand, and thorough. Pretesting the survey was conducted with a handful of friends that enjoy hiking (Peterson, 2000). The pretest group said the survey questions were easy to answer and relevant to the topic, and that the survey took less than ten minutes to complete. The survey used in the parks was the form that was pretested. The data from each of the three parks was entered into Excel spreadsheets for charting purposes. All of the data from each park is provided in the Appendix section of this thesis. This data when charted by individual parks in different ways furthers their research into a particular area of interest.

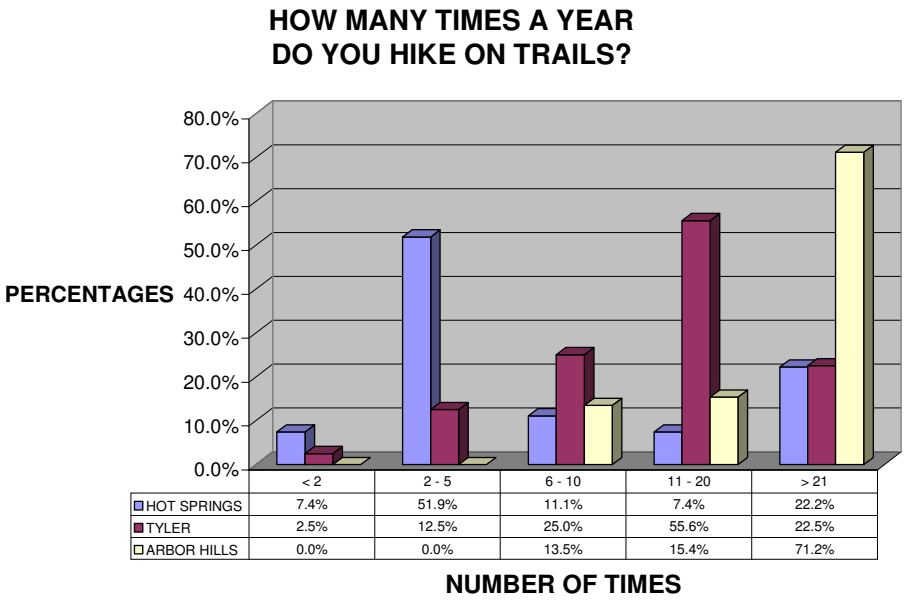
The surveys had closed-ended questions which are charted (Peterson, 2000). The main demographic questions are covered in the first nine charts. The forty-two trail questions were covered in two ways: first, a scale from strongly agree to strongly disagree with statement; and second, a scale of how important is the statement to the hiker. Both of these are charted and the two charts will be displayed on the same page. Some of the questions on the survey are grouped together concerning a particular topic.

These groups are identified showing the question numbers associated with the group. Text on the charts describes the percentages by the individual park in each category. The open-ended questions are discussed in section 4.2.3 (Peterson, 2000).

The first three sections of this chapter show the individual charts for each question. The overviews drawn from these charts and the responses to the open-ended questions are in Chapter 4.2.4. Conclusions will be in Chapter Five.

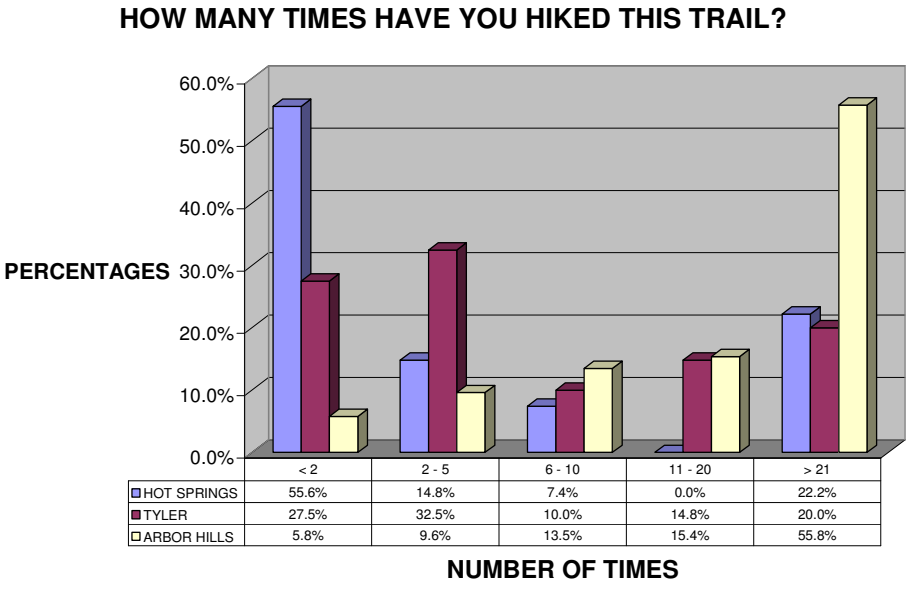
4.2.1 Demographic Survey Results Charted by Park

This series of charts shows the demographics of the trail users in each park.



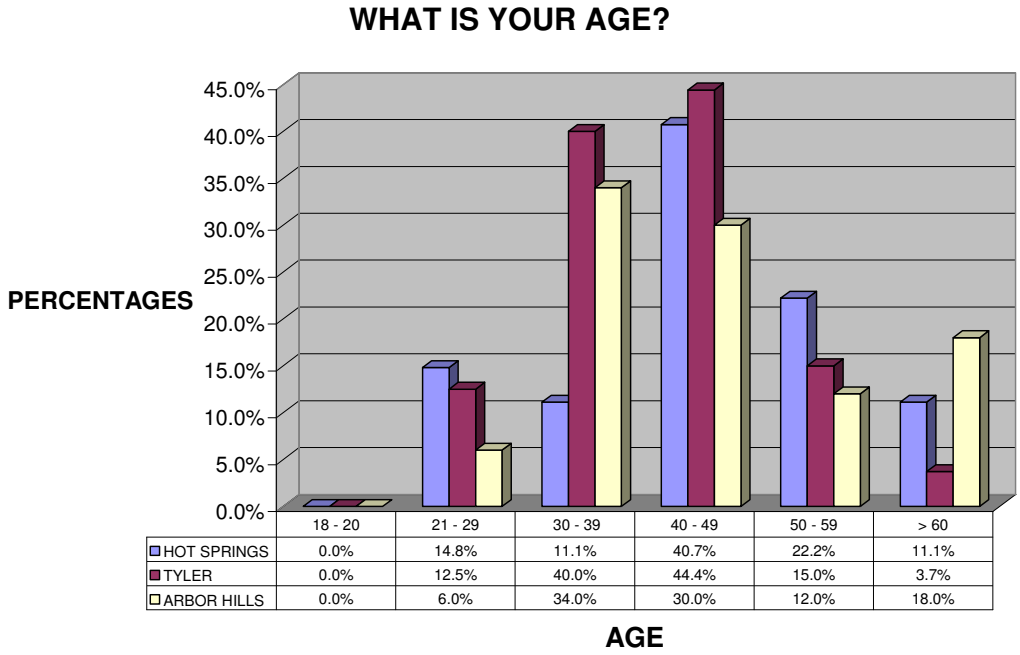
	< 2	2 - 5	6 - 10	11 - 20	> 21
HOT SPRINGS	7.4%	51.9%	11.1%	7.4%	22.2%
TYLER	2.5%	12.5%	25.0%	55.6%	22.5%
ARBOR HILLS	0.0%	0.0%	13.5%	15.4%	71.2%

Fig. 4.2 Chart of Demographic Question 1



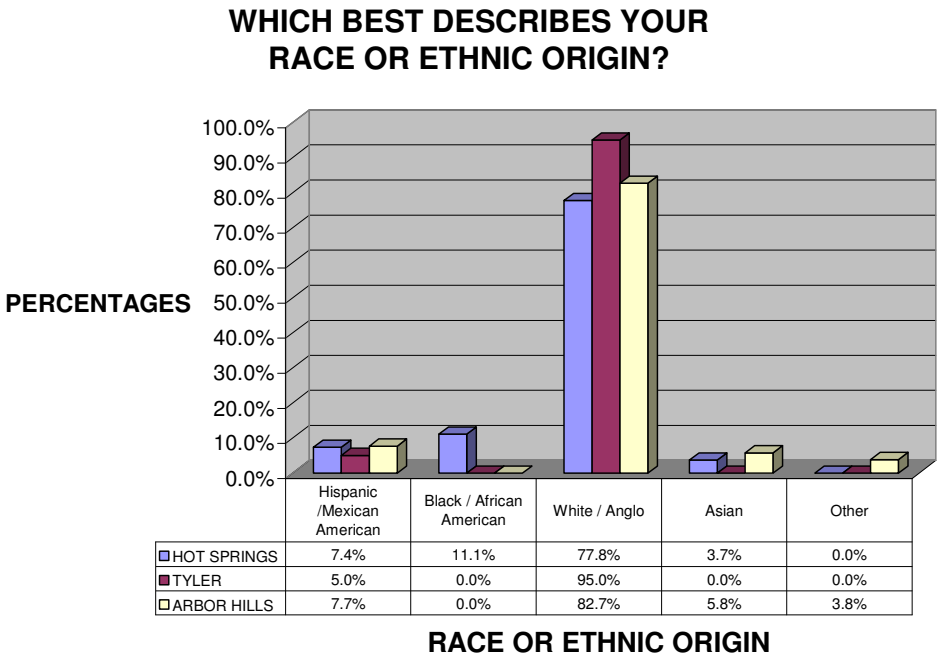
	< 2	2 - 5	6 - 10	11 - 20	> 21
HOT SPRINGS	55.6%	14.8%	7.4%	0.0%	22.2%
TYLER	27.5%	32.5%	10.0%	14.8%	20.0%
ARBOR HILLS	5.8%	9.6%	13.5%	15.4%	55.8%

Fig. 4.3 Chart of Demographic Question 2



	18 - 20	21 - 29	30 - 39	40 - 49	50 - 59	> 60
HOT SPRINGS	0.0%	14.8%	11.1%	40.7%	22.2%	11.1%
TYLER	0.0%	12.5%	40.0%	44.4%	15.0%	3.7%
ARBOR HILLS	0.0%	6.0%	34.0%	30.0%	12.0%	18.0%

Fig. 4.4 Chart of Demographic Question 3



	Hispanic /Mexican American	Black / African American	White / Anglo	Asian	Other
HOT SPRINGS	7.4%	11.1%	77.8%	3.7%	0.0%
TYLER	5.0%	0.0%	95.0%	0.0%	0.0%
ARBOR HILLS	7.7%	0.0%	82.7%	5.8%	3.8%

Fig. 4.5 Chart of Demographic Question 4

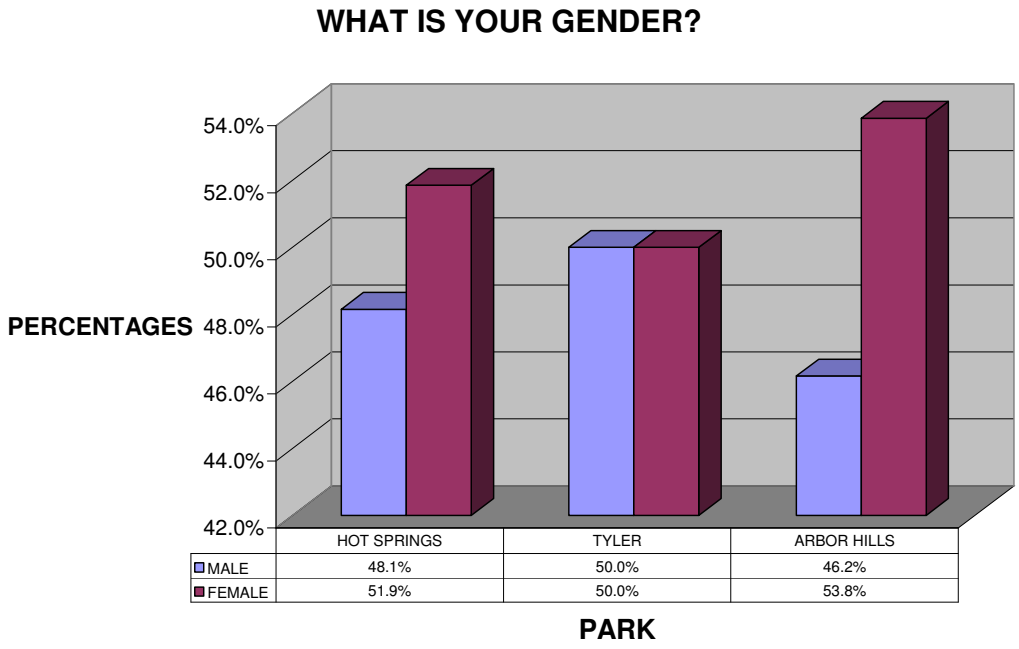


Fig. 4.6 Chart of Demographic Question 5

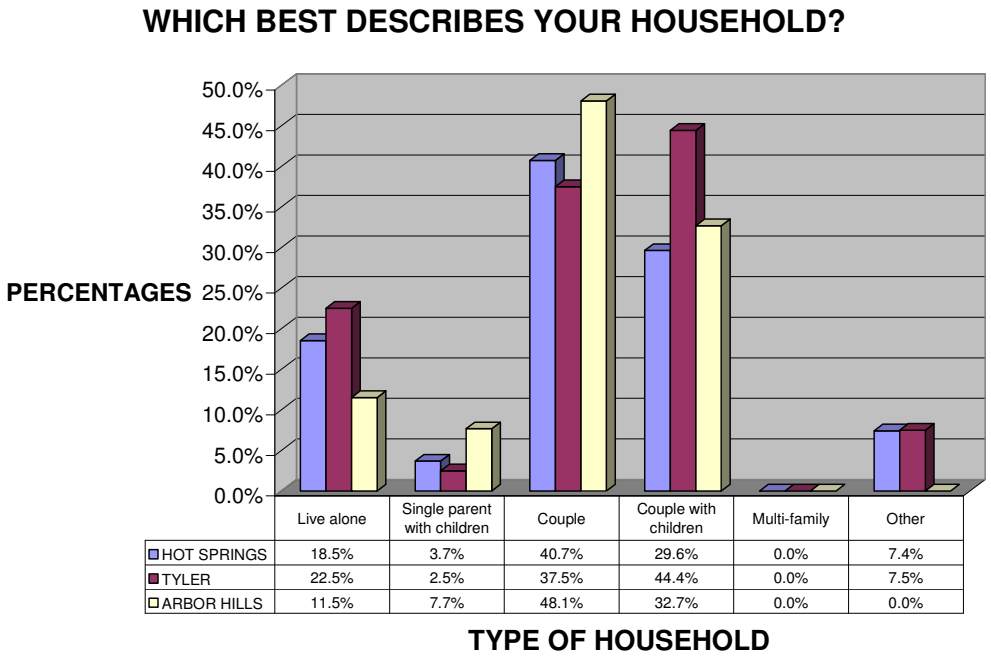
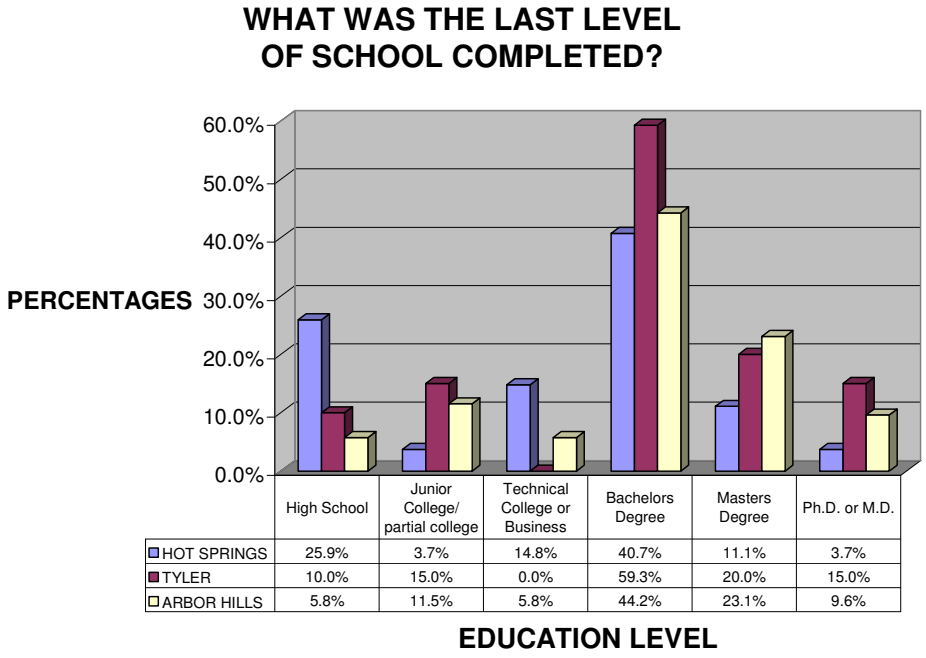
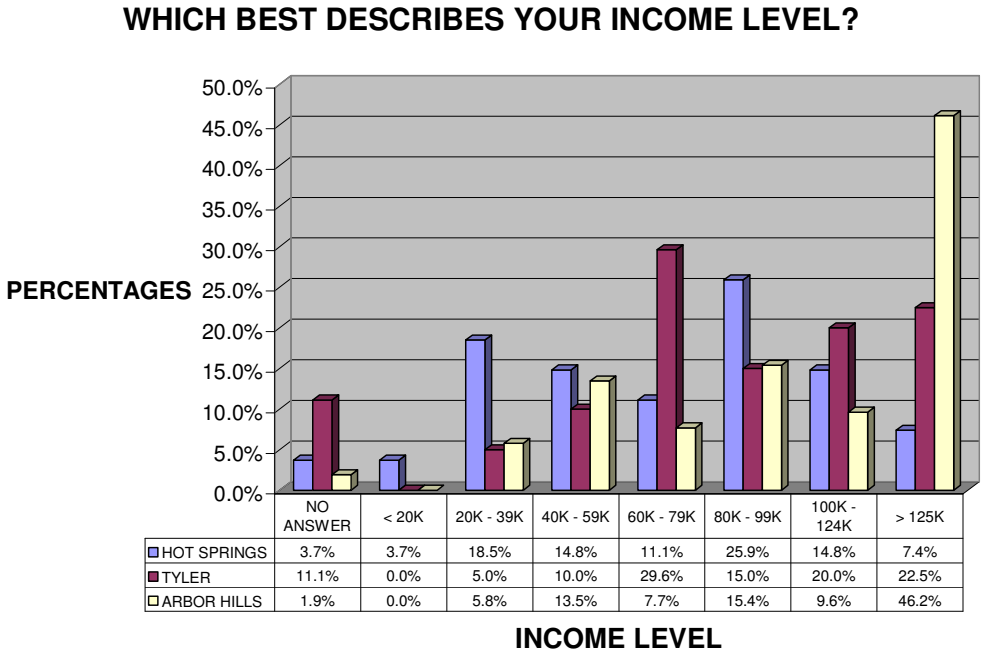


Fig. 4.7 Chart of Demographic Question 7



	High School	Junior College/ partial college	Technical College or Business	Bachelors Degree	Masters Degree	Ph.D. or M.D.
HOT SPRINGS	25.9%	3.7%	14.8%	40.7%	11.1%	3.7%
TYLER	10.0%	15.0%	0.0%	59.3%	20.0%	15.0%
ARBOR HILLS	5.8%	11.5%	5.8%	44.2%	23.1%	9.6%

Fig. 4.8 Chart of Demographic Question 8



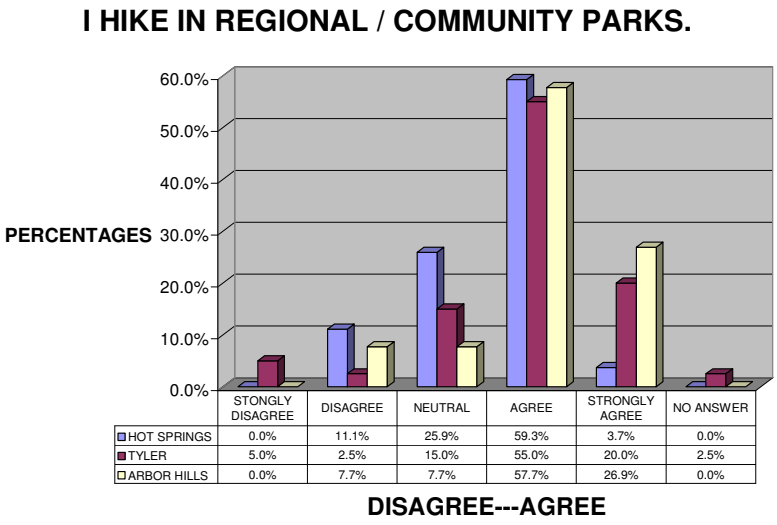
	NO ANSWER	< 20K	20K - 39K	40K - 59K	60K - 79K	80K - 99K	100K - 124K	> 125K
HOT SPRINGS	3.7%	3.7%	18.5%	14.8%	11.1%	25.9%	14.8%	7.4%
TYLER	11.1%	0.0%	5.0%	10.0%	29.6%	15.0%	20.0%	22.5%
ARBOR HILLS	1.9%	0.0%	5.8%	13.5%	7.7%	15.4%	9.6%	46.2%

Fig. 4.9 Chart of Demographic Question 9

4.2.2 Trail Question Results Charted by Park

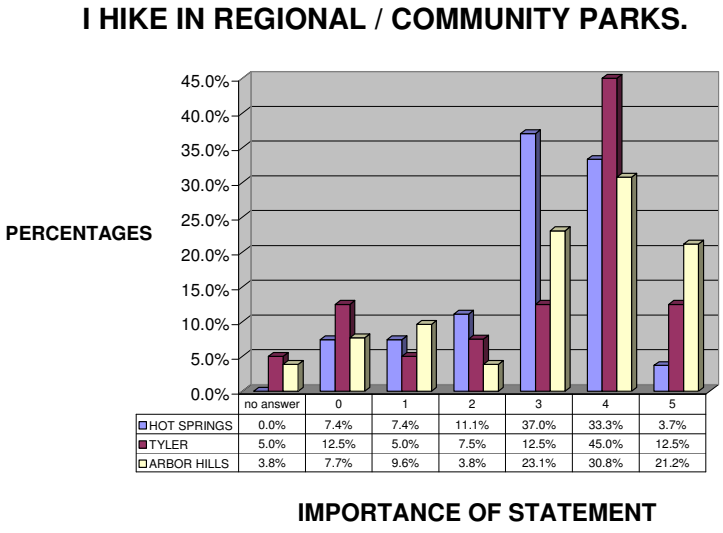
This series of charts has to deal with agree-disagree of a statement and how important the statement is to the one taking the survey.

4.2.2.1 Parks They Like to Hike



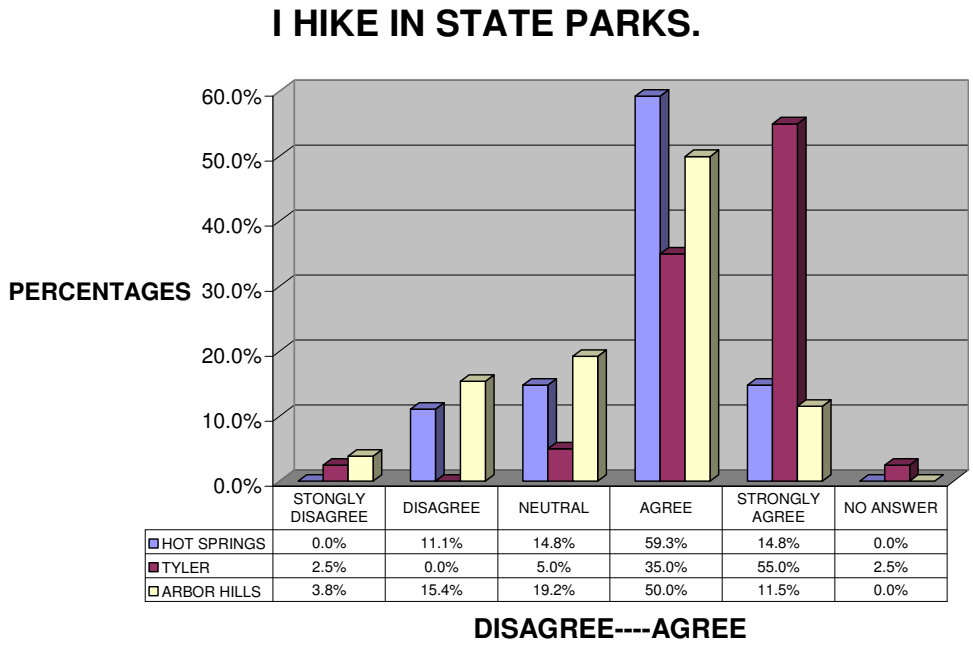
	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	0.0%	11.1%	25.9%	59.3%	3.7%	0.0%
TYLER	5.0%	2.5%	15.0%	55.0%	20.0%	2.5%
ARBOR HILLS	0.0%	7.7%	7.7%	57.7%	26.9%	0.0%

Fig. 4.10 Chart of Trail Question 1a



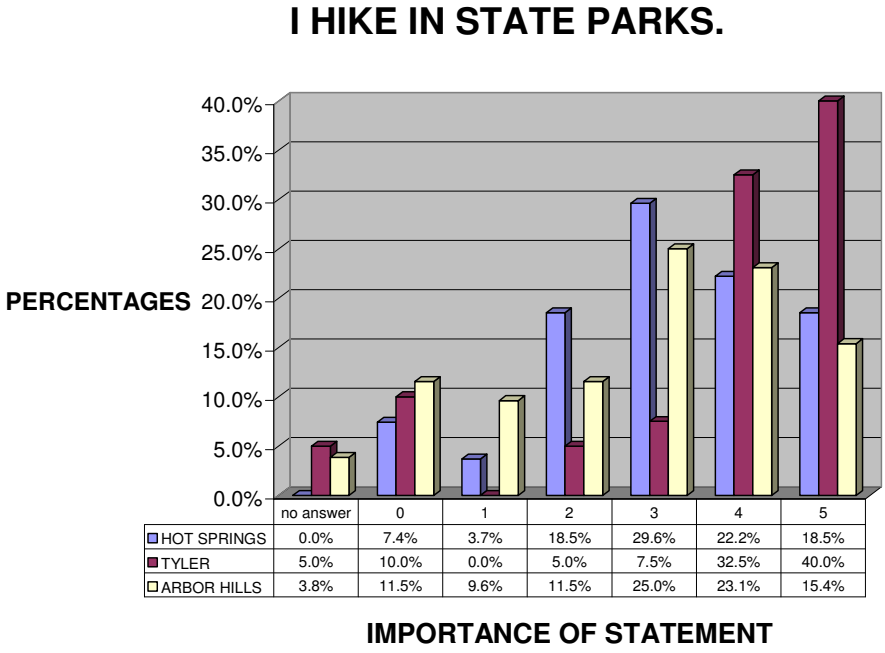
	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	7.4%	7.4%	11.1%	37.0%	33.3%	3.7%
TYLER	5.0%	12.5%	5.0%	7.5%	12.5%	45.0%	12.5%
ARBOR HILLS	3.8%	7.7%	9.6%	3.8%	23.1%	30.8%	21.2%

Fig. 4.11 Chart of Trail Question 1b



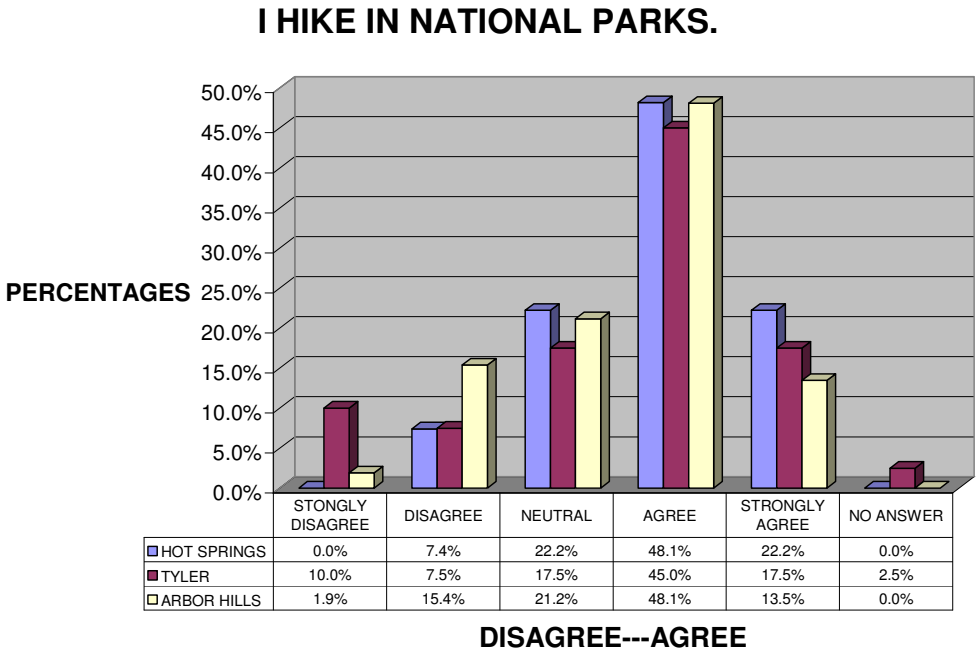
	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	0.0%	11.1%	14.8%	59.3%	14.8%	0.0%
TYLER	2.5%	0.0%	5.0%	35.0%	55.0%	2.5%
ARBOR HILLS	3.8%	15.4%	19.2%	50.0%	11.5%	0.0%

Fig. 4.12 Chart of Trail Question 2a



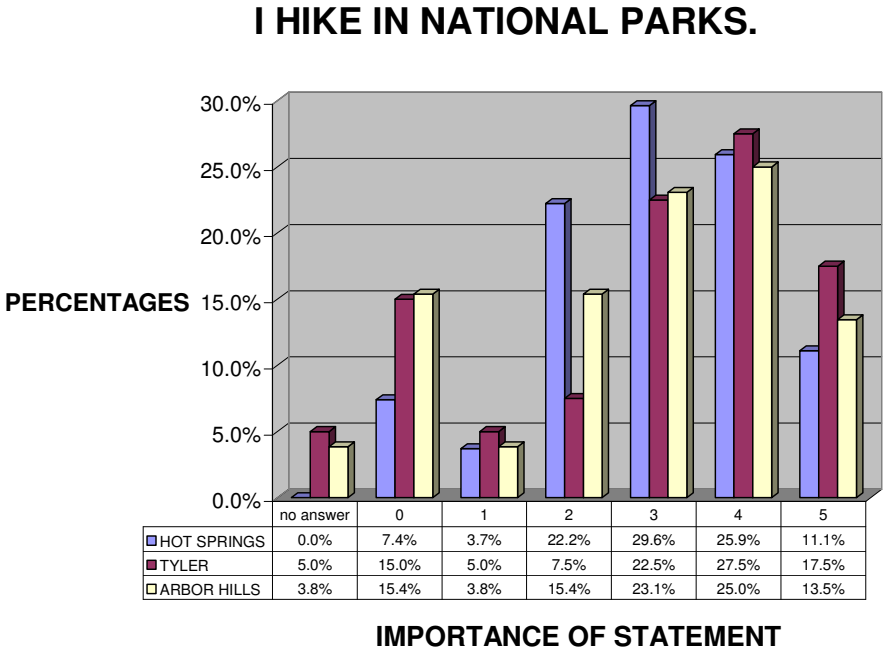
	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	7.4%	3.7%	18.5%	29.6%	22.2%	18.5%
TYLER	5.0%	10.0%	0.0%	5.0%	7.5%	32.5%	40.0%
ARBOR HILLS	3.8%	11.5%	9.6%	11.5%	25.0%	23.1%	15.4%

Fig. 4.13 Chart of Trail Question 2b



	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	0.0%	7.4%	22.2%	48.1%	22.2%	0.0%
TYLER	10.0%	7.5%	17.5%	45.0%	17.5%	2.5%
ARBOR HILLS	1.9%	15.4%	21.2%	48.1%	13.5%	0.0%

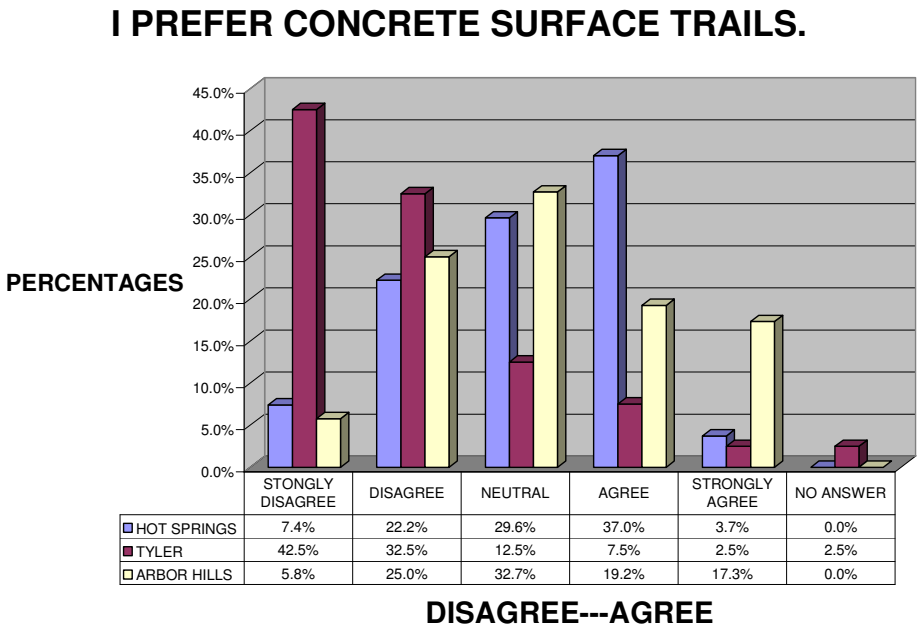
Fig. 4.14 Chart of Trail Question 3a



	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	7.4%	3.7%	22.2%	29.6%	25.9%	11.1%
TYLER	5.0%	15.0%	5.0%	7.5%	22.5%	27.5%	17.5%
ARBOR HILLS	3.8%	15.4%	3.8%	15.4%	23.1%	25.0%	13.5%

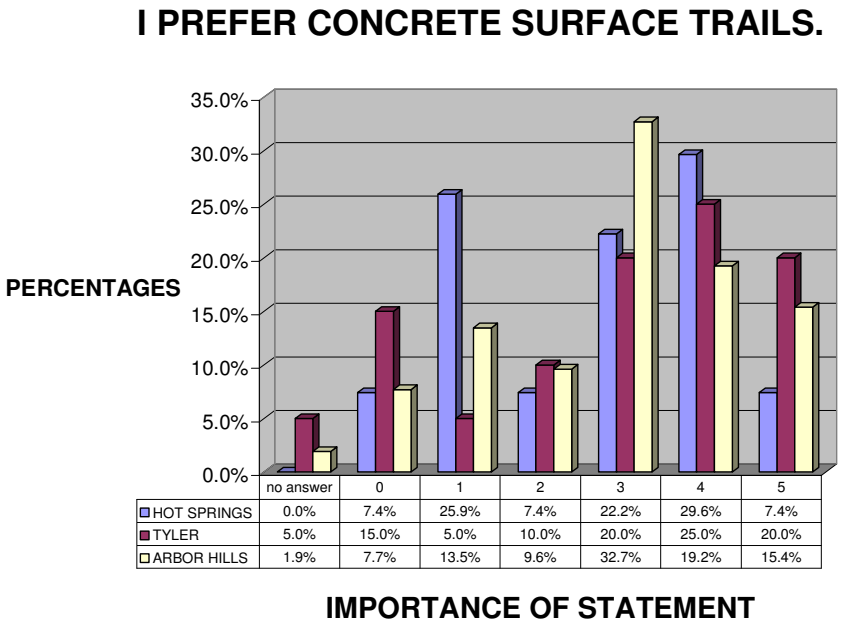
Fig. 4.15 Chart of Trail Question 3b

4.2.2.2 Type of Trail Surface Preferred



	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	7.4%	22.2%	29.6%	37.0%	3.7%	0.0%
TYLER	42.5%	32.5%	12.5%	7.5%	2.5%	2.5%
ARBOR HILLS	5.8%	25.0%	32.7%	19.2%	17.3%	0.0%

Fig. 4.16 Chart of Trail Question 4a



	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	7.4%	25.9%	7.4%	22.2%	29.6%	7.4%
TYLER	5.0%	15.0%	5.0%	10.0%	20.0%	25.0%	20.0%
ARBOR HILLS	1.9%	7.7%	13.5%	9.6%	32.7%	19.2%	15.4%

Fig. 4.17 Chart of Trail Question 4b

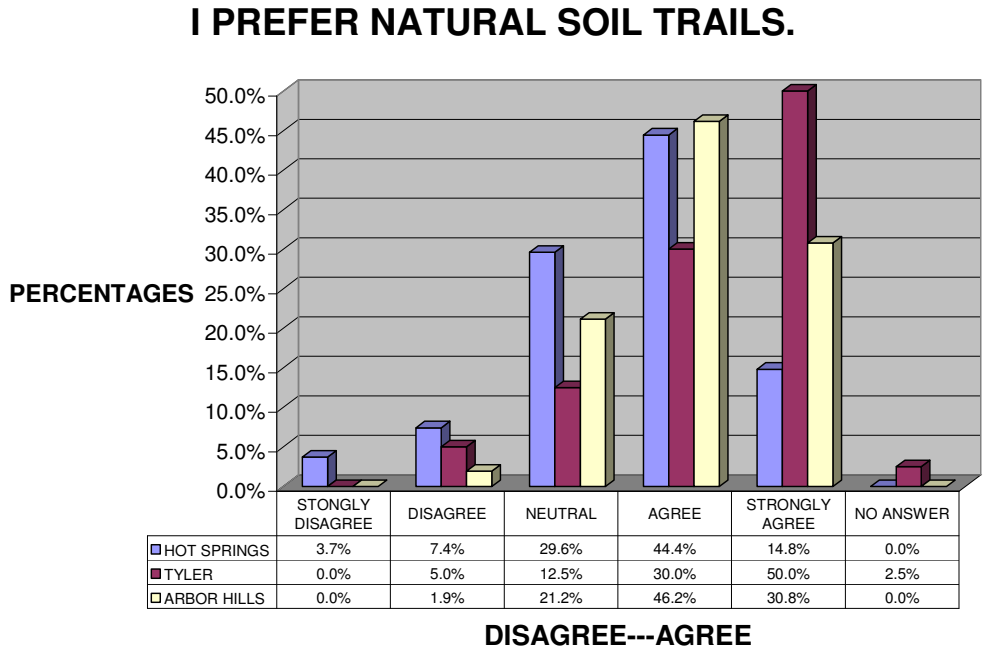


Fig. 4.18 Chart of Trail Question 5a

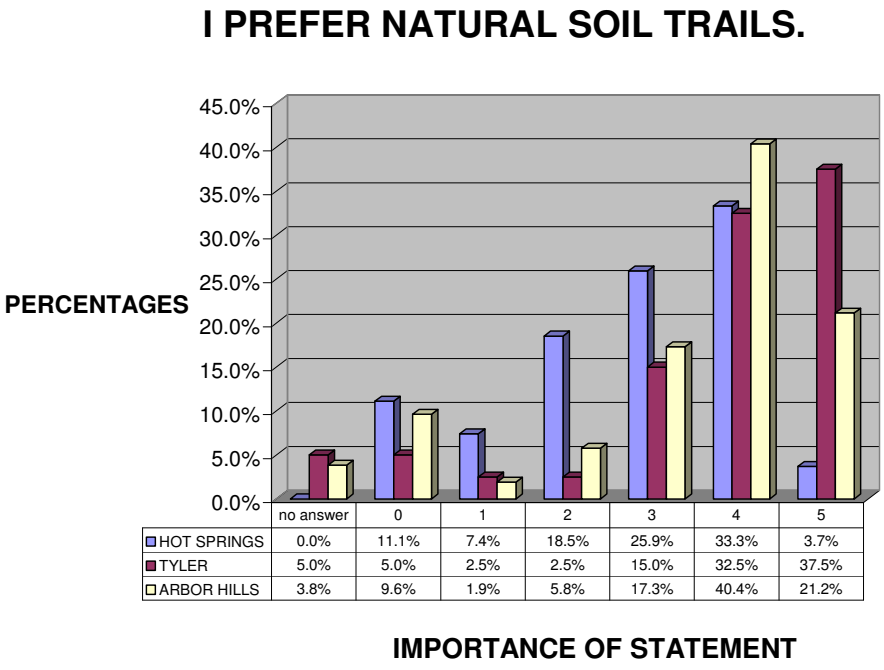
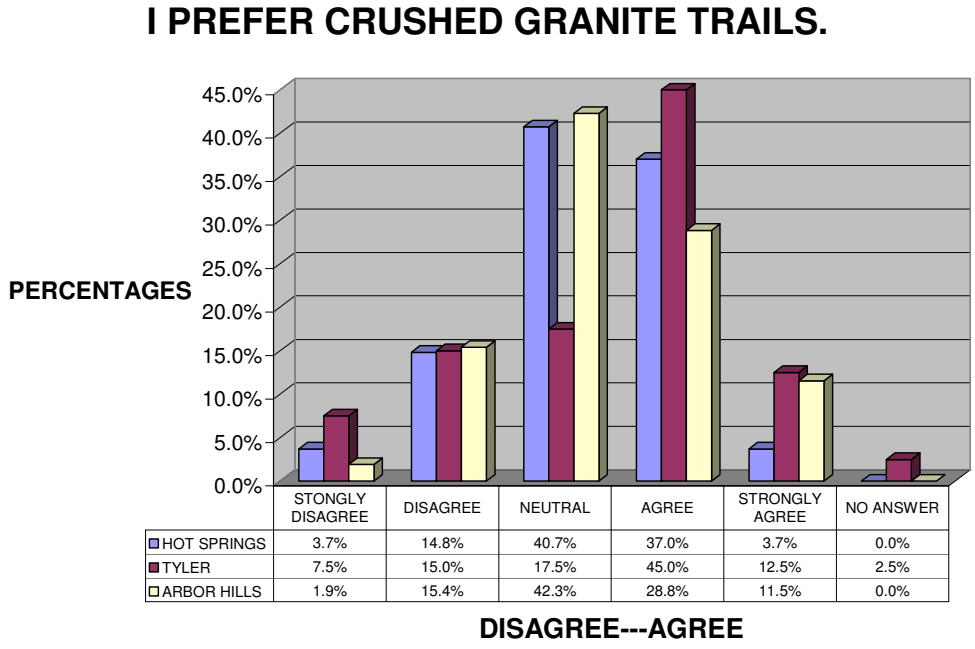
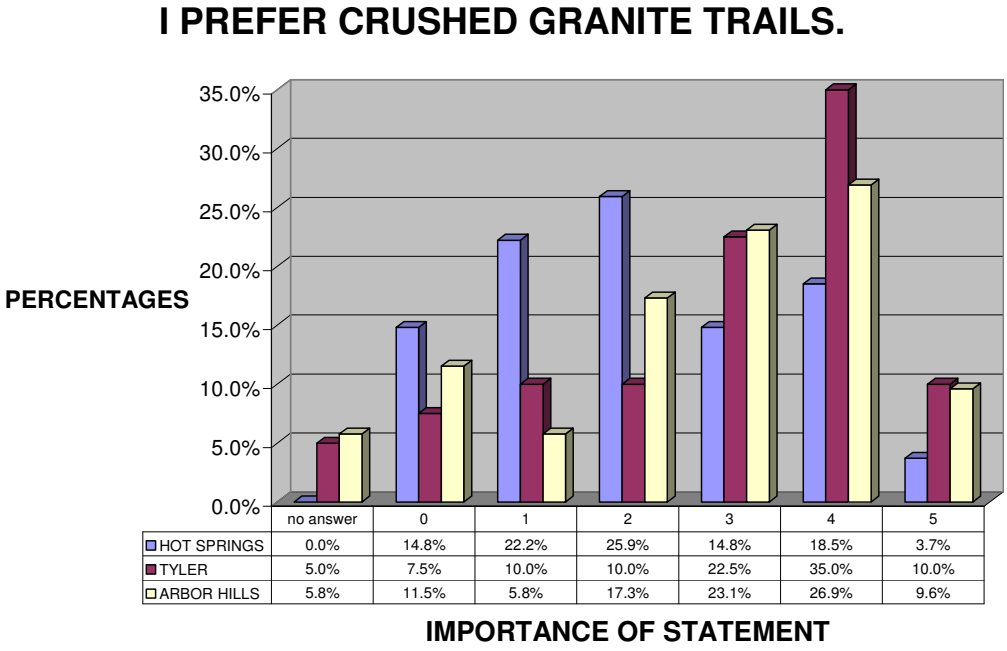


Fig. 4.19 Chart of Trail Question 5b



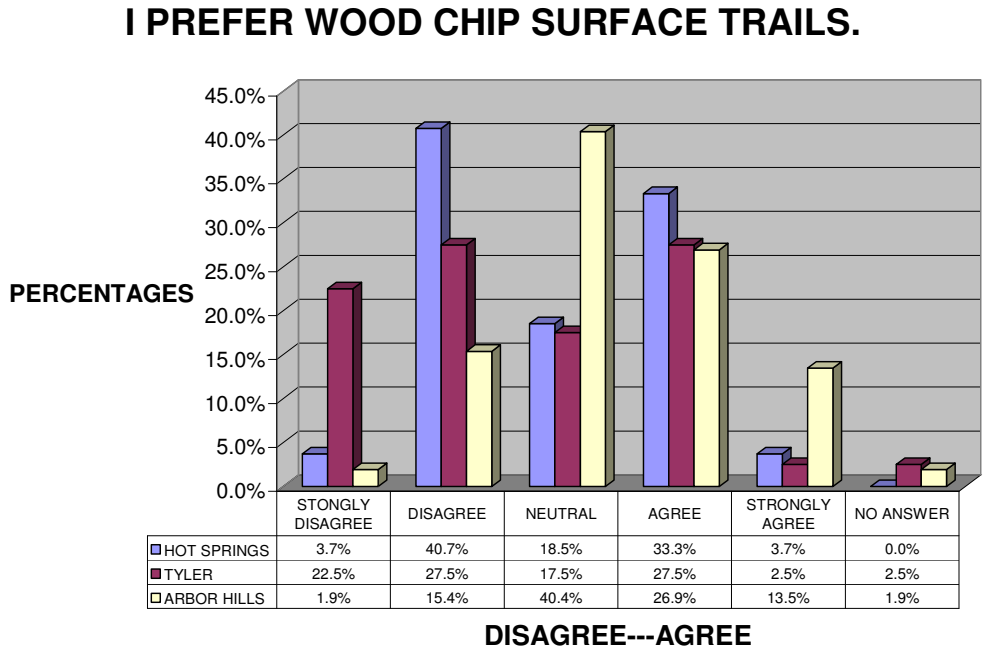
	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	3.7%	14.8%	40.7%	37.0%	3.7%	0.0%
TYLER	7.5%	15.0%	17.5%	45.0%	12.5%	2.5%
ARBOR HILLS	1.9%	15.4%	42.3%	28.8%	11.5%	0.0%

Fig. 4.20 Chart of Trail Question 6a



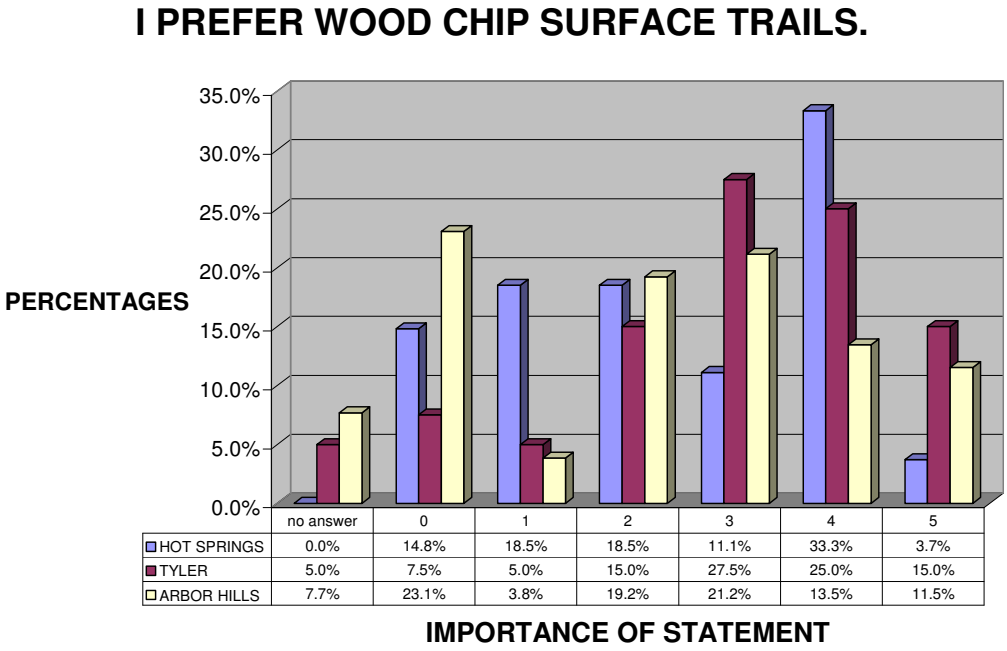
	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	14.8%	22.2%	25.9%	14.8%	18.5%	3.7%
TYLER	5.0%	7.5%	10.0%	10.0%	22.5%	35.0%	10.0%
ARBOR HILLS	5.8%	11.5%	5.8%	17.3%	23.1%	26.9%	9.6%

Fig. 4.21 Chart of Trail Question 6b



	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	3.7%	40.7%	18.5%	33.3%	3.7%	0.0%
TYLER	22.5%	27.5%	17.5%	27.5%	2.5%	2.5%
ARBOR HILLS	1.9%	15.4%	40.4%	26.9%	13.5%	1.9%

Fig. 4.22 Chart of Trail Question 7a



	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	14.8%	18.5%	18.5%	11.1%	33.3%	3.7%
TYLER	5.0%	7.5%	5.0%	15.0%	27.5%	25.0%	15.0%
ARBOR HILLS	7.7%	23.1%	3.8%	19.2%	21.2%	13.5%	11.5%

Fig. 4.23 Chart of Trail Question 7b

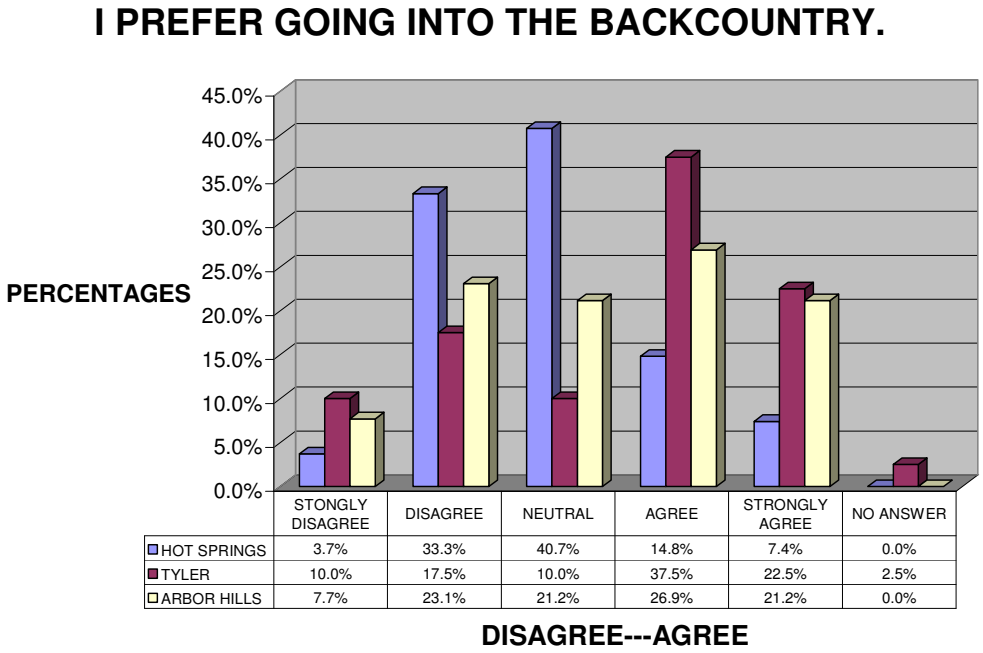


Fig. 4.24 Chart of Trail Question 8a

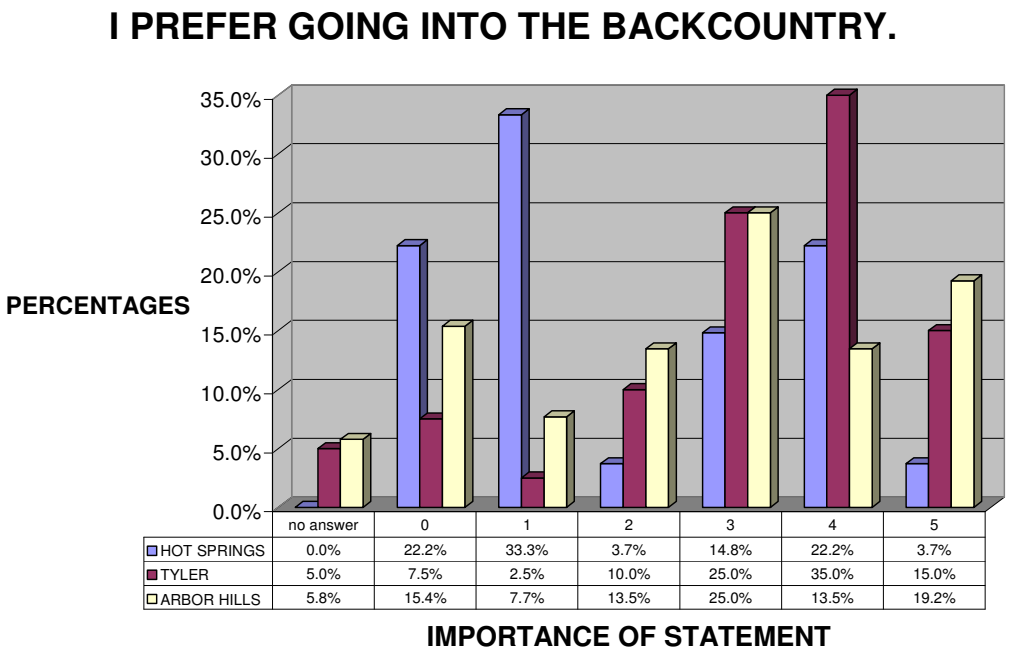
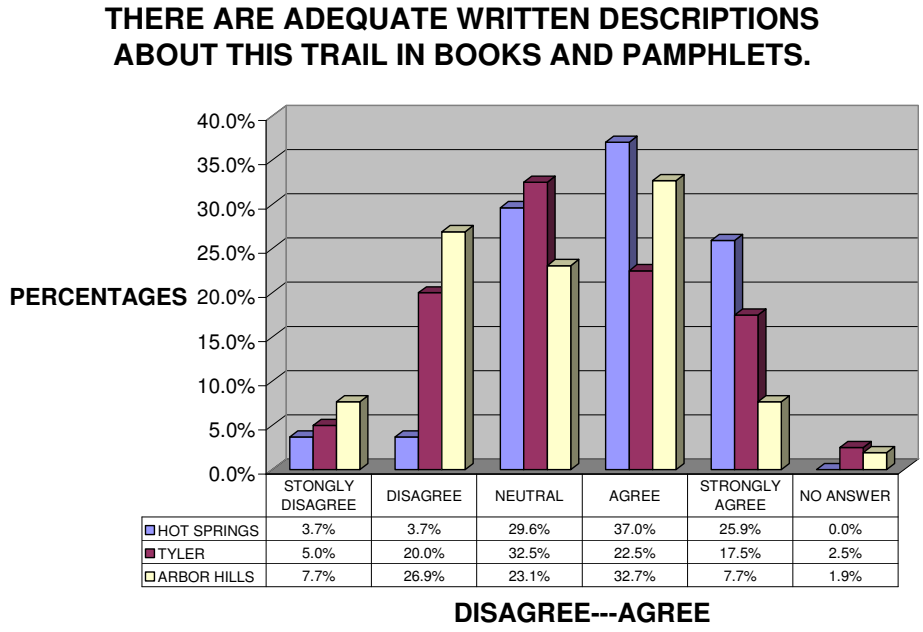


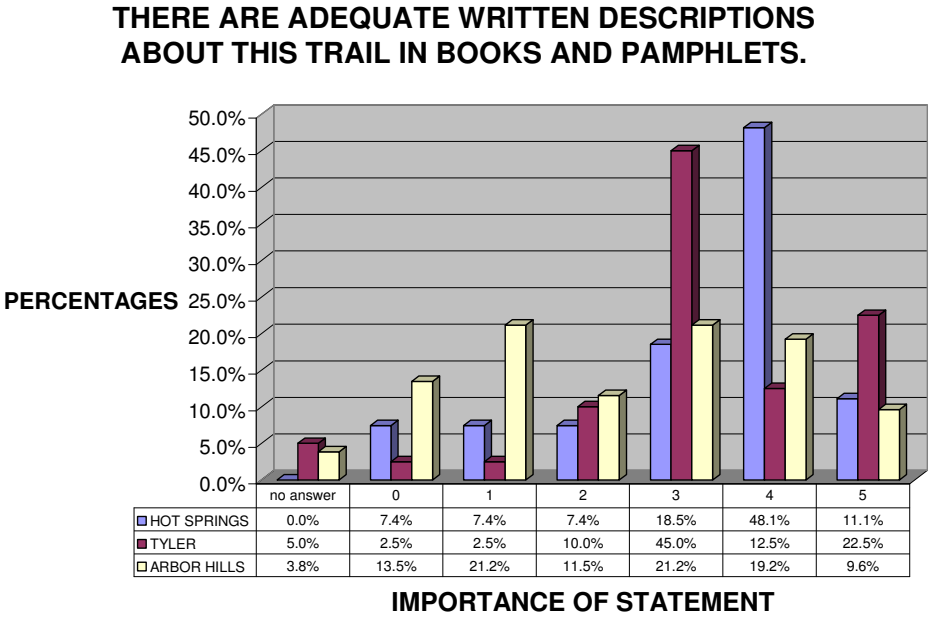
Fig. 4.25 Chart of Trail Question 8b

4.2.2.3 Descriptions and Advertising about the Trails



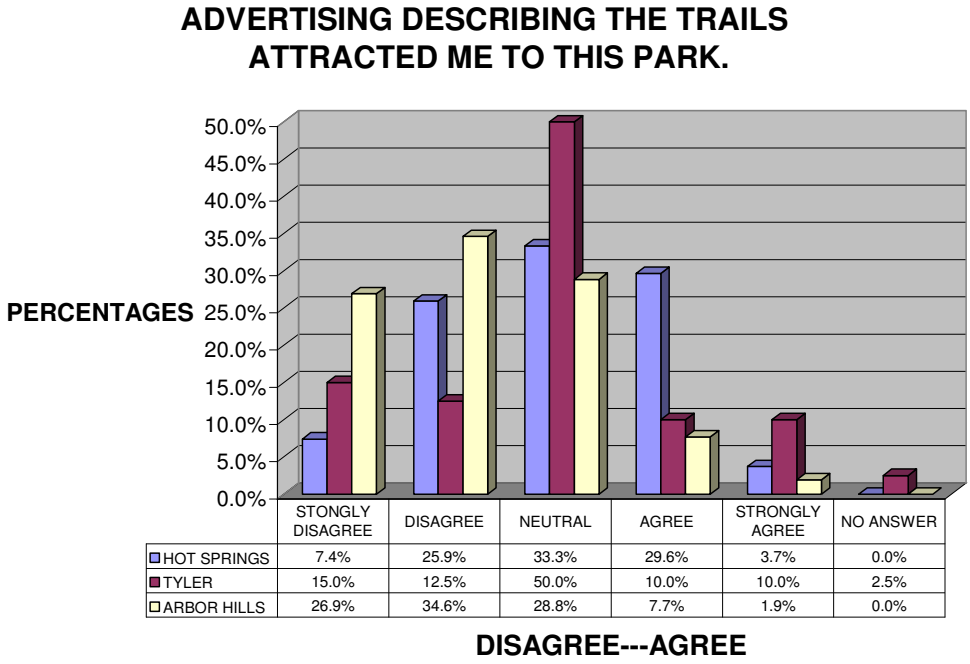
	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	3.7%	3.7%	29.6%	37.0%	25.9%	0.0%
TYLER	5.0%	20.0%	32.5%	22.5%	17.5%	2.5%
ARBOR HILLS	7.7%	26.9%	23.1%	32.7%	7.7%	1.9%

Fig. 4.26 Chart of Trail Question 9a



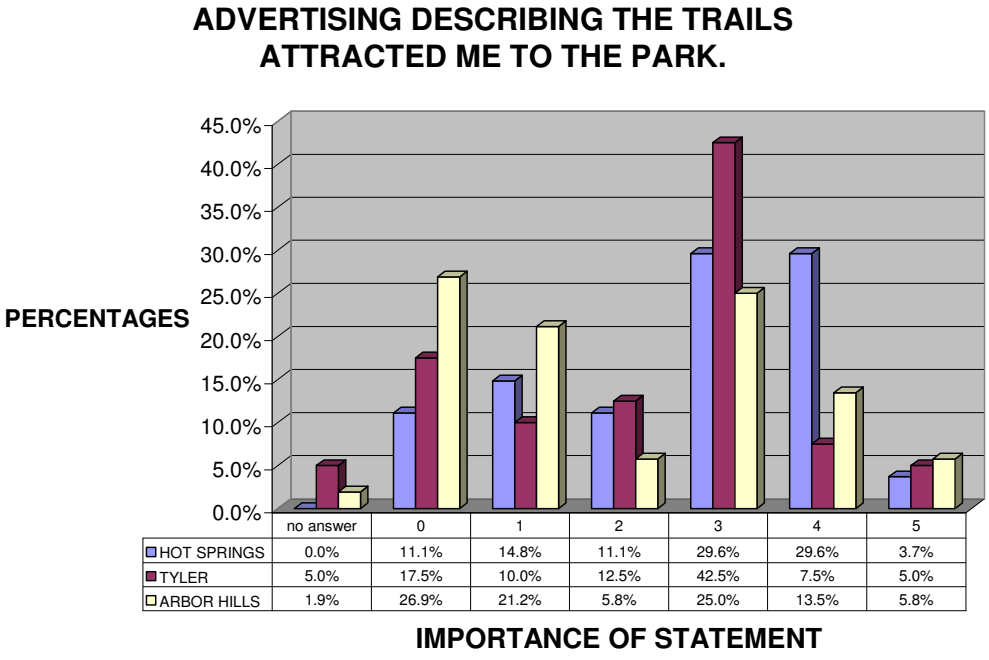
	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	7.4%	7.4%	7.4%	18.5%	48.1%	11.1%
TYLER	5.0%	2.5%	2.5%	10.0%	45.0%	12.5%	22.5%
ARBOR HILLS	3.8%	13.5%	21.2%	11.5%	21.2%	19.2%	9.6%

Fig. 4.27 Chart of Trail Question 9b



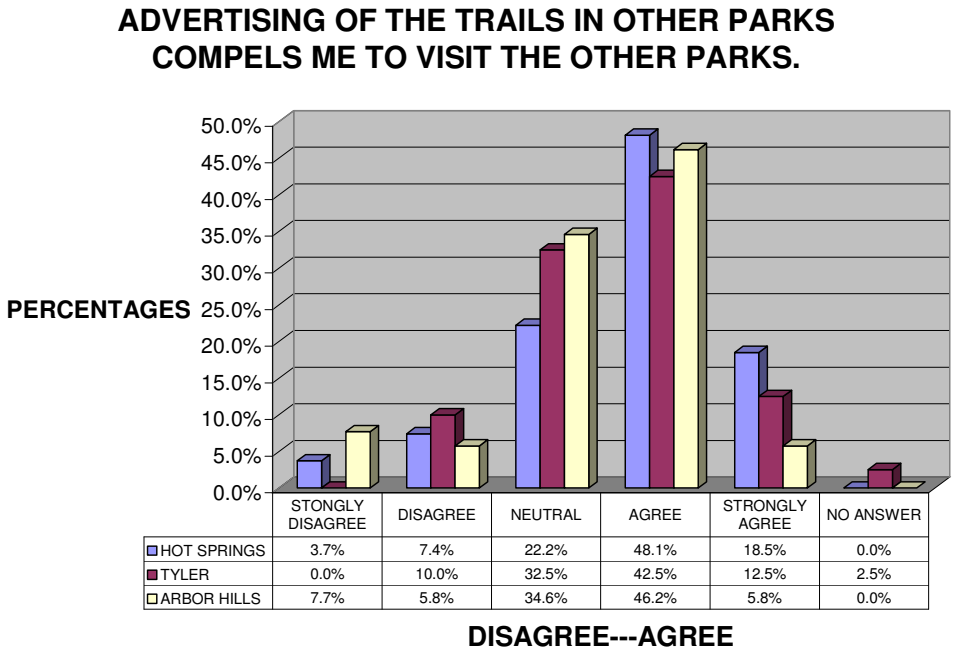
	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	7.4%	25.9%	33.3%	29.6%	3.7%	0.0%
TYLER	15.0%	12.5%	50.0%	10.0%	10.0%	2.5%
ARBOR HILLS	26.9%	34.6%	28.8%	7.7%	1.9%	0.0%

Fig. 4.28 Chart of Trail Question 10a



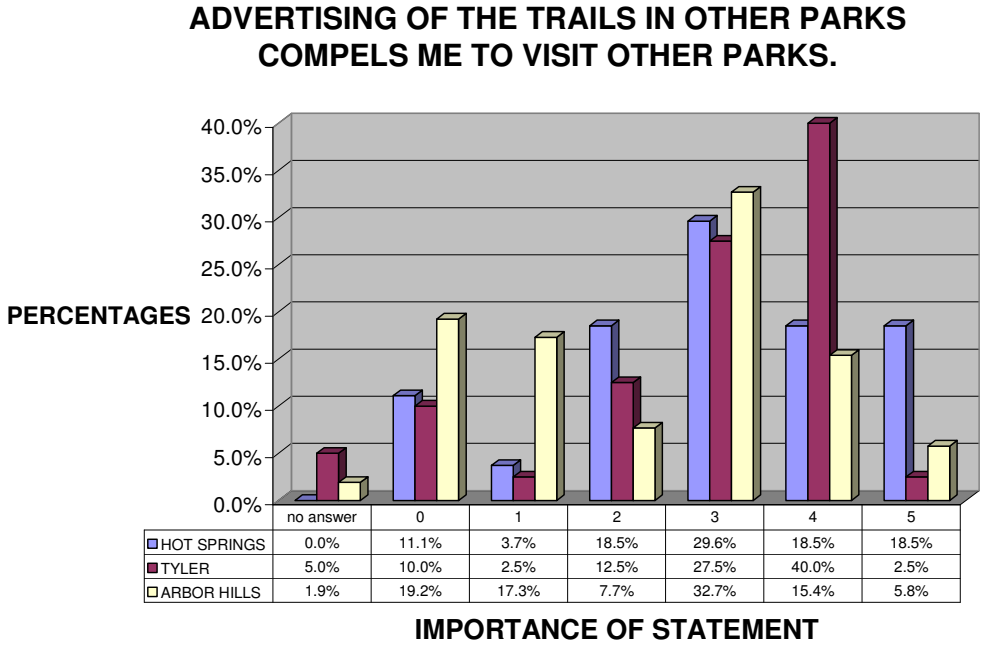
	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	11.1%	14.8%	11.1%	29.6%	29.6%	3.7%
TYLER	5.0%	17.5%	10.0%	12.5%	42.5%	7.5%	5.0%
ARBOR HILLS	1.9%	26.9%	21.2%	5.8%	25.0%	13.5%	5.8%

Fig. 4.29 Chart of Trail Question 10b



	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	3.7%	7.4%	22.2%	48.1%	18.5%	0.0%
TYLER	0.0%	10.0%	32.5%	42.5%	12.5%	2.5%
ARBOR HILLS	7.7%	5.8%	34.6%	46.2%	5.8%	0.0%

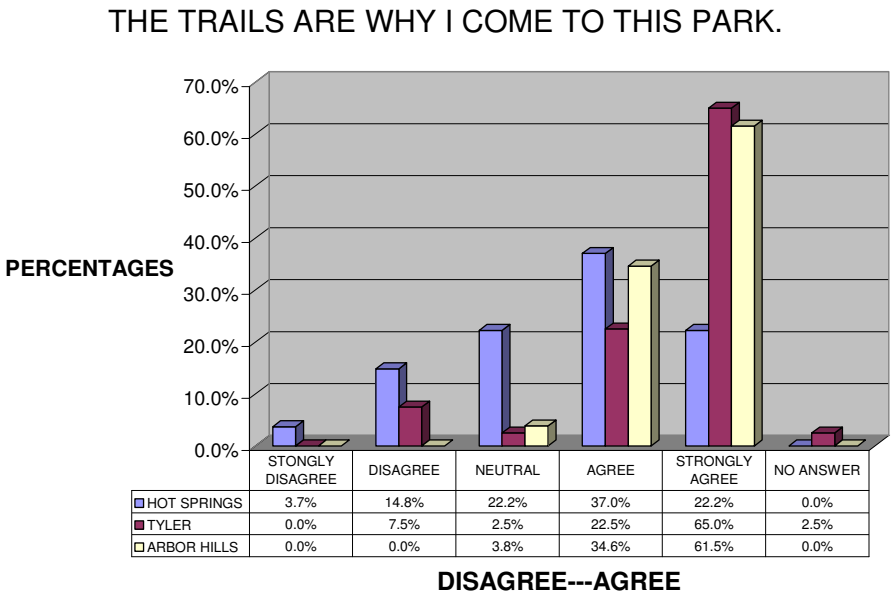
Fig. 4.30 Chart of Trail Question 17a



	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	11.1%	3.7%	18.5%	29.6%	18.5%	18.5%
TYLER	5.0%	10.0%	2.5%	12.5%	27.5%	40.0%	2.5%
ARBOR HILLS	1.9%	19.2%	17.3%	7.7%	32.7%	15.4%	5.8%

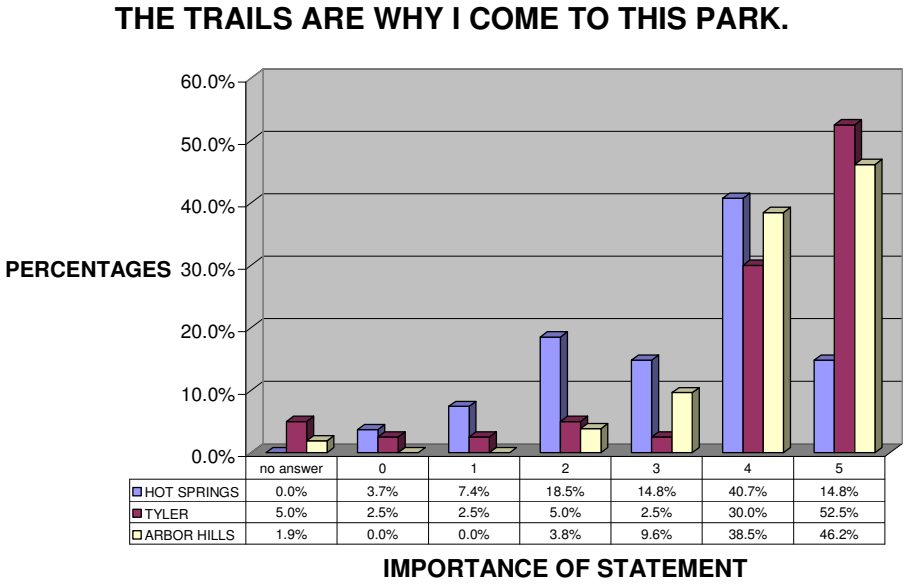
Fig. 4.31 Chart of Trail Question 17b

4.2.2.4 Reasons for Coming to the Trail



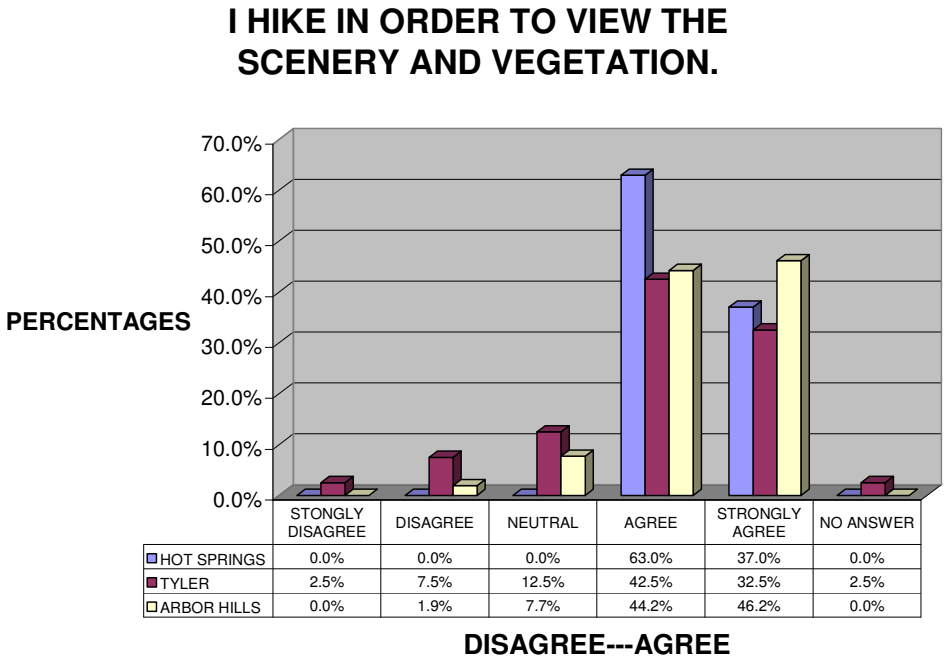
	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	3.7%	14.8%	22.2%	37.0%	22.2%	0.0%
TYLER	0.0%	7.5%	2.5%	22.5%	65.0%	2.5%
ARBOR HILLS	0.0%	0.0%	3.8%	34.6%	61.5%	0.0%

Fig. 4.32 Chart of Trail Question 11a



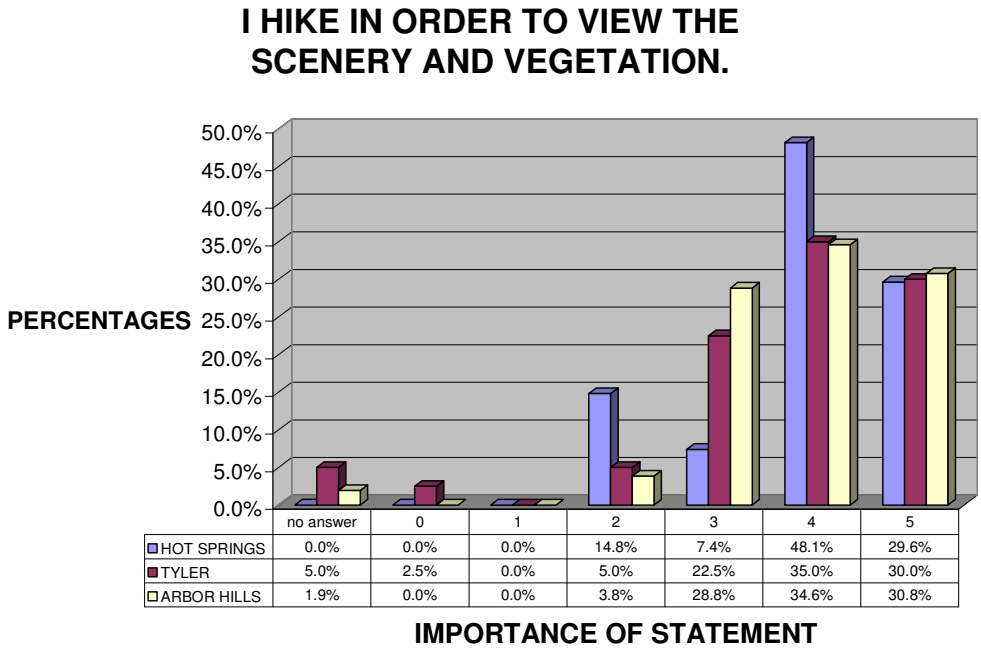
	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	3.7%	7.4%	18.5%	14.8%	40.7%	14.8%
TYLER	5.0%	2.5%	2.5%	5.0%	2.5%	30.0%	52.5%
ARBOR HILLS	1.9%	0.0%	0.0%	3.8%	9.6%	38.5%	46.2%

Fig. 4.33 Chart of Trail Question 11b



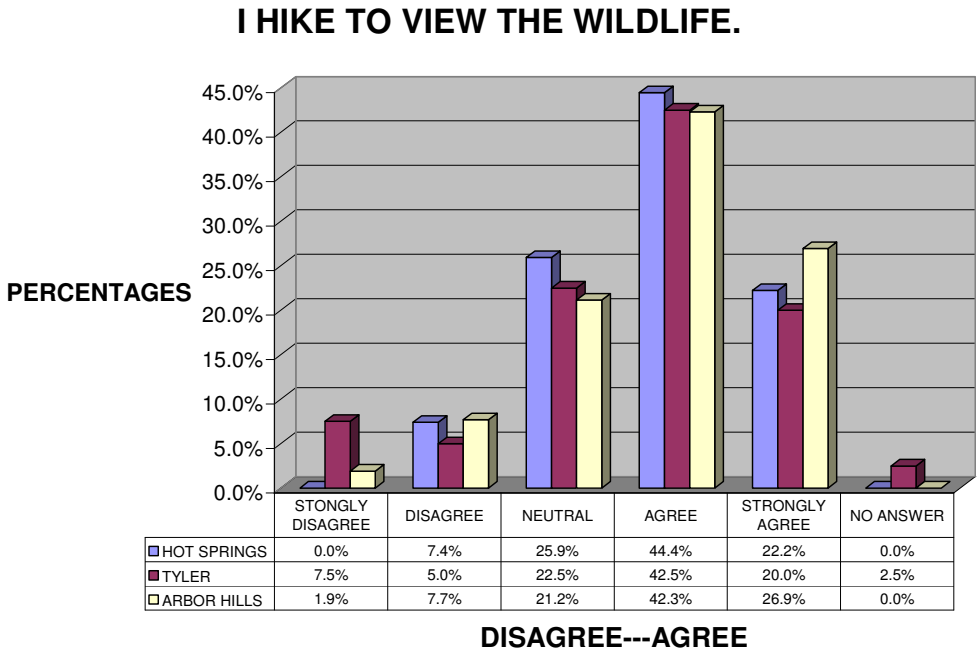
	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	0.0%	0.0%	0.0%	63.0%	37.0%	0.0%
TYLER	2.5%	7.5%	12.5%	42.5%	32.5%	2.5%
ARBOR HILLS	0.0%	1.9%	7.7%	44.2%	46.2%	0.0%

Fig. 4.34 Chart of Trail Question 12a



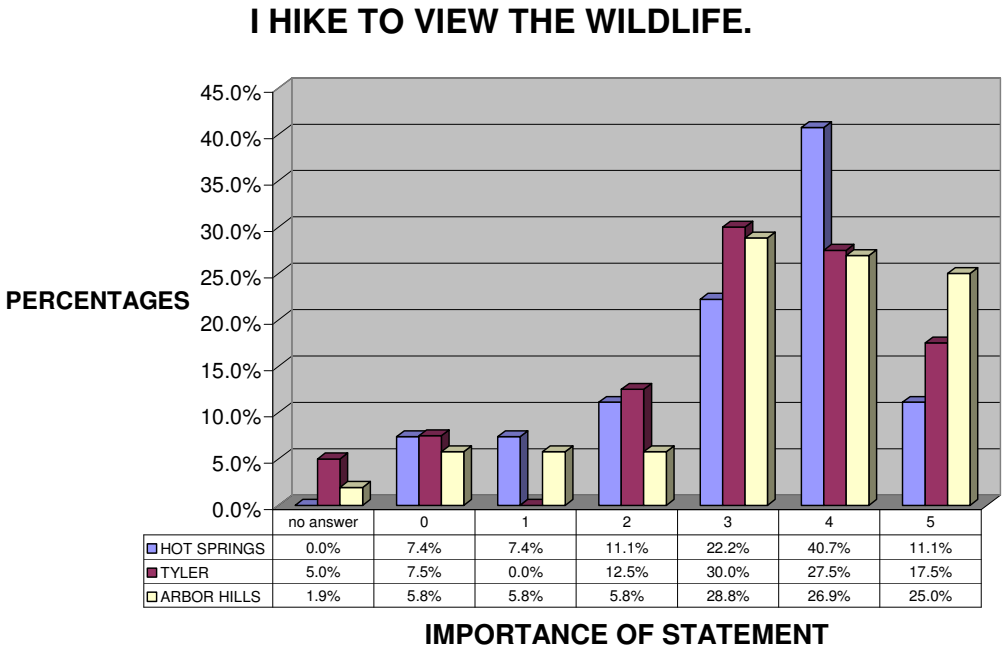
	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	0.0%	0.0%	14.8%	7.4%	48.1%	29.6%
TYLER	5.0%	2.5%	0.0%	5.0%	22.5%	35.0%	30.0%
ARBOR HILLS	1.9%	0.0%	0.0%	3.8%	28.8%	34.6%	30.8%

Fig. 4.35 Chart of Trail Question 12b



	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	0.0%	7.4%	25.9%	44.4%	22.2%	0.0%
TYLER	7.5%	5.0%	22.5%	42.5%	20.0%	2.5%
ARBOR HILLS	1.9%	7.7%	21.2%	42.3%	26.9%	0.0%

Fig. 4.36 Chart of Trail Question 16a



	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	7.4%	7.4%	11.1%	22.2%	40.7%	11.1%
TYLER	5.0%	7.5%	0.0%	12.5%	30.0%	27.5%	17.5%
ARBOR HILLS	1.9%	5.8%	5.8%	5.8%	28.8%	26.9%	25.0%

Fig. 4.37 Chart of Trail Question 16b

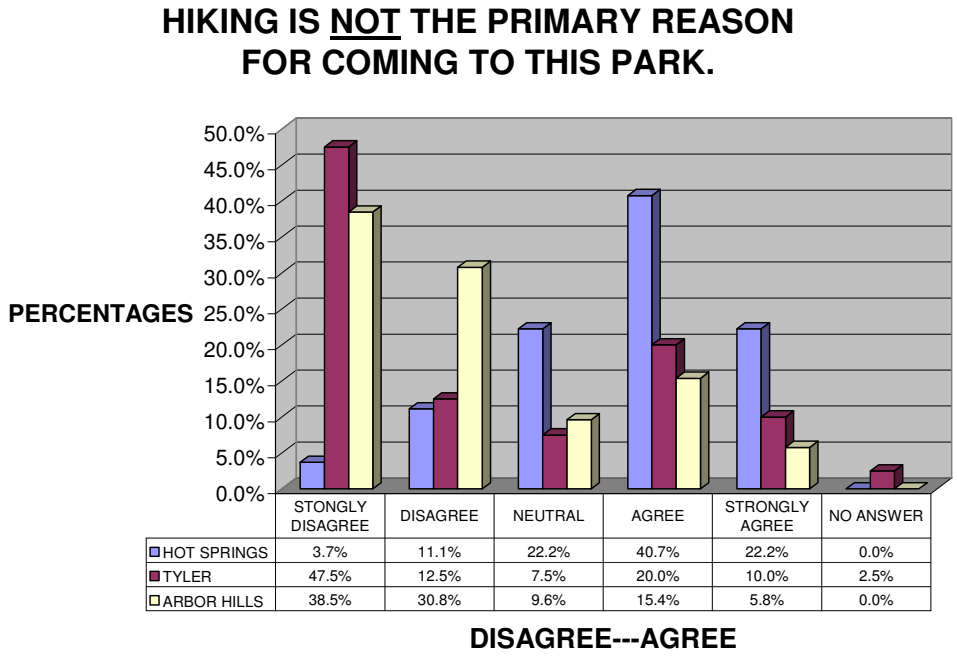


Fig. 4.38 Chart of Trail Question 19a

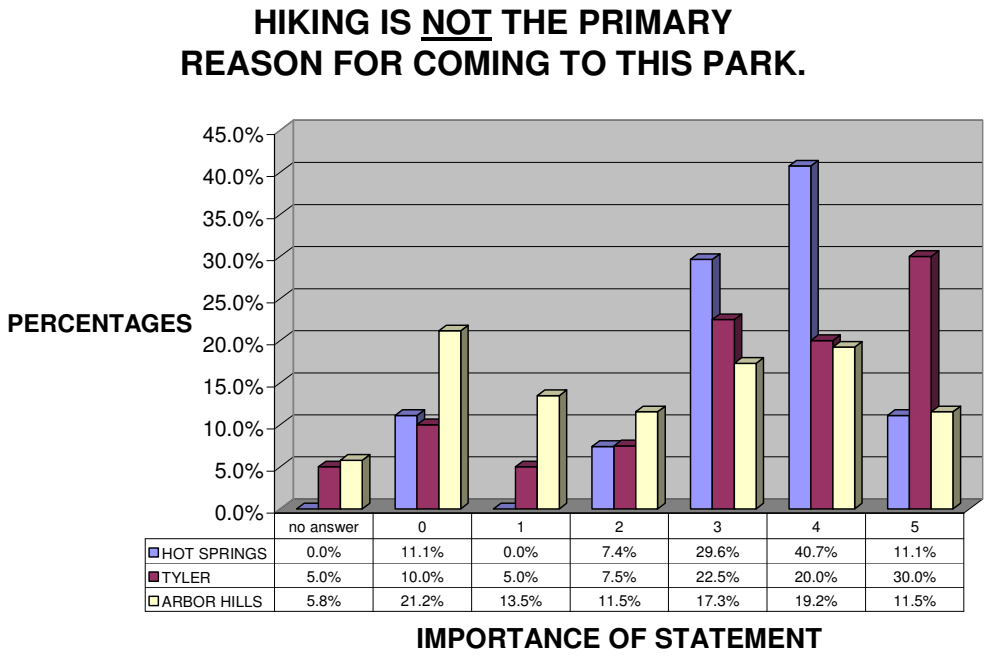
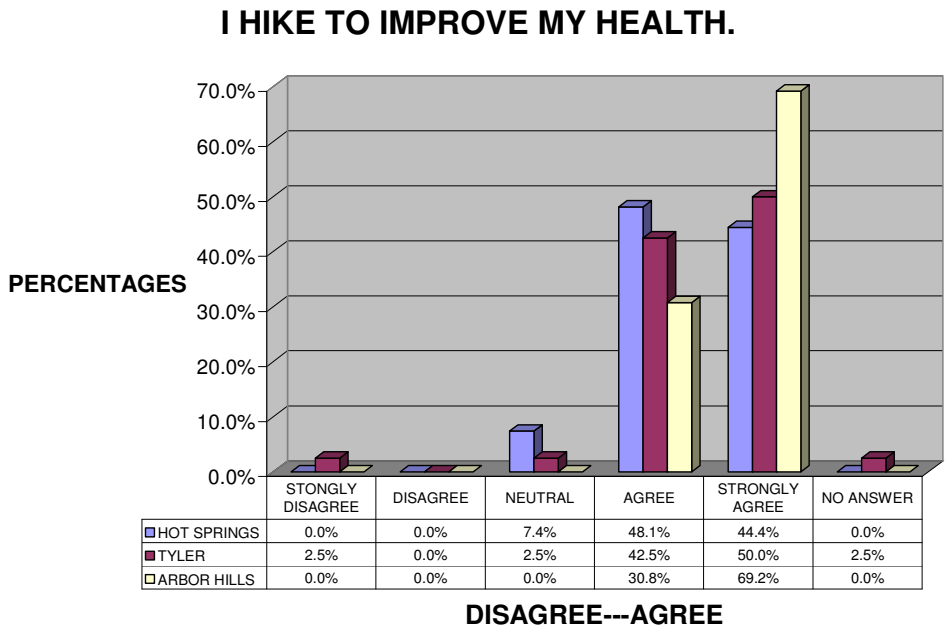


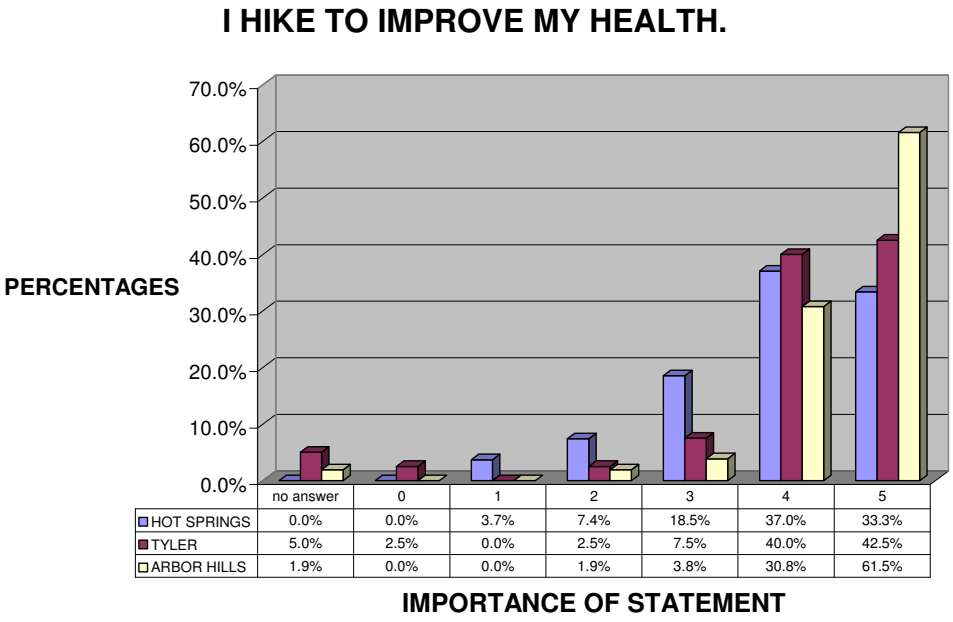
Fig. 4.39 Chart of Trail Question 19b

4.2.2.5 Health and Hiking



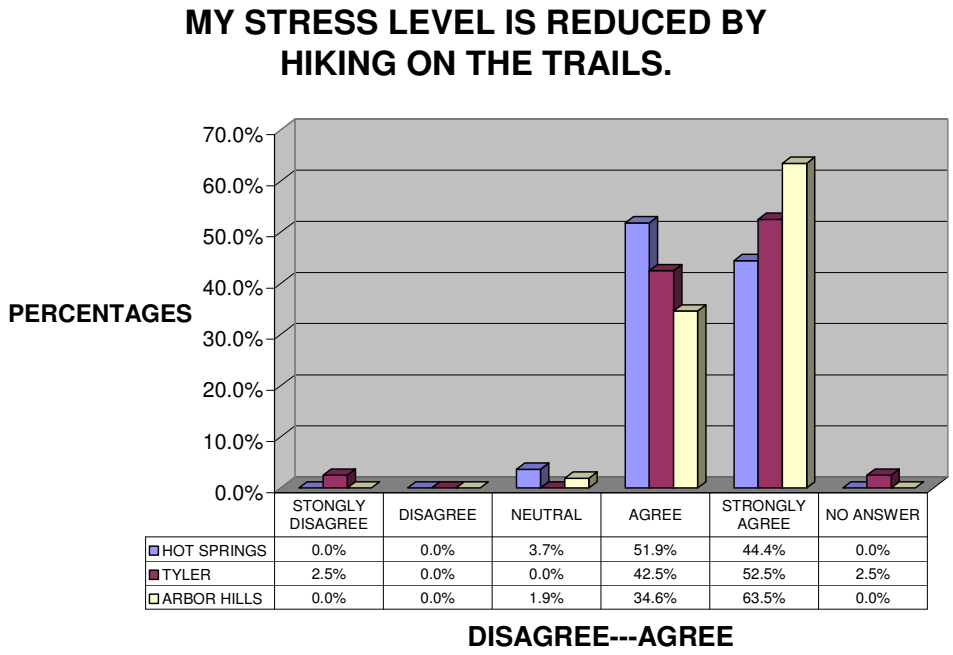
	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	0.0%	0.0%	7.4%	48.1%	44.4%	0.0%
TYLER	2.5%	0.0%	2.5%	42.5%	50.0%	2.5%
ARBOR HILLS	0.0%	0.0%	0.0%	30.8%	69.2%	0.0%

Fig. 4.40 Chart of Trail Question 13a



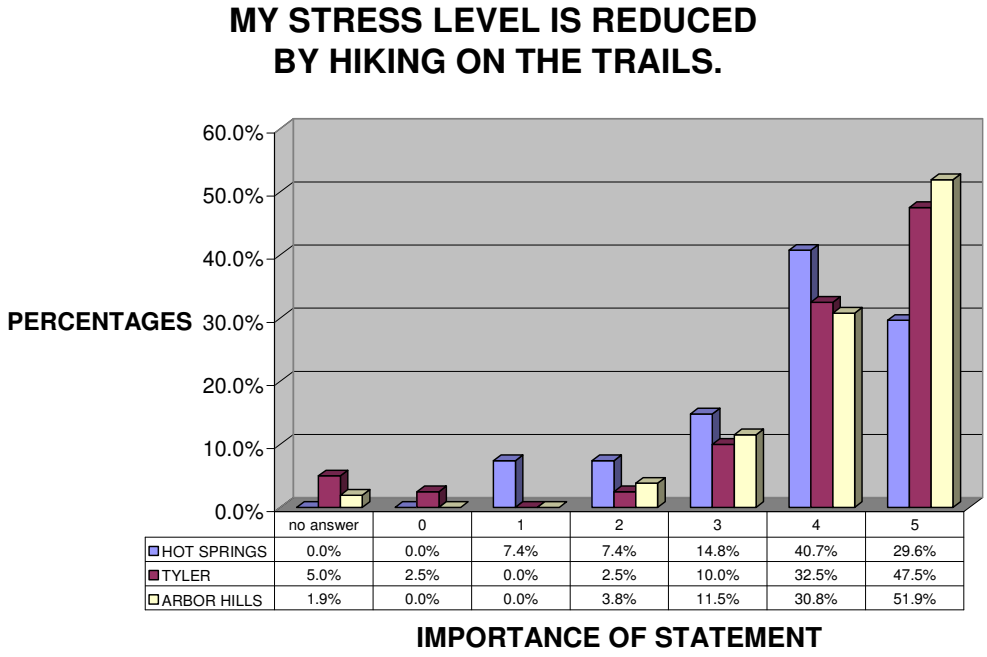
	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	0.0%	3.7%	7.4%	18.5%	37.0%	33.3%
TYLER	5.0%	2.5%	0.0%	2.5%	7.5%	40.0%	42.5%
ARBOR HILLS	1.9%	0.0%	0.0%	1.9%	3.8%	30.8%	61.5%

Fig. 4.41 Chart of Trail Question 13b



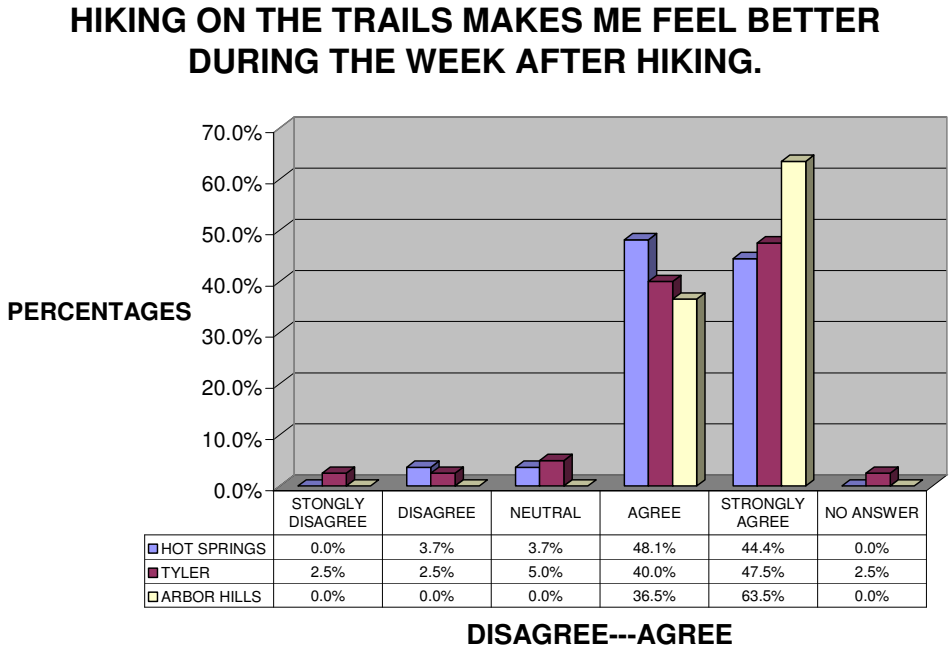
	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	0.0%	0.0%	3.7%	51.9%	44.4%	0.0%
TYLER	2.5%	0.0%	0.0%	42.5%	52.5%	2.5%
ARBOR HILLS	0.0%	0.0%	1.9%	34.6%	63.5%	0.0%

Fig. 4.42 Chart of Trail Question 14a



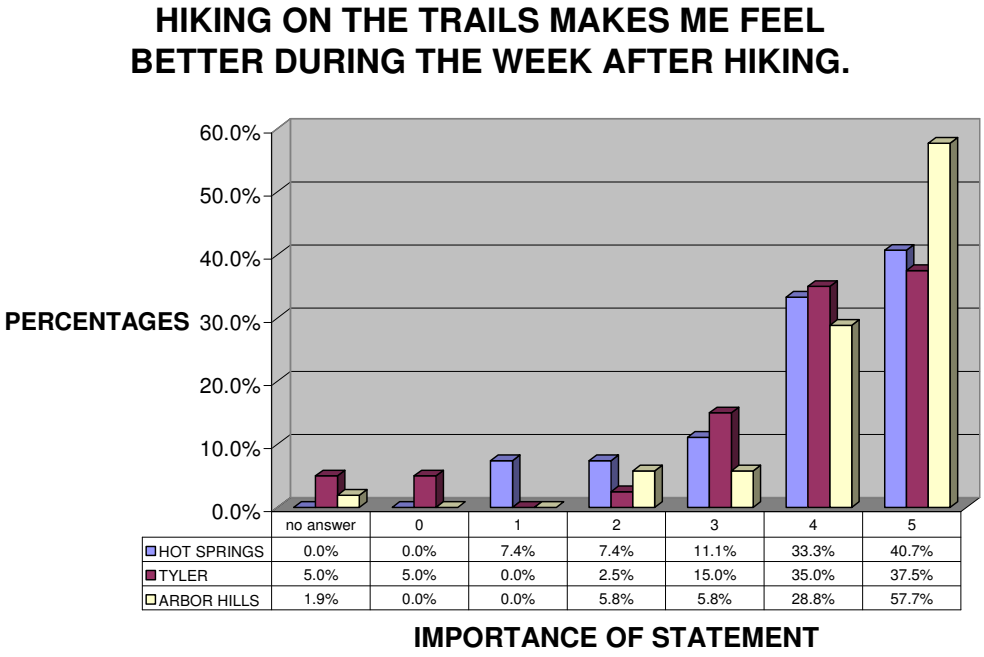
	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	0.0%	7.4%	7.4%	14.8%	40.7%	29.6%
TYLER	5.0%	2.5%	0.0%	2.5%	10.0%	32.5%	47.5%
ARBOR HILLS	1.9%	0.0%	0.0%	3.8%	11.5%	30.8%	51.9%

Fig. 4.43 Chart of Trail Question 14b



	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	0.0%	3.7%	3.7%	48.1%	44.4%	0.0%
TYLER	2.5%	2.5%	5.0%	40.0%	47.5%	2.5%
ARBOR HILLS	0.0%	0.0%	0.0%	36.5%	63.5%	0.0%

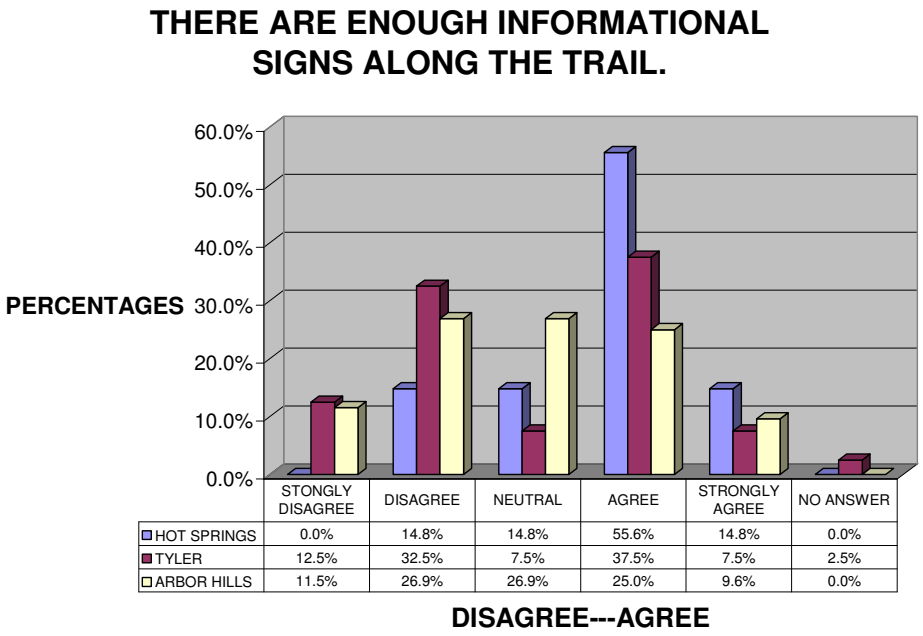
Fig. 4.44 Chart of Trail Question 15a



	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	0.0%	7.4%	7.4%	11.1%	33.3%	40.7%
TYLER	5.0%	5.0%	0.0%	2.5%	15.0%	35.0%	37.5%
ARBOR HILLS	1.9%	0.0%	0.0%	5.8%	5.8%	28.8%	57.7%

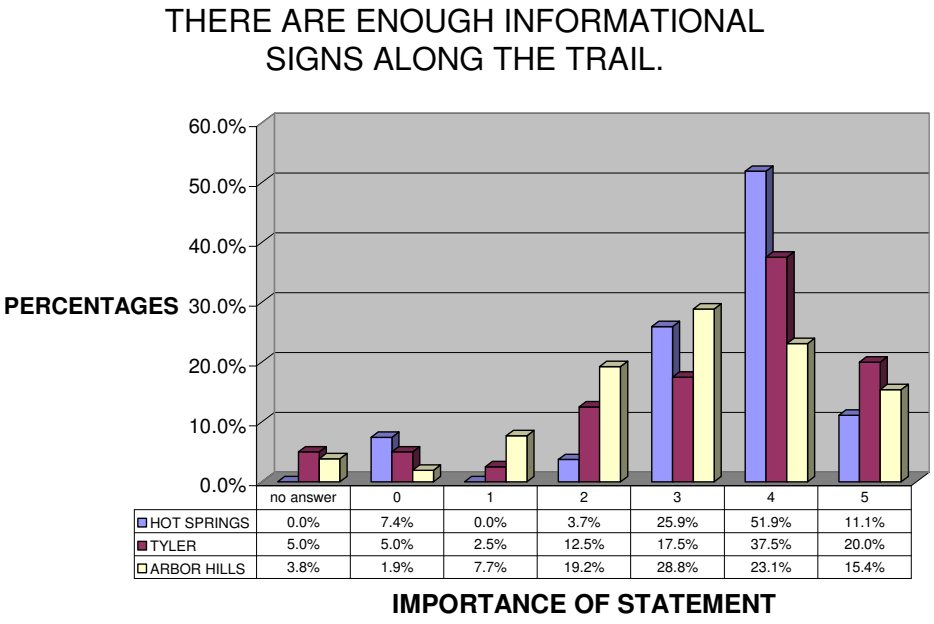
Fig. 4.45 Chart of Trail Question 15b

4.2.2.6 Signage



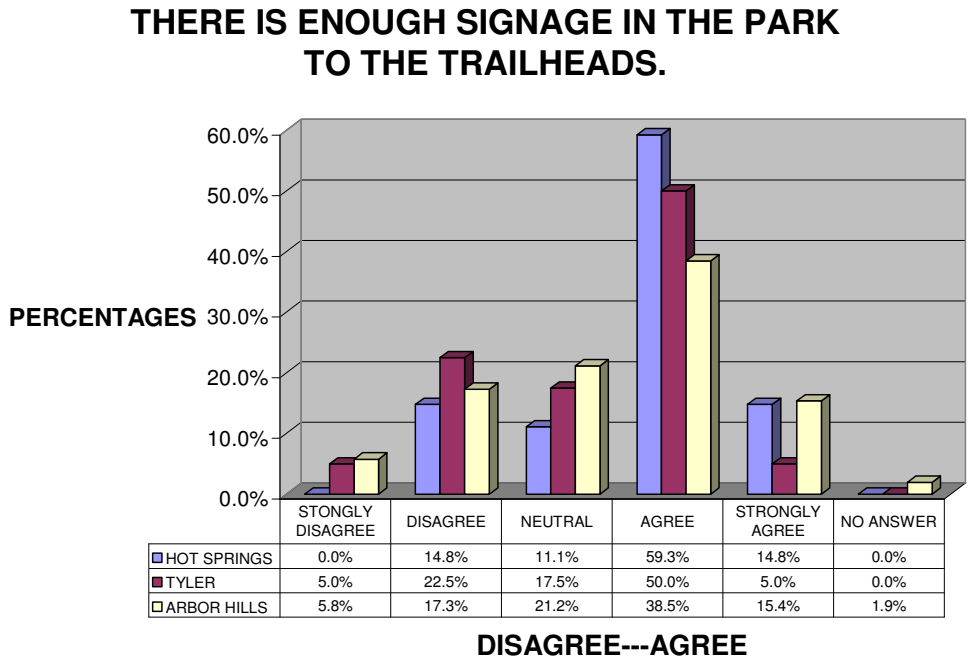
	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	0.0%	14.8%	14.8%	55.6%	14.8%	0.0%
TYLER	12.5%	32.5%	7.5%	37.5%	7.5%	2.5%
ARBOR HILLS	11.5%	26.9%	26.9%	25.0%	9.6%	0.0%

Fig. 4.46 Chart of Trail Question 18a



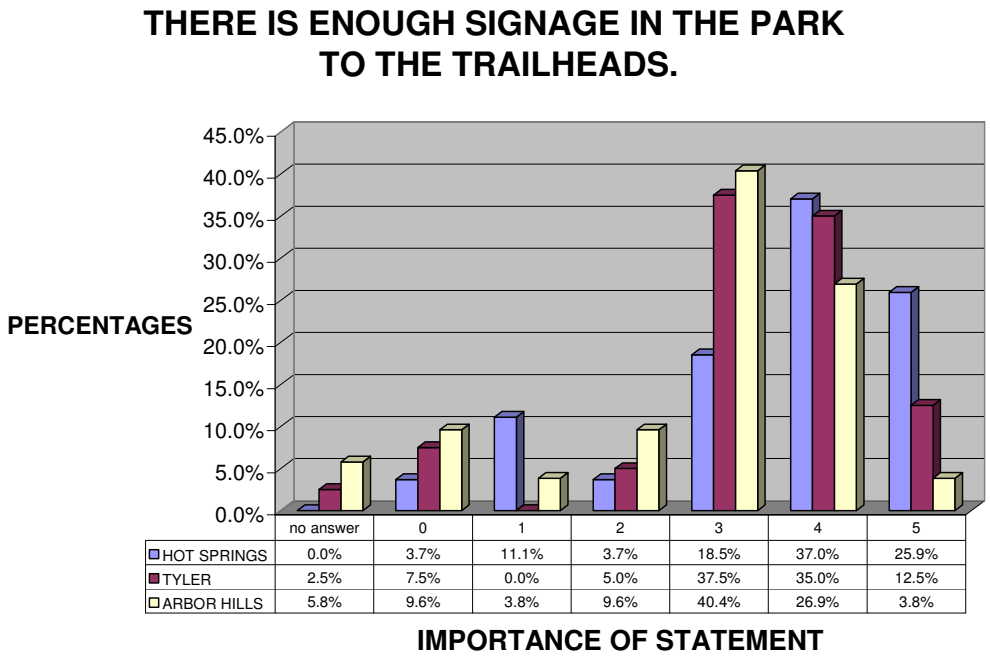
	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	7.4%	0.0%	3.7%	25.9%	51.9%	11.1%
TYLER	5.0%	5.0%	2.5%	12.5%	17.5%	37.5%	20.0%
ARBOR HILLS	3.8%	1.9%	7.7%	19.2%	28.8%	23.1%	15.4%

Fig. 4.47 Chart of Trail Question 18b



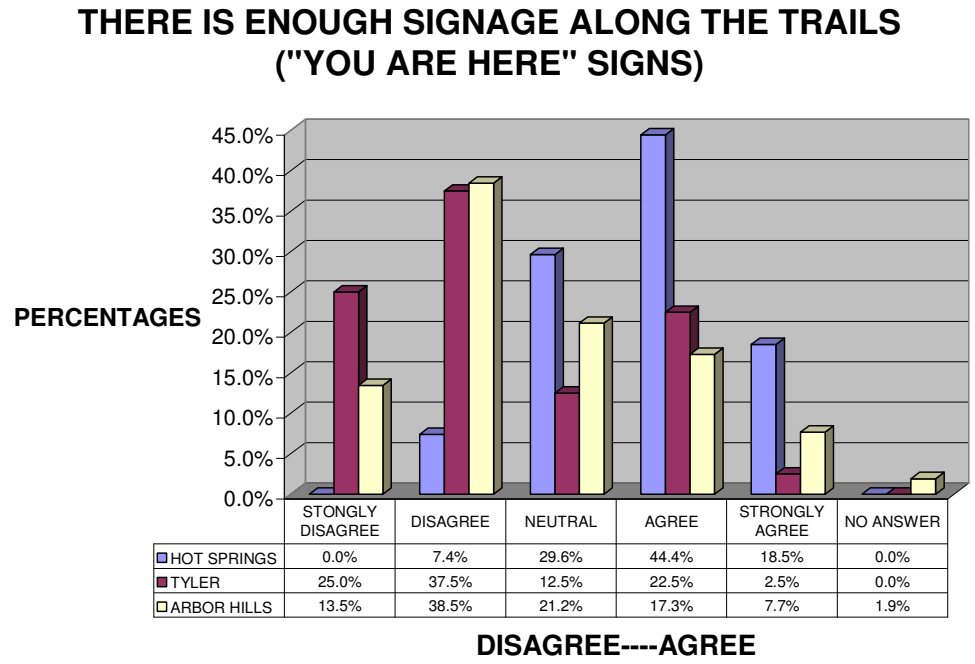
	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	0.0%	14.8%	11.1%	59.3%	14.8%	0.0%
TYLER	5.0%	22.5%	17.5%	50.0%	5.0%	0.0%
ARBOR HILLS	5.8%	17.3%	21.2%	38.5%	15.4%	1.9%

Fig. 4.48 Chart of Trail Question 22a



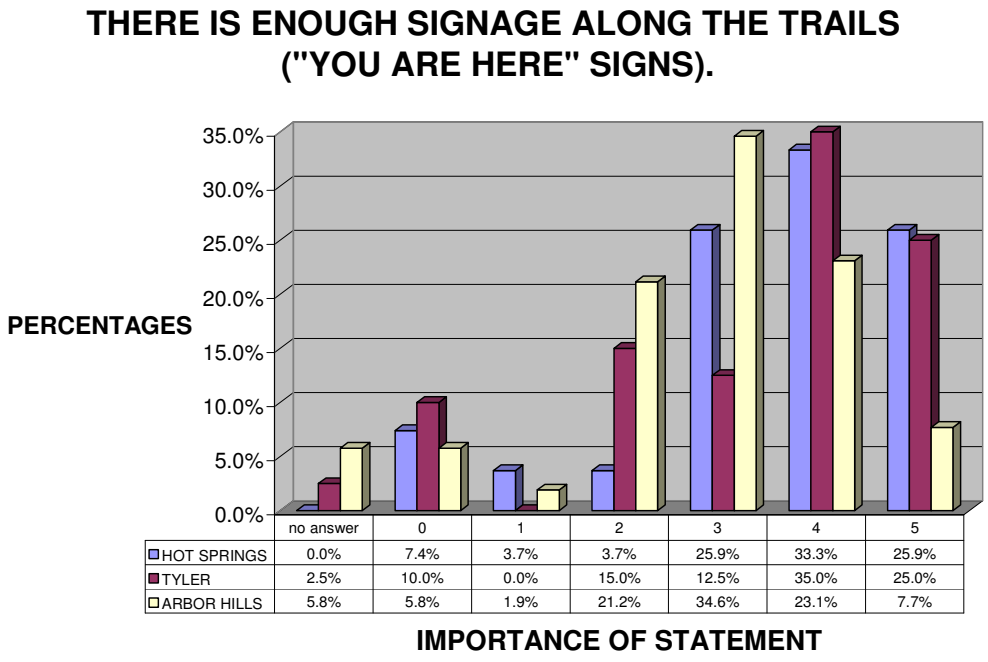
	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	3.7%	11.1%	3.7%	18.5%	37.0%	25.9%
TYLER	2.5%	7.5%	0.0%	5.0%	37.5%	35.0%	12.5%
ARBOR HILLS	5.8%	9.6%	3.8%	9.6%	40.4%	26.9%	3.8%

Fig. 4.49 Chart of Trail Question 22b



	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	0.0%	7.4%	29.6%	44.4%	18.5%	0.0%
TYLER	25.0%	37.5%	12.5%	22.5%	2.5%	0.0%
ARBOR HILLS	13.5%	38.5%	21.2%	17.3%	7.7%	1.9%

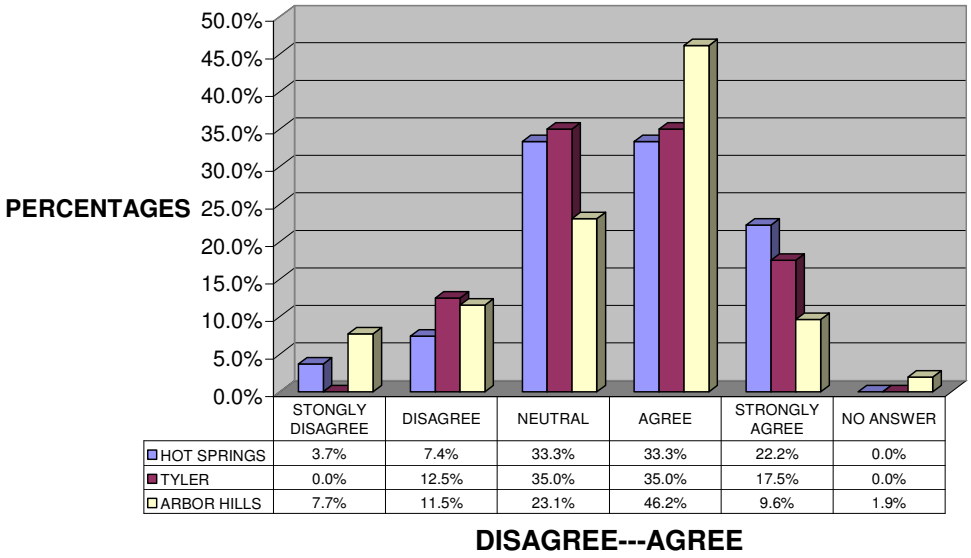
Fig. 4.50 Chart of Trail Question 23a



	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	7.4%	3.7%	3.7%	25.9%	33.3%	25.9%
TYLER	2.5%	10.0%	0.0%	15.0%	12.5%	35.0%	25.0%
ARBOR HILLS	5.8%	5.8%	1.9%	21.2%	34.6%	23.1%	7.7%

Fig. 4.51 Chart of Trail Question 23b

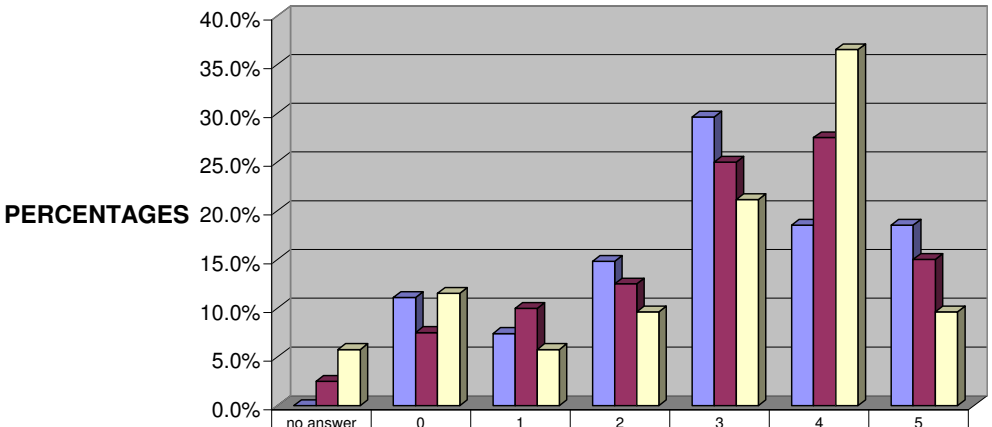
I WOULD LIKE TO SEE MORE SIGNAGE ALONG THE TRAILS DESCRIBING THE VEGETATION AND WILDLIFE.



	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	3.7%	7.4%	33.3%	33.3%	22.2%	0.0%
TYLER	0.0%	12.5%	35.0%	35.0%	17.5%	0.0%
ARBOR HILLS	7.7%	11.5%	23.1%	46.2%	9.6%	1.9%

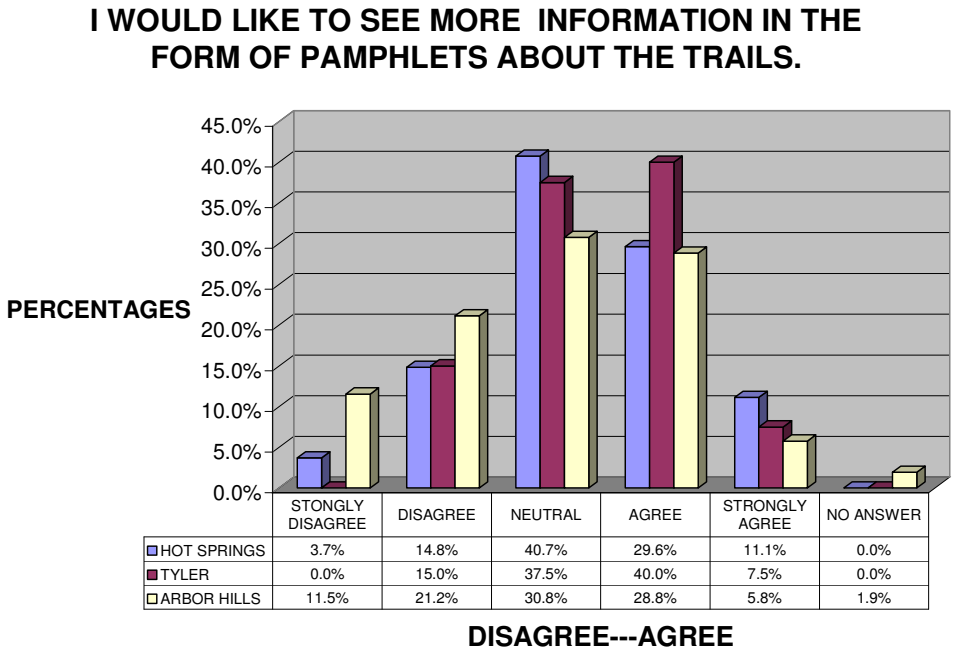
Fig. 4.52 Chart of Trail Question 34a

I WOULD LIKE TO SEE MORE SIGNAGE ALONG THE TRAILS DESCRIBING THE VEGETATION AND WILDLIFE.



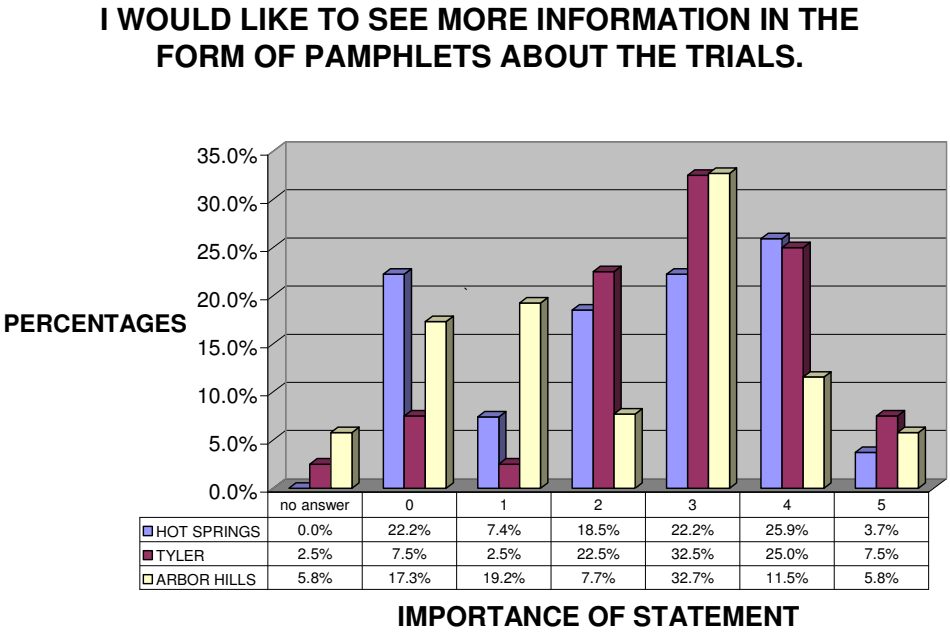
	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	11.1%	7.4%	14.8%	29.6%	18.5%	18.5%
TYLER	2.5%	7.5%	10.0%	12.5%	25.0%	27.5%	15.0%
ARBOR HILLS	5.8%	11.5%	5.8%	9.6%	21.2%	36.5%	9.6%

Fig. 4.53 Chart of Trail Question 34b



	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	3.7%	14.8%	40.7%	29.6%	11.1%	0.0%
TYLER	0.0%	15.0%	37.5%	40.0%	7.5%	0.0%
ARBOR HILLS	11.5%	21.2%	30.8%	28.8%	5.8%	1.9%

Fig. 4.54 Chart of Trail Question 33a



	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	22.2%	7.4%	18.5%	22.2%	25.9%	3.7%
TYLER	2.5%	7.5%	2.5%	22.5%	32.5%	25.0%	7.5%
ARBOR HILLS	5.8%	17.3%	19.2%	7.7%	32.7%	11.5%	5.8%

Fig. 4.55 Chart of Trail Question 33b

4.2.2.7 Trailheads

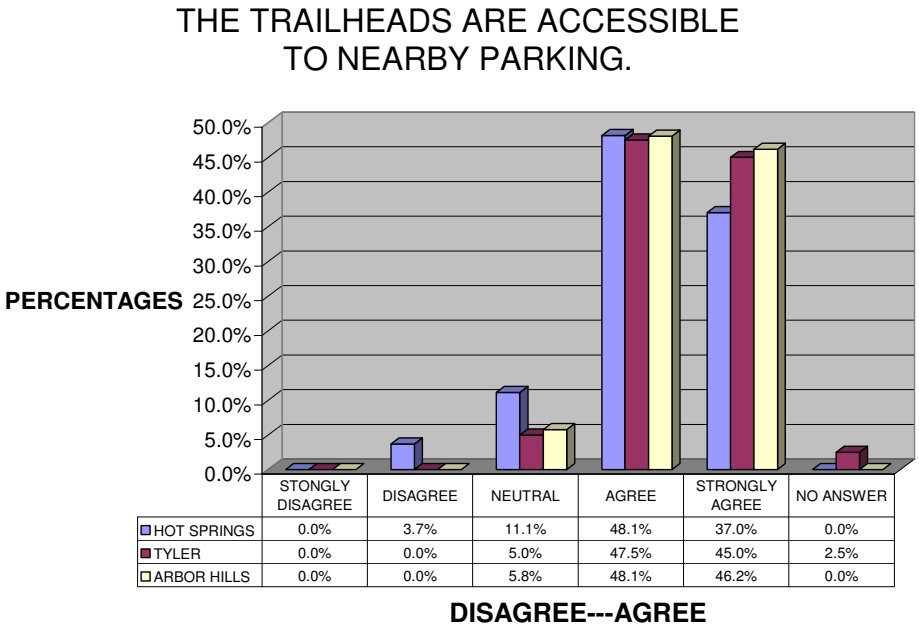


Fig. 4.56 Chart of Trail Question 20a

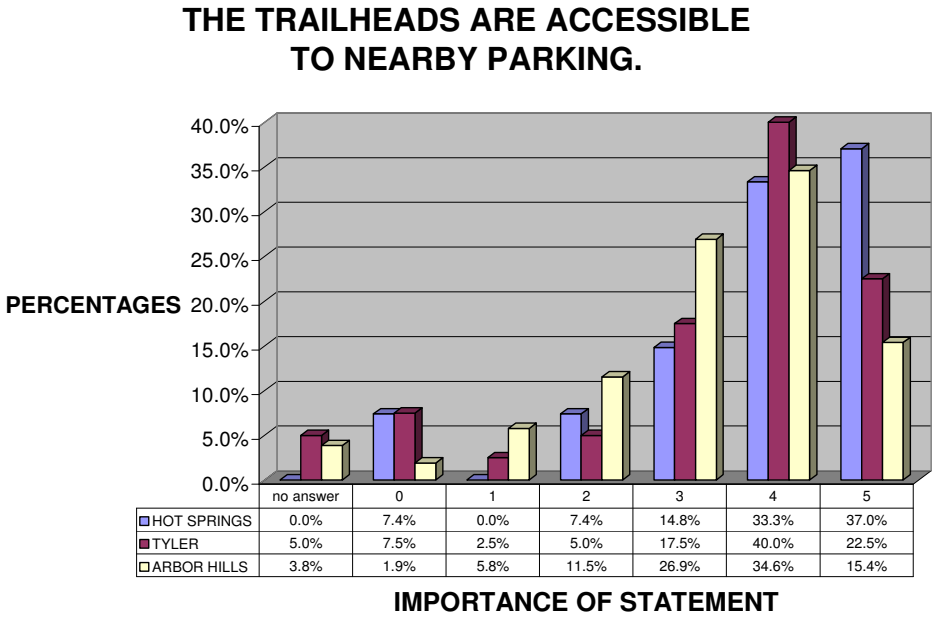
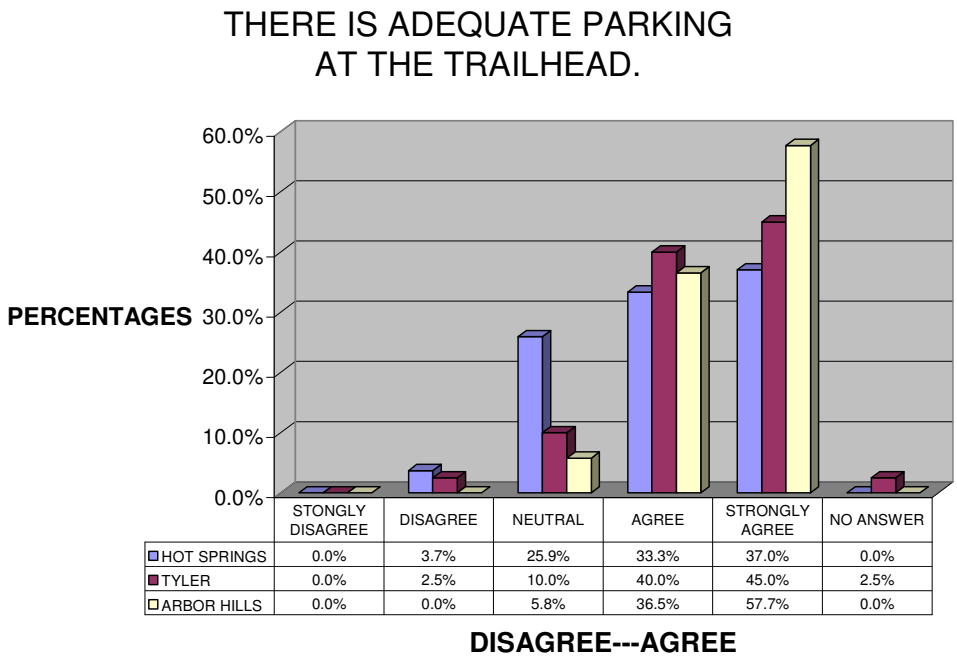
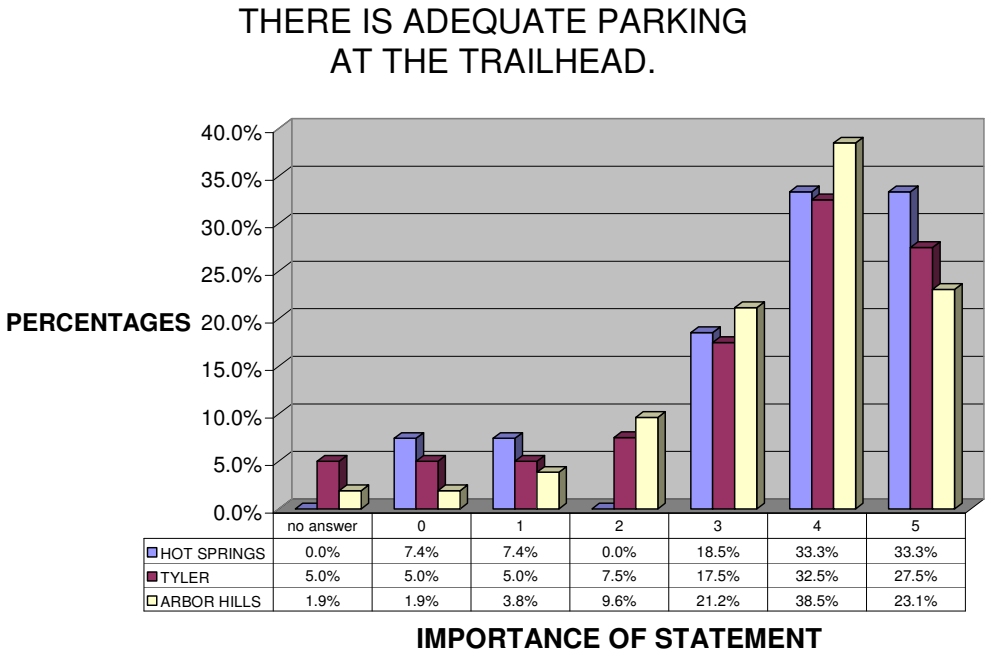


Fig. 4.57 Chart of Trail Question 20b



	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	0.0%	3.7%	25.9%	33.3%	37.0%	0.0%
TYLER	0.0%	2.5%	10.0%	40.0%	45.0%	2.5%
ARBOR HILLS	0.0%	0.0%	5.8%	36.5%	57.7%	0.0%

Fig. 4.58 Chart of Trail Question 21a



	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	7.4%	7.4%	0.0%	18.5%	33.3%	33.3%
TYLER	5.0%	5.0%	5.0%	7.5%	17.5%	32.5%	27.5%
ARBOR HILLS	1.9%	1.9%	3.8%	9.6%	21.2%	38.5%	23.1%

Fig. 4.59 Chart of Trail Question 21b

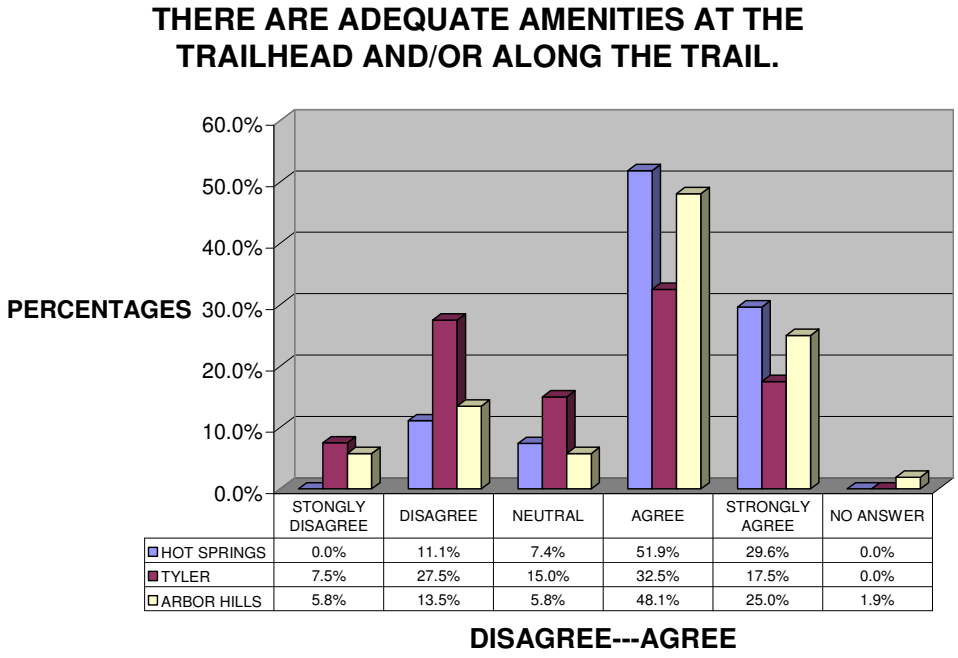


Fig. 4.60 Chart of Trail Question 26a

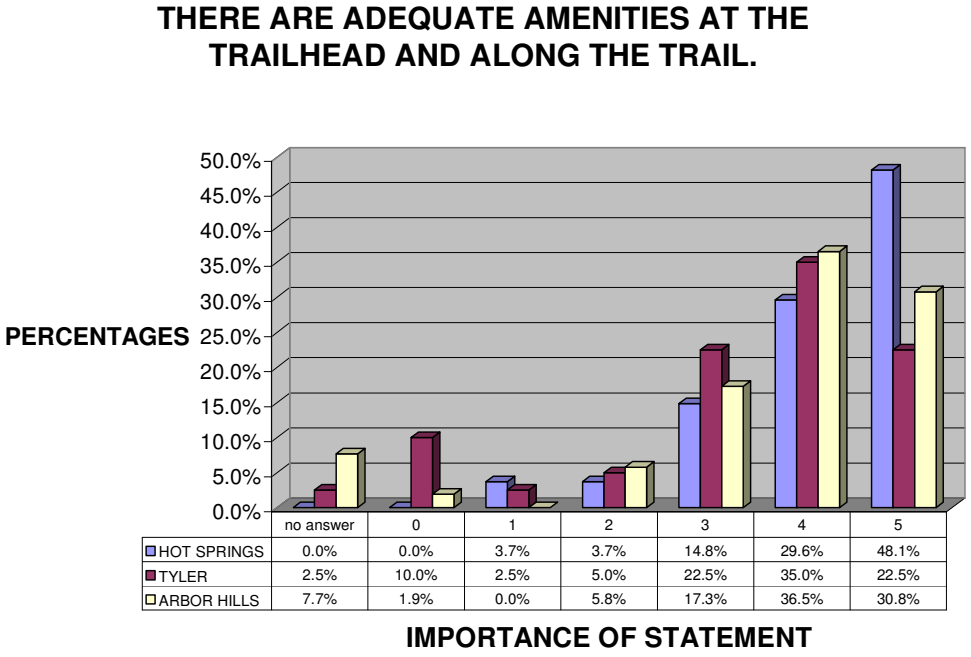
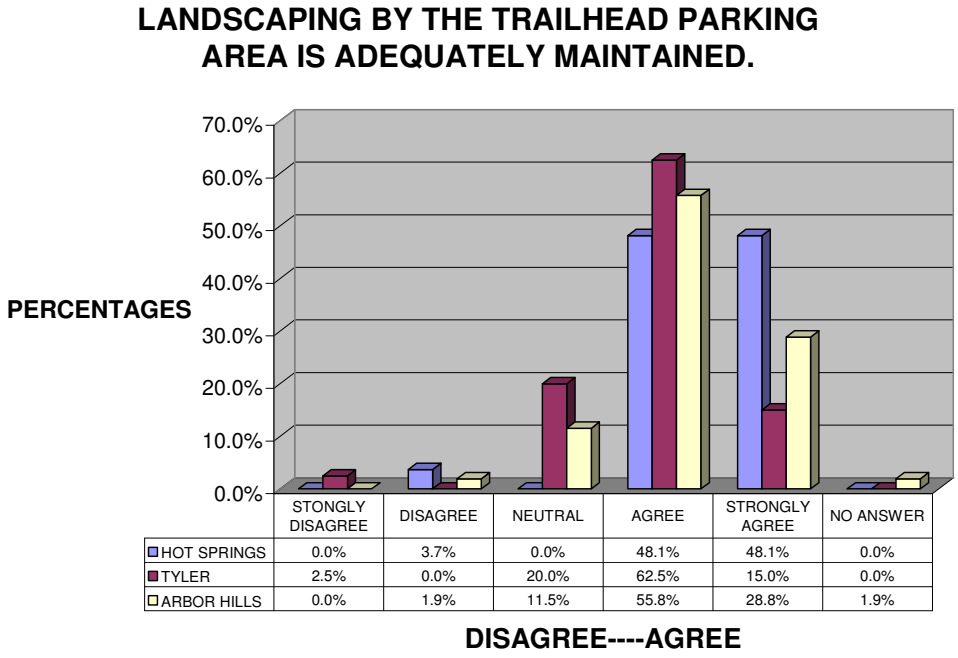
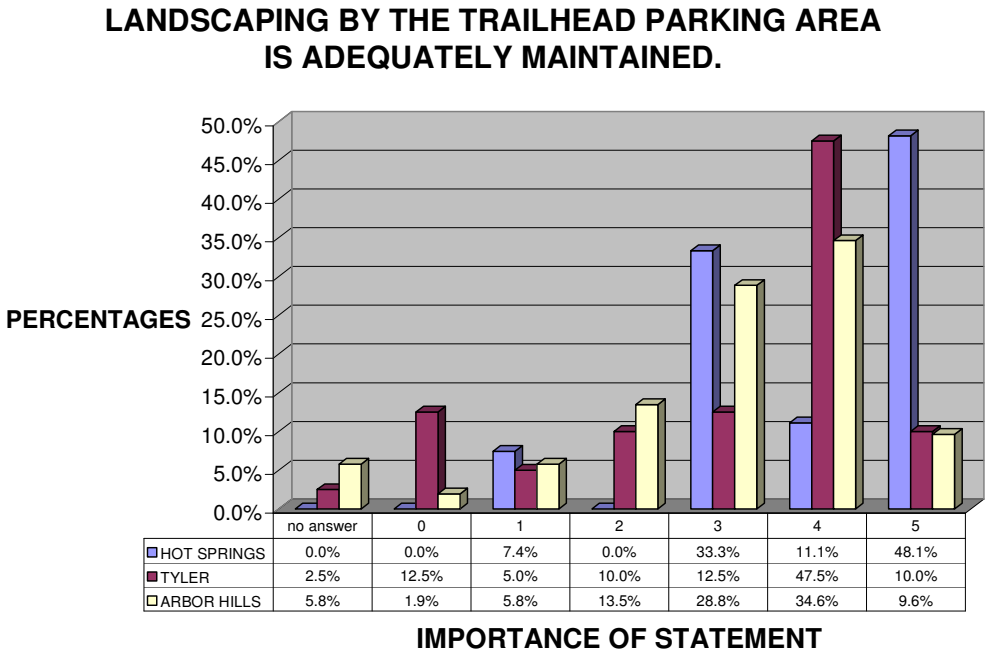


Fig. 4.61 Chart of Trail Question 26b



	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	0.0%	3.7%	0.0%	48.1%	48.1%	0.0%
TYLER	2.5%	0.0%	20.0%	62.5%	15.0%	0.0%
ARBOR HILLS	0.0%	1.9%	11.5%	55.8%	28.8%	1.9%

Fig. 4.62 Chart of Trail Question 27a



	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	0.0%	7.4%	0.0%	33.3%	11.1%	48.1%
TYLER	2.5%	12.5%	5.0%	10.0%	12.5%	47.5%	10.0%
ARBOR HILLS	5.8%	1.9%	5.8%	13.5%	28.8%	34.6%	9.6%

Fig. 4.63 Chart of Trail Question 27b

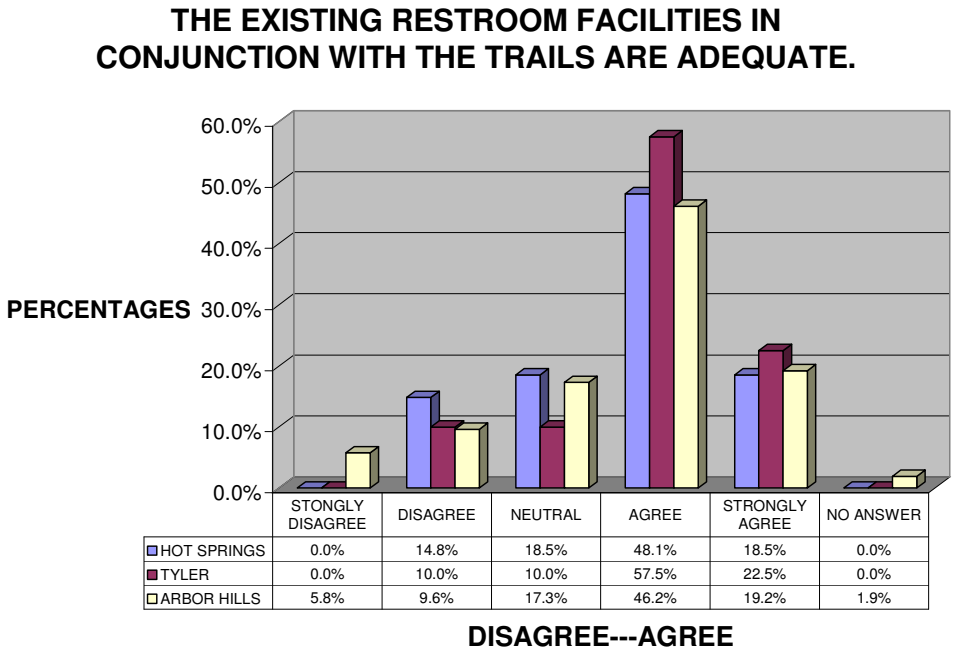


Fig. 4.64 Chart of Trail Question 28a

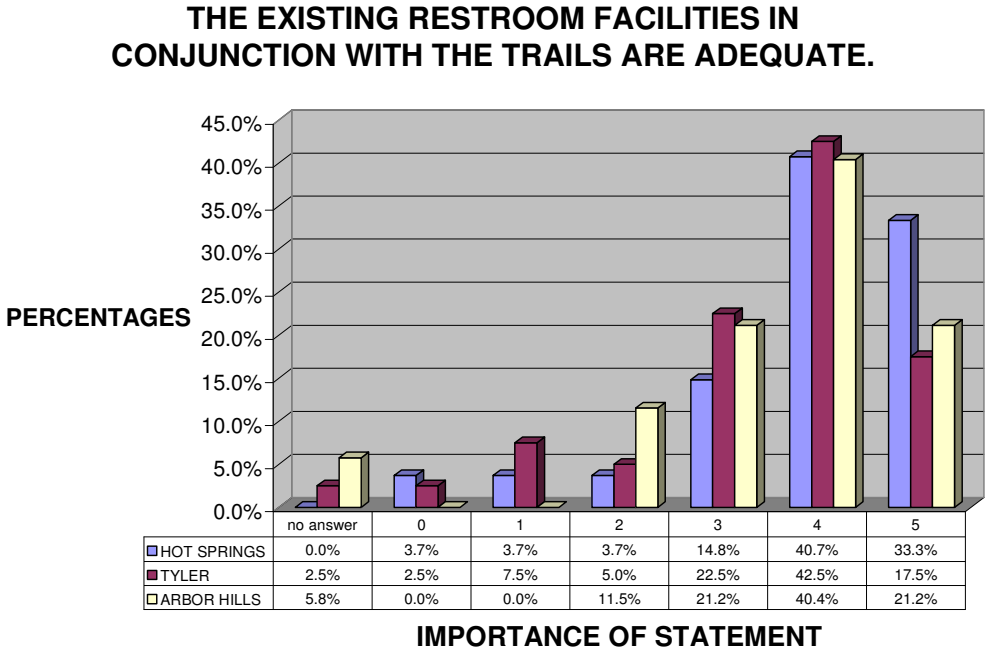


Fig. 4.65 Chart of Trail Question 28b

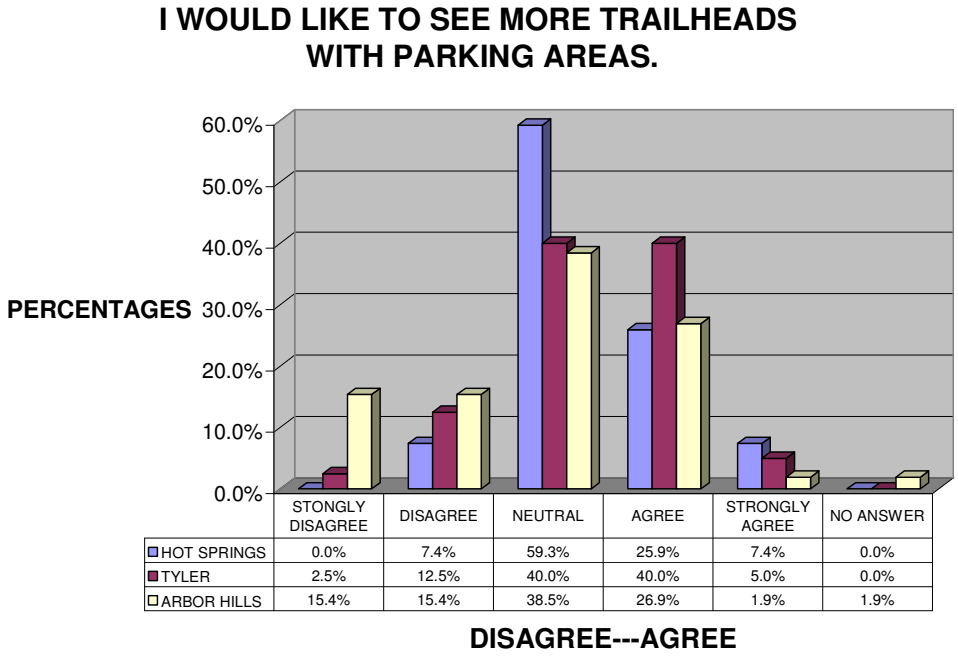


Fig. 4.66 Chart of Trail Question 32a

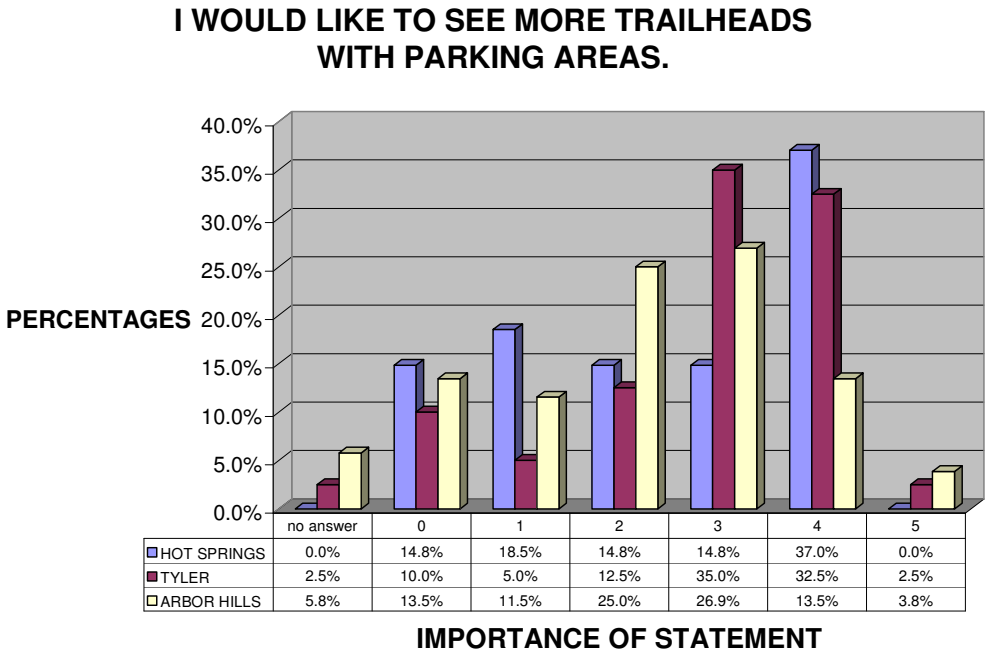
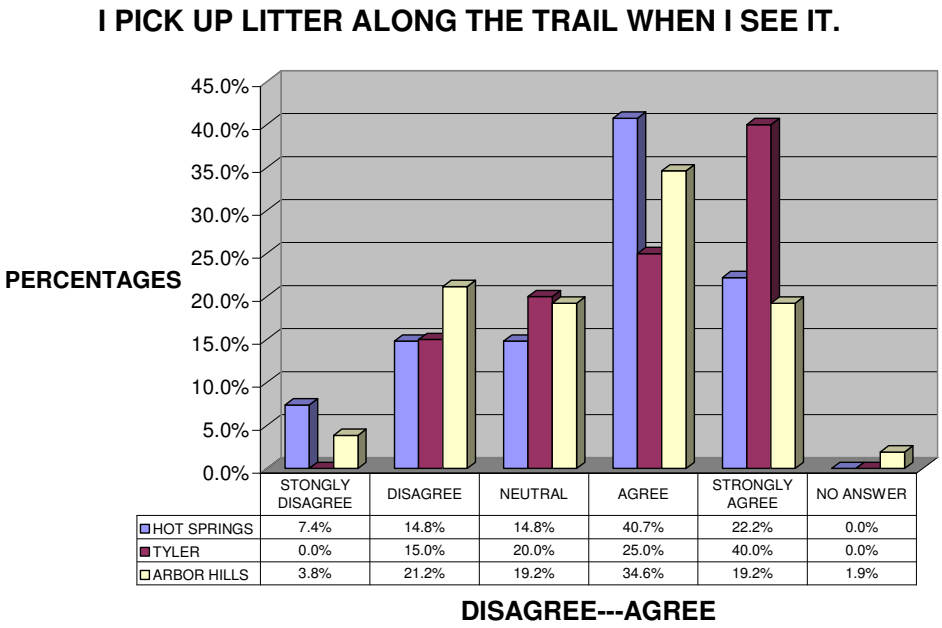


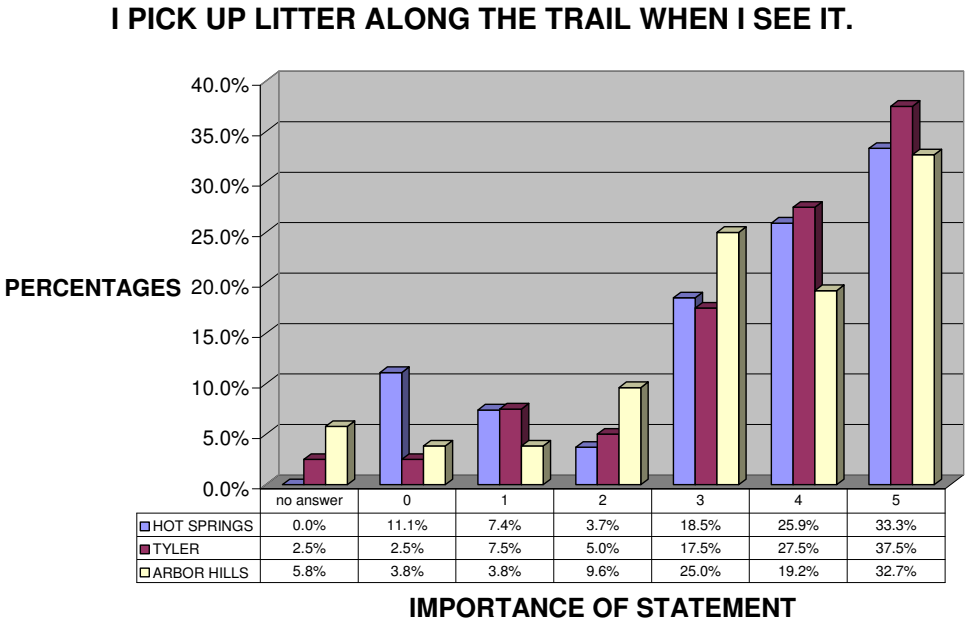
Fig. 4.67 Chart of Trail Question 32b

4.2.2.8 Litter, Safety, and Picnic areas



	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	7.4%	14.8%	14.8%	40.7%	22.2%	0.0%
TYLER	0.0%	15.0%	20.0%	25.0%	40.0%	0.0%
ARBOR HILLS	3.8%	21.2%	19.2%	34.6%	19.2%	1.9%

Fig. 4.68 Chart of Trail Question 24a



	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	11.1%	7.4%	3.7%	18.5%	25.9%	33.3%
TYLER	2.5%	2.5%	7.5%	5.0%	17.5%	27.5%	37.5%
ARBOR HILLS	5.8%	3.8%	3.8%	9.6%	25.0%	19.2%	32.7%

Fig. 4.69 Chart of Trail Question 24b

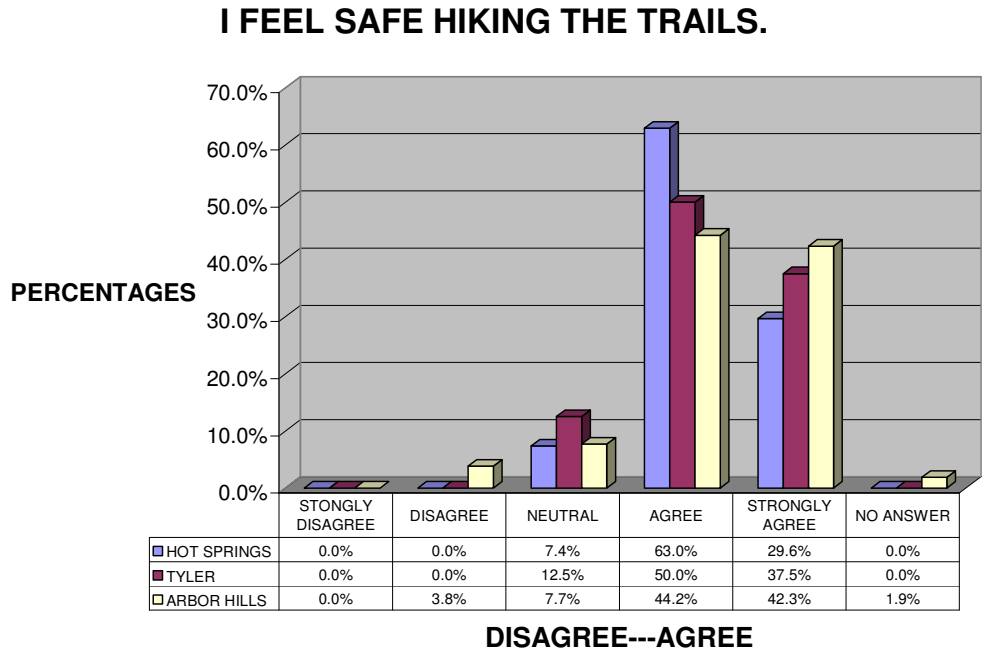


Fig. 4.70 Chart of Trail Question 25a

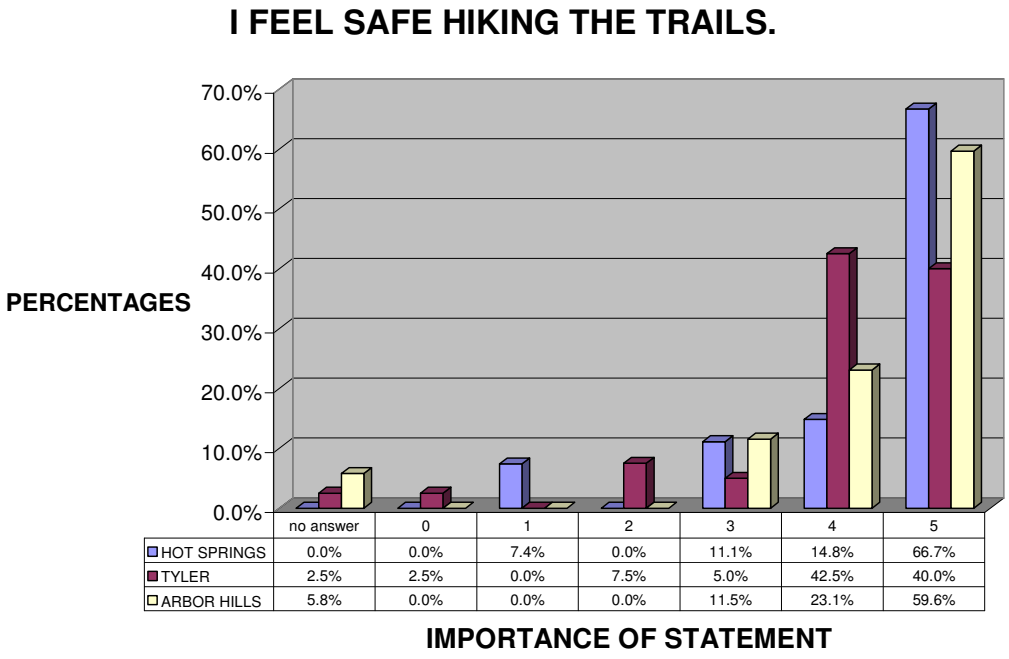
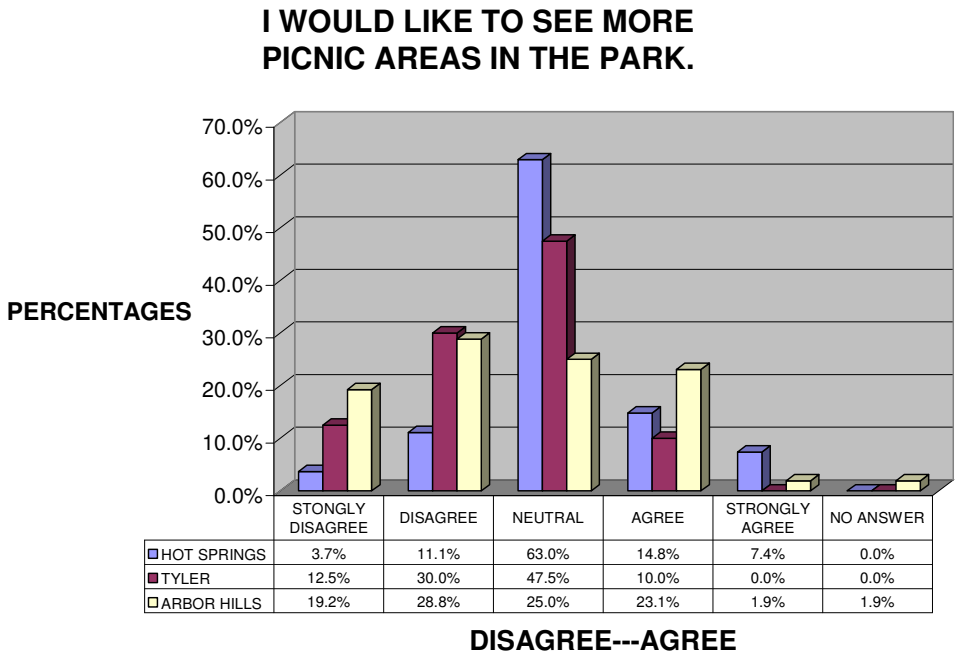
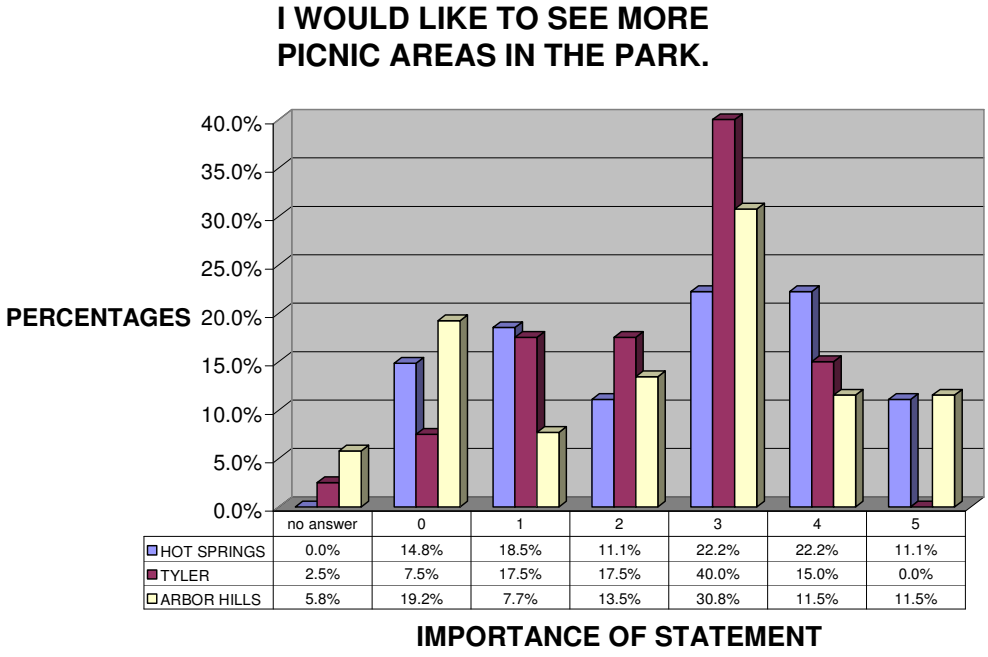


Fig. 4.71 Chart of Trail Question 25b



	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	3.7%	11.1%	63.0%	14.8%	7.4%	0.0%
TYLER	12.5%	30.0%	47.5%	10.0%	0.0%	0.0%
ARBOR HILLS	19.2%	28.8%	25.0%	23.1%	1.9%	1.9%

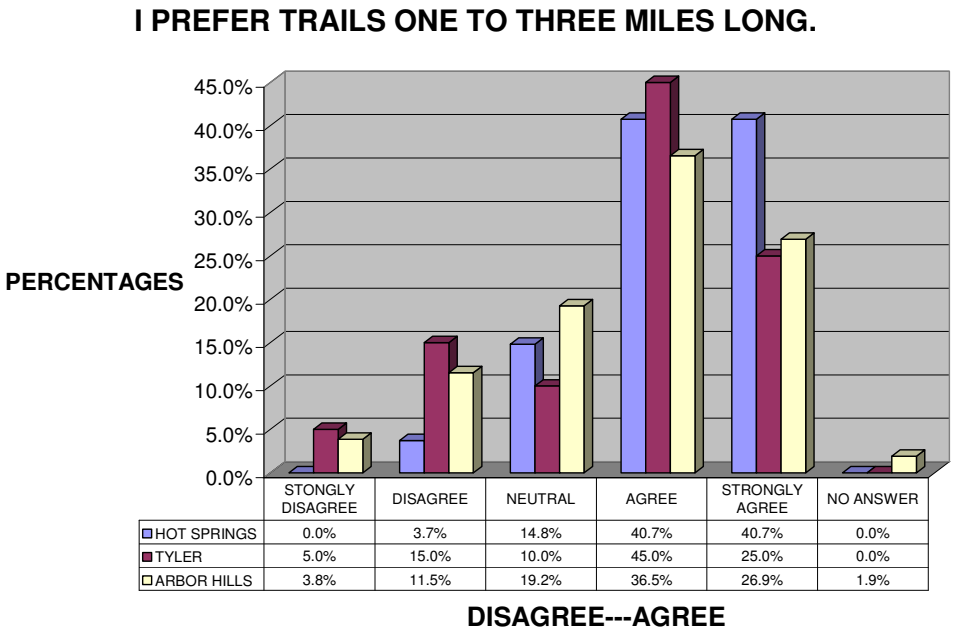
Fig. 4.72 Chart of Trail Question 29a



	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	14.8%	18.5%	11.1%	22.2%	22.2%	11.1%
TYLER	2.5%	7.5%	17.5%	17.5%	40.0%	15.0%	0.0%
ARBOR HILLS	5.8%	19.2%	7.7%	13.5%	30.8%	11.5%	11.5%

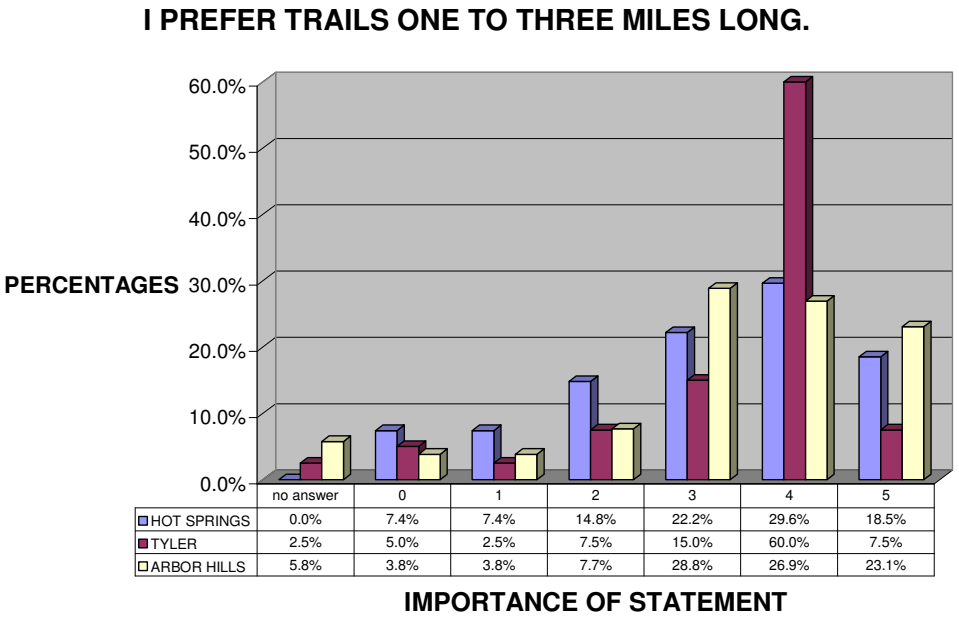
Fig. 4.73 Chart of Trail Question 29b

4.2.2.9 Length of Trail Preferred



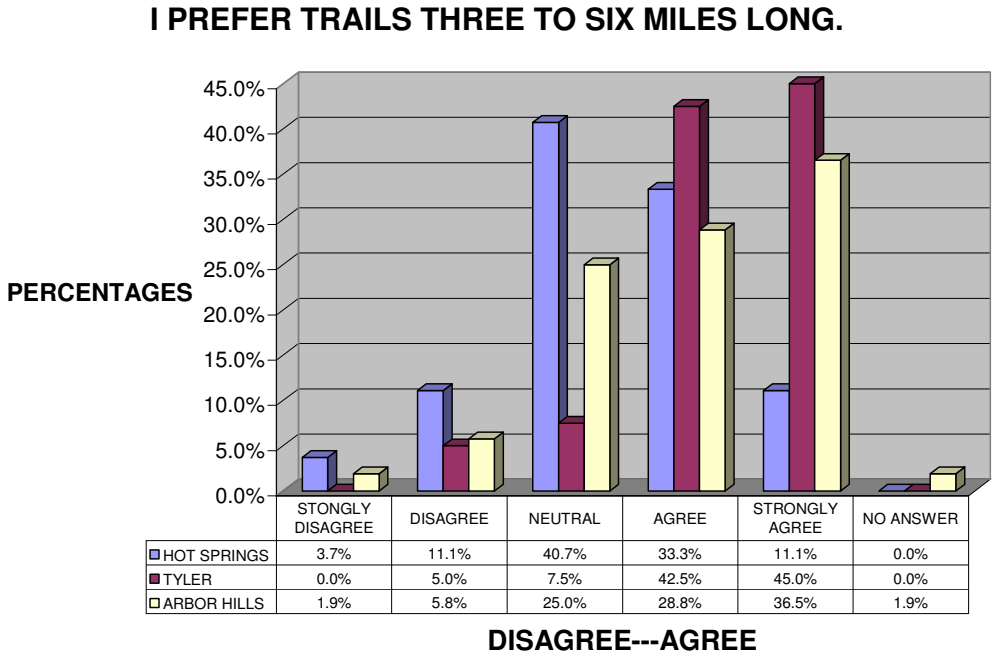
	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	0.0%	3.7%	14.8%	40.7%	40.7%	0.0%
TYLER	5.0%	15.0%	10.0%	45.0%	25.0%	0.0%
ARBOR HILLS	3.8%	11.5%	19.2%	36.5%	26.9%	1.9%

Fig. 4.74 Chart of Trail Question 30a



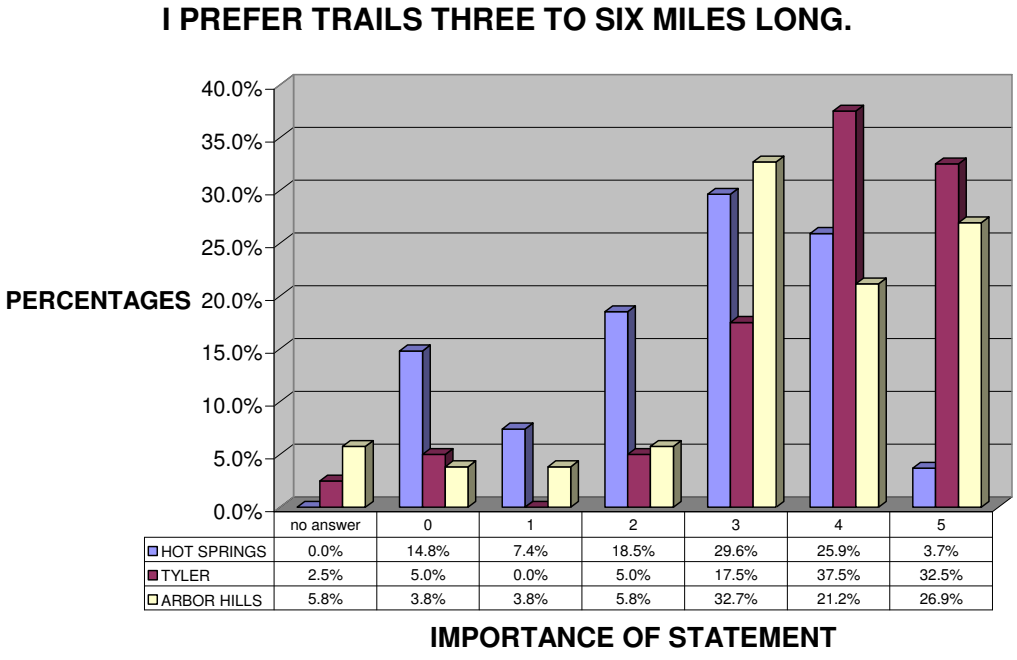
	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	7.4%	7.4%	14.8%	22.2%	29.6%	18.5%
TYLER	2.5%	5.0%	2.5%	7.5%	15.0%	60.0%	7.5%
ARBOR HILLS	5.8%	3.8%	3.8%	7.7%	28.8%	26.9%	23.1%

Fig. 4.75 Chart of Trail Question 30b



	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	3.7%	11.1%	40.7%	33.3%	11.1%	0.0%
TYLER	0.0%	5.0%	7.5%	42.5%	45.0%	0.0%
ARBOR HILLS	1.9%	5.8%	25.0%	28.8%	36.5%	1.9%

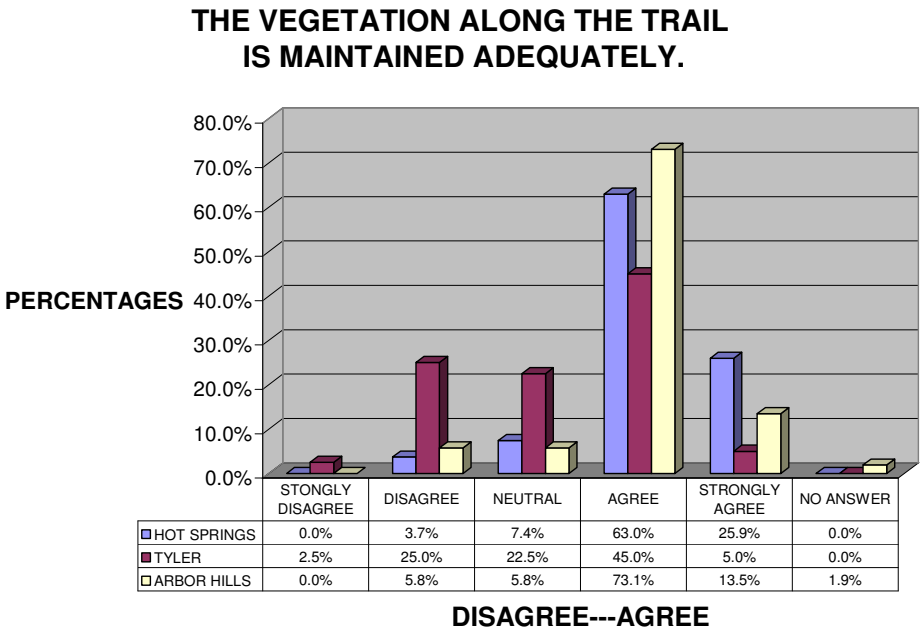
Fig. 4.76 Chart of Trail Question 31a



	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	14.8%	7.4%	18.5%	29.6%	25.9%	3.7%
TYLER	2.5%	5.0%	0.0%	5.0%	17.5%	37.5%	32.5%
ARBOR HILLS	5.8%	3.8%	3.8%	5.8%	32.7%	21.2%	26.9%

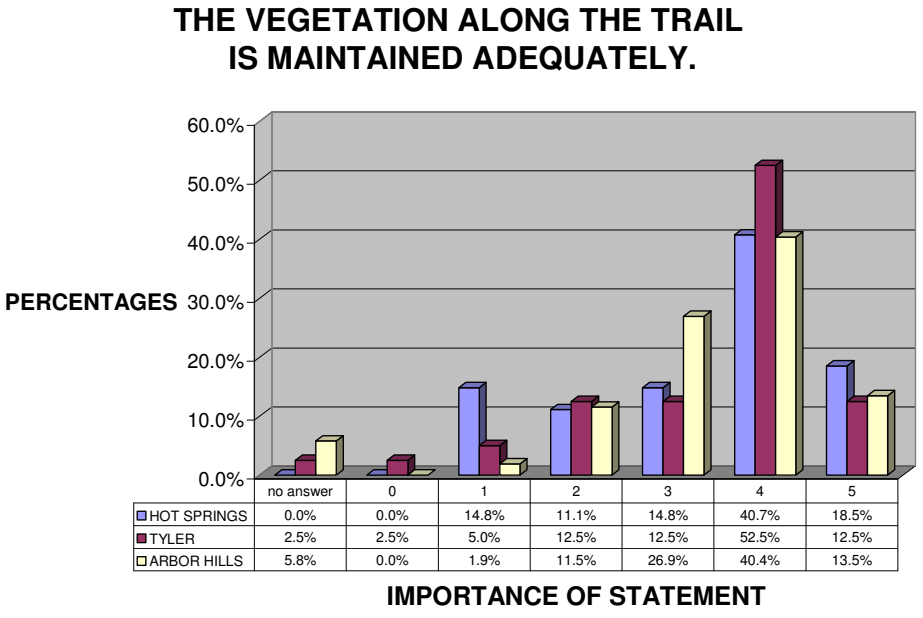
Fig. 4.77 Chart of Trail Question 31b

4.2.2.10 Maintenance



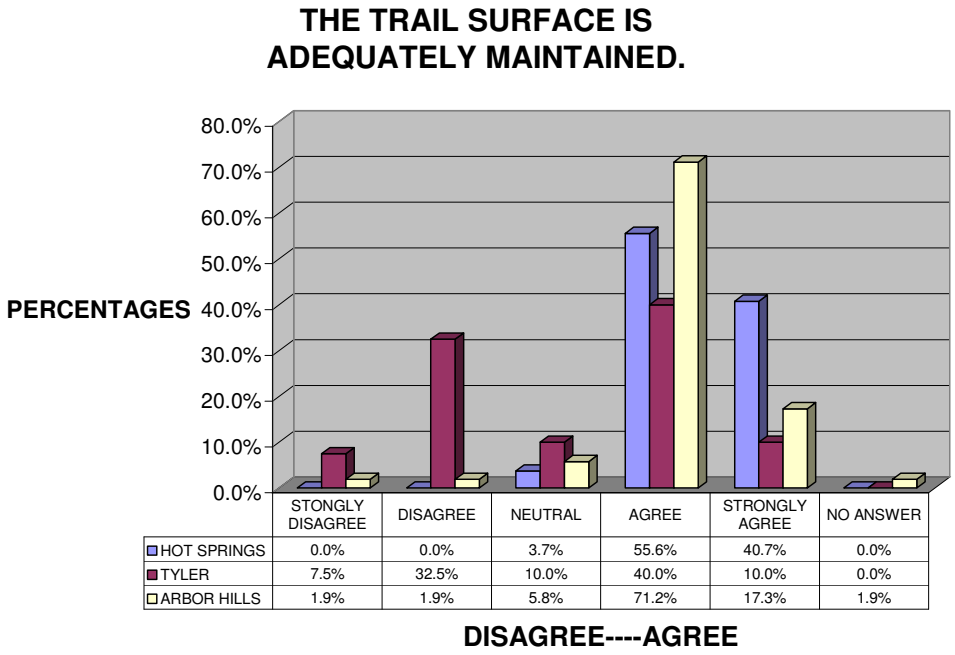
	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	0.0%	3.7%	7.4%	63.0%	25.9%	0.0%
TYLER	2.5%	25.0%	22.5%	45.0%	5.0%	0.0%
ARBOR HILLS	0.0%	5.8%	5.8%	73.1%	13.5%	1.9%

Fig. 4.78 Chart of Trail Question 35a



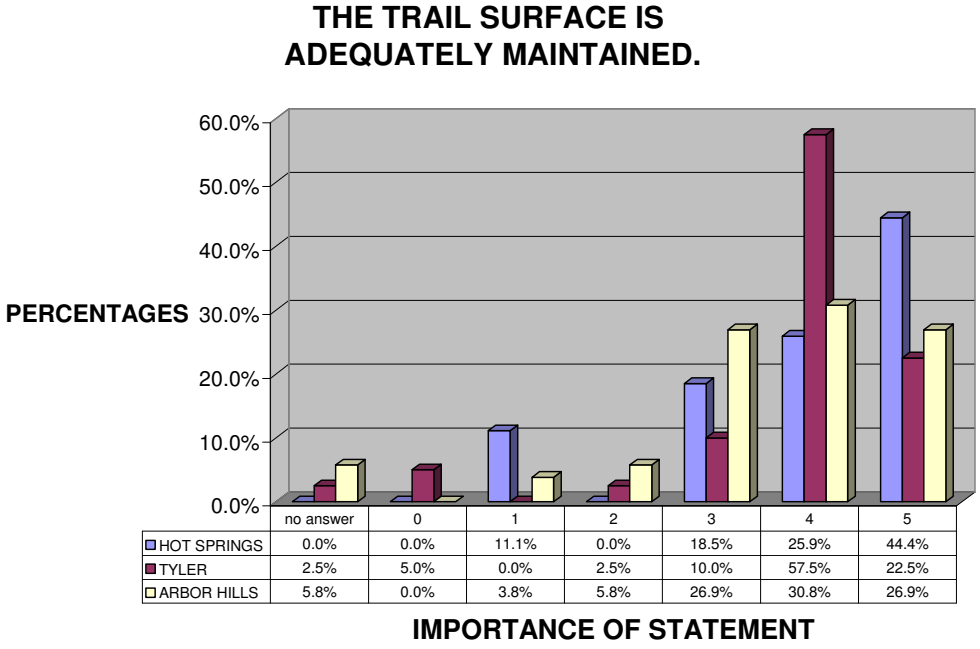
	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	0.0%	14.8%	11.1%	14.8%	40.7%	18.5%
TYLER	2.5%	2.5%	5.0%	12.5%	12.5%	52.5%	12.5%
ARBOR HILLS	5.8%	0.0%	1.9%	11.5%	26.9%	40.4%	13.5%

Fig. 4.79 Chart of Trail Question 35b



	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	0.0%	0.0%	3.7%	55.6%	40.7%	0.0%
TYLER	7.5%	32.5%	10.0%	40.0%	10.0%	0.0%
ARBOR HILLS	1.9%	1.9%	5.8%	71.2%	17.3%	1.9%

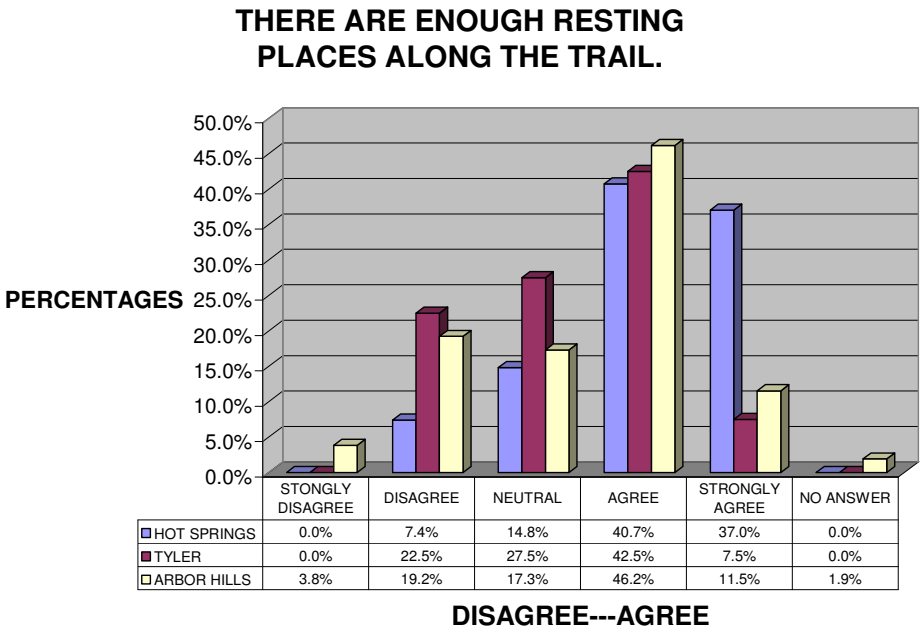
Fig. 4.80 Chart of Trail Question 36a



	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	0.0%	11.1%	0.0%	18.5%	25.9%	44.4%
TYLER	2.5%	5.0%	0.0%	2.5%	10.0%	57.5%	22.5%
ARBOR HILLS	5.8%	0.0%	3.8%	5.8%	26.9%	30.8%	26.9%

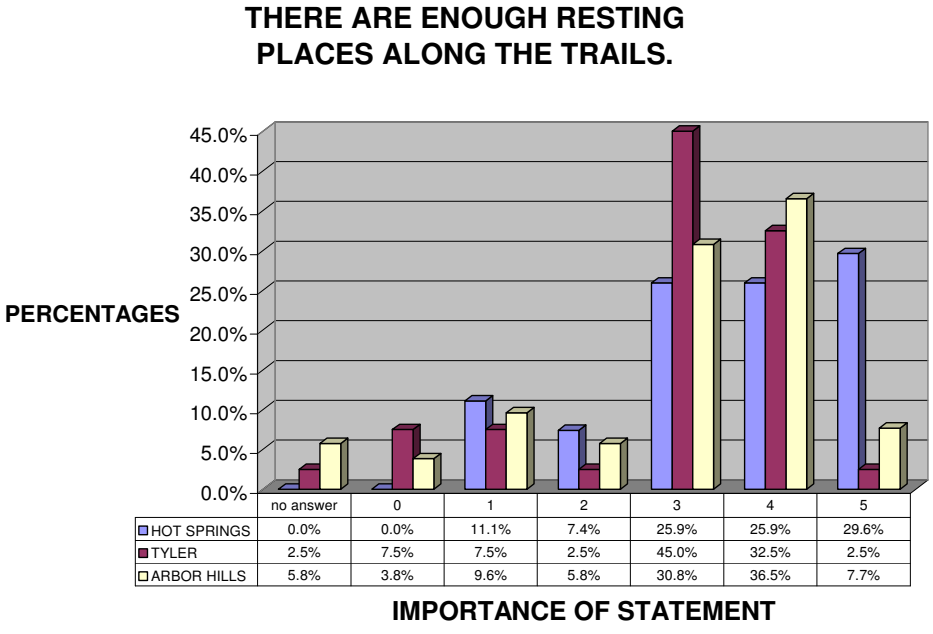
Fig. 4.81 Chart of Trail Question 36b

4.2.2.11 Trails Overall



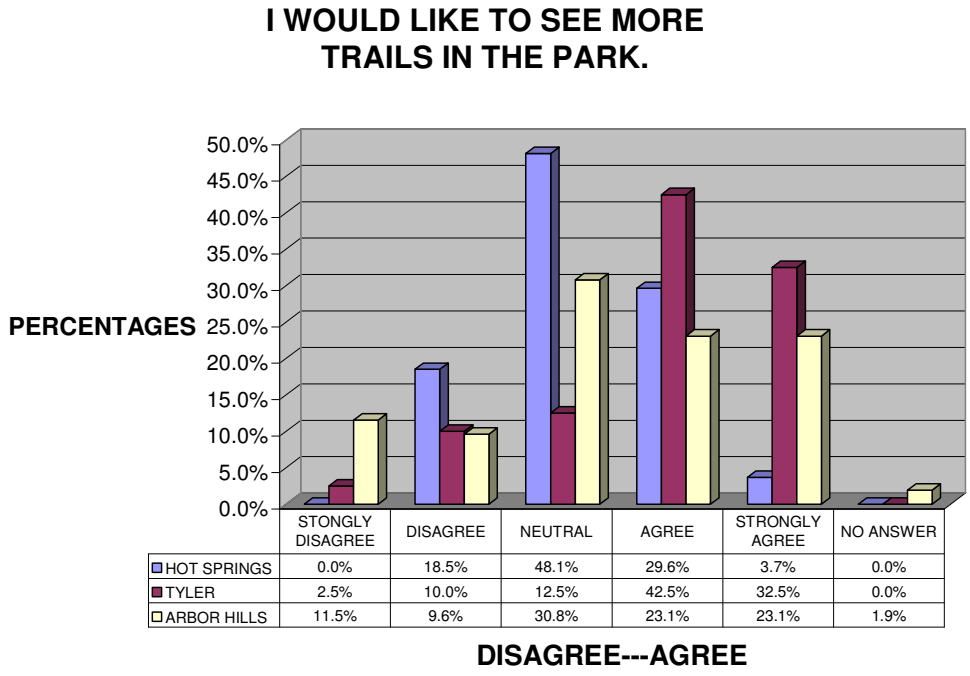
	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	0.0%	7.4%	14.8%	40.7%	37.0%	0.0%
TYLER	0.0%	22.5%	27.5%	42.5%	7.5%	0.0%
ARBOR HILLS	3.8%	19.2%	17.3%	46.2%	11.5%	1.9%

Fig. 4.82 Chart of Trail Question 37a



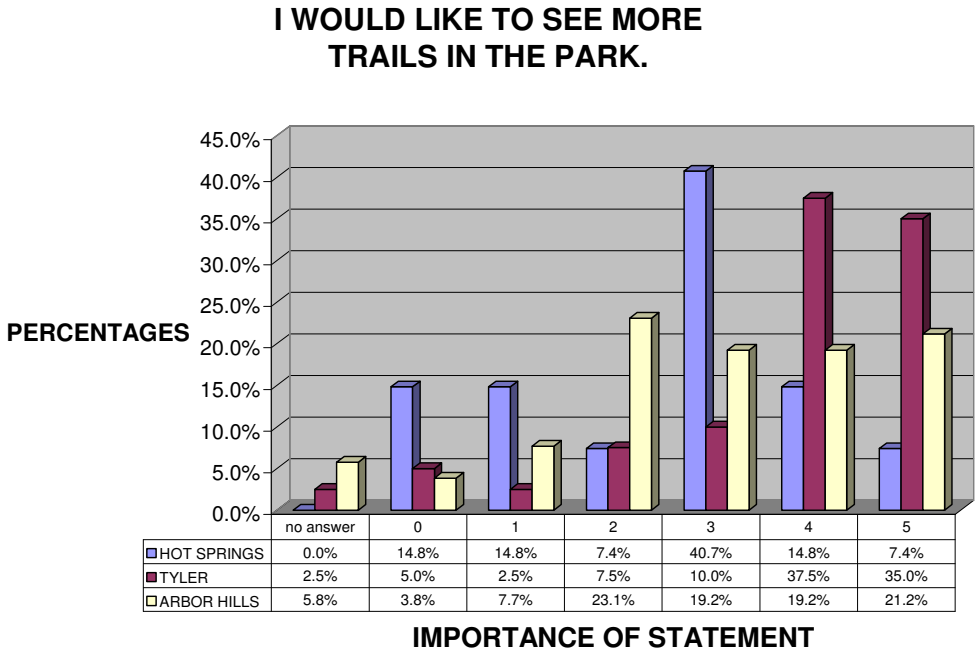
	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	0.0%	11.1%	7.4%	25.9%	25.9%	29.6%
TYLER	2.5%	7.5%	7.5%	2.5%	45.0%	32.5%	2.5%
ARBOR HILLS	5.8%	3.8%	9.6%	5.8%	30.8%	36.5%	7.7%

Fig. 4.83 Chart of Trail Question 37b



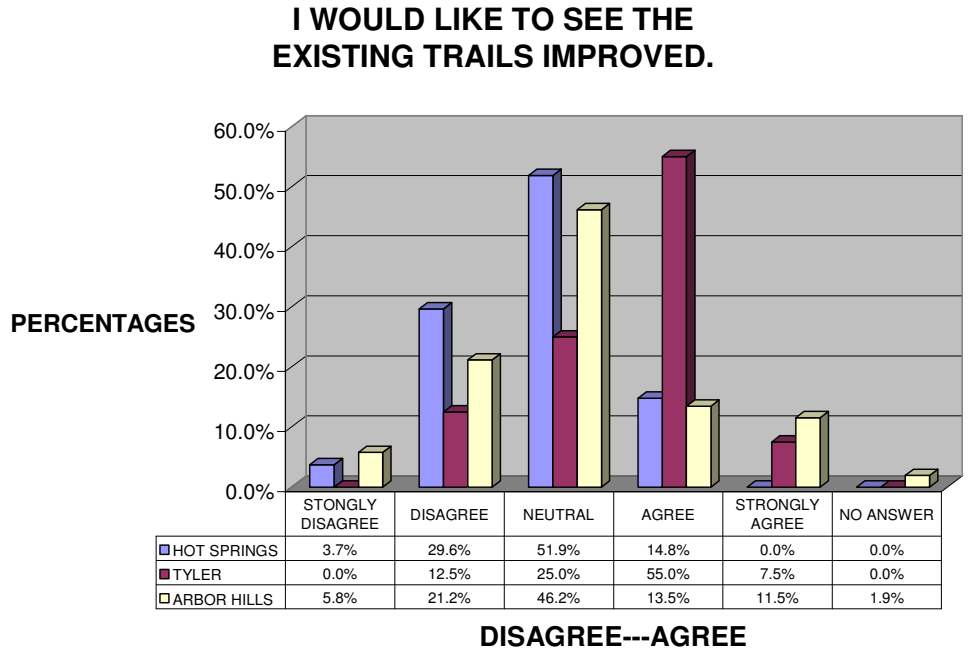
	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	0.0%	18.5%	48.1%	29.6%	3.7%	0.0%
TYLER	2.5%	10.0%	12.5%	42.5%	32.5%	0.0%
ARBOR HILLS	11.5%	9.6%	30.8%	23.1%	23.1%	1.9%

Fig. 4.84 Chart of Trail Question 38a



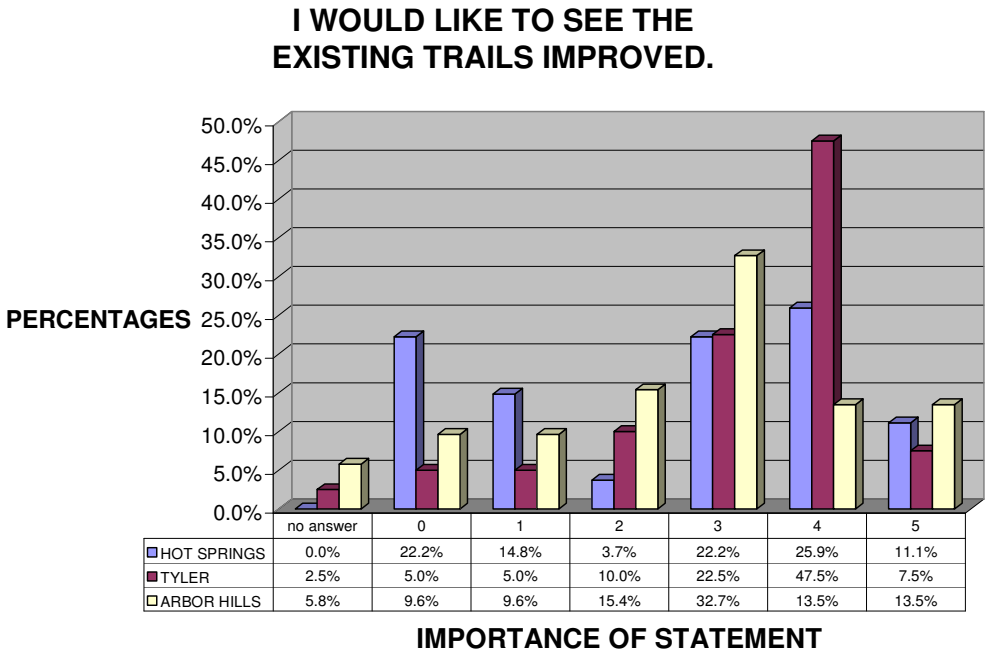
	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	14.8%	14.8%	7.4%	40.7%	14.8%	7.4%
TYLER	2.5%	5.0%	2.5%	7.5%	10.0%	37.5%	35.0%
ARBOR HILLS	5.8%	3.8%	7.7%	23.1%	19.2%	19.2%	21.2%

Fig. 4.85 Chart of Trail Question 38b



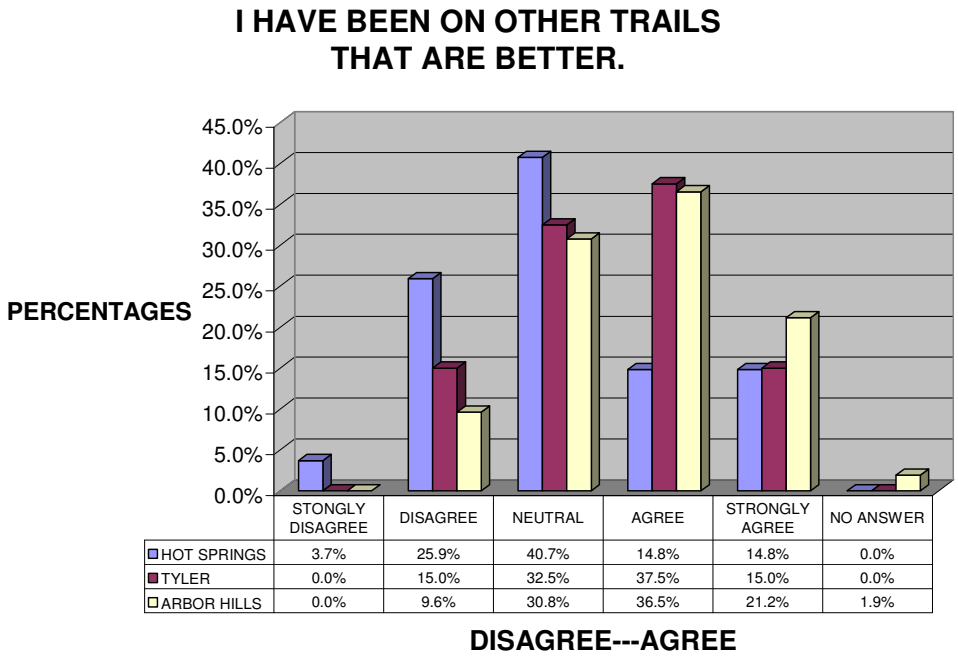
	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	3.7%	29.6%	51.9%	14.8%	0.0%	0.0%
TYLER	0.0%	12.5%	25.0%	55.0%	7.5%	0.0%
ARBOR HILLS	5.8%	21.2%	46.2%	13.5%	11.5%	1.9%

Fig. 4.86 Chart of Trail Question 39a



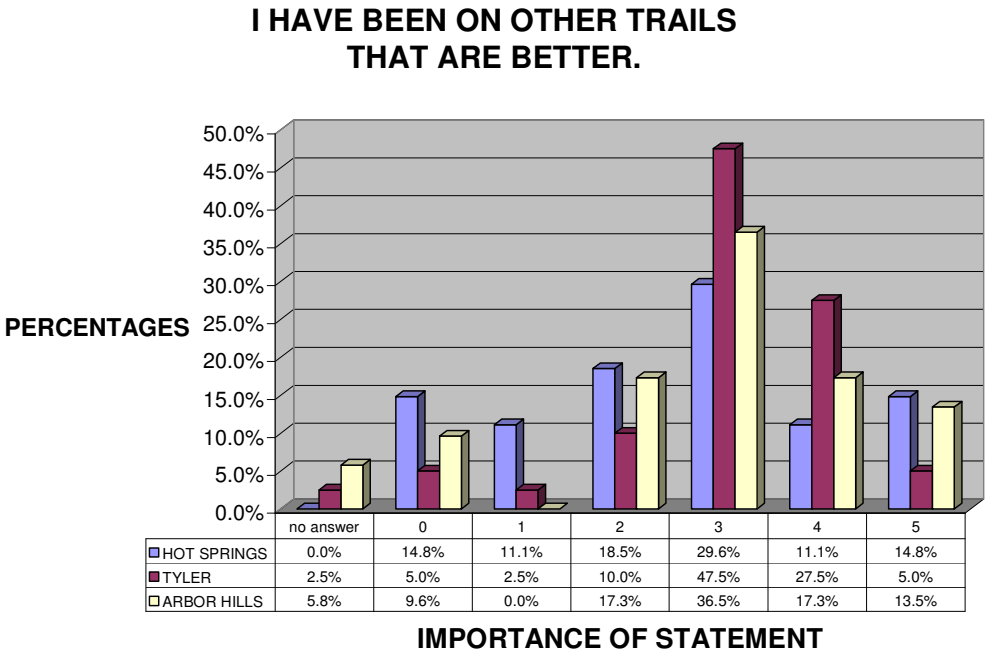
	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	22.2%	14.8%	3.7%	22.2%	25.9%	11.1%
TYLER	2.5%	5.0%	5.0%	10.0%	22.5%	47.5%	7.5%
ARBOR HILLS	5.8%	9.6%	9.6%	15.4%	32.7%	13.5%	13.5%

Fig. 4.87 Chart of Trail Question 39b



	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	3.7%	25.9%	40.7%	14.8%	14.8%	0.0%
TYLER	0.0%	15.0%	32.5%	37.5%	15.0%	0.0%
ARBOR HILLS	0.0%	9.6%	30.8%	36.5%	21.2%	1.9%

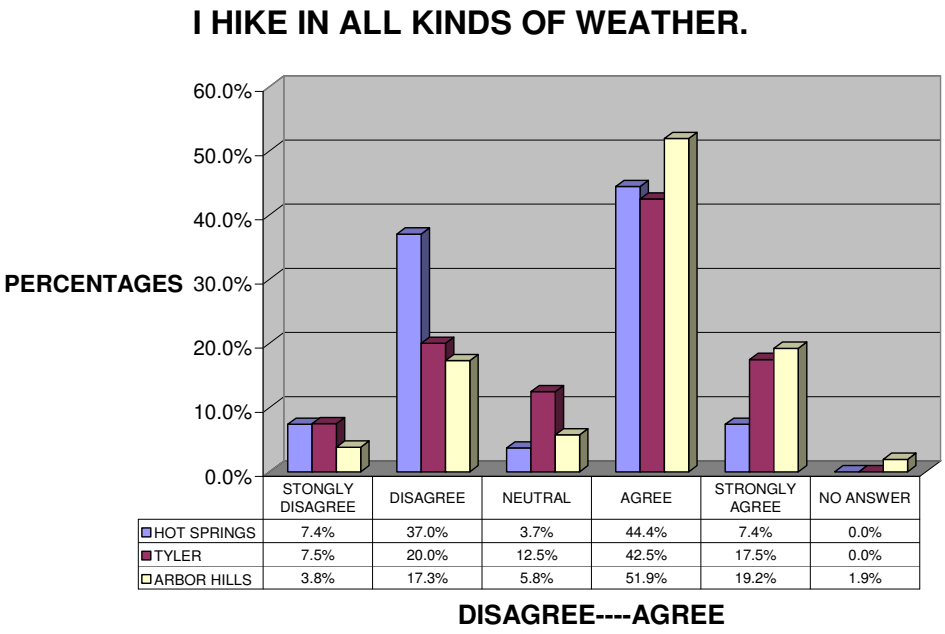
Fig. 4.88 Chart of Trail Question 40a



	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	14.8%	11.1%	18.5%	29.6%	11.1%	14.8%
TYLER	2.5%	5.0%	2.5%	10.0%	47.5%	27.5%	5.0%
ARBOR HILLS	5.8%	9.6%	0.0%	17.3%	36.5%	17.3%	13.5%

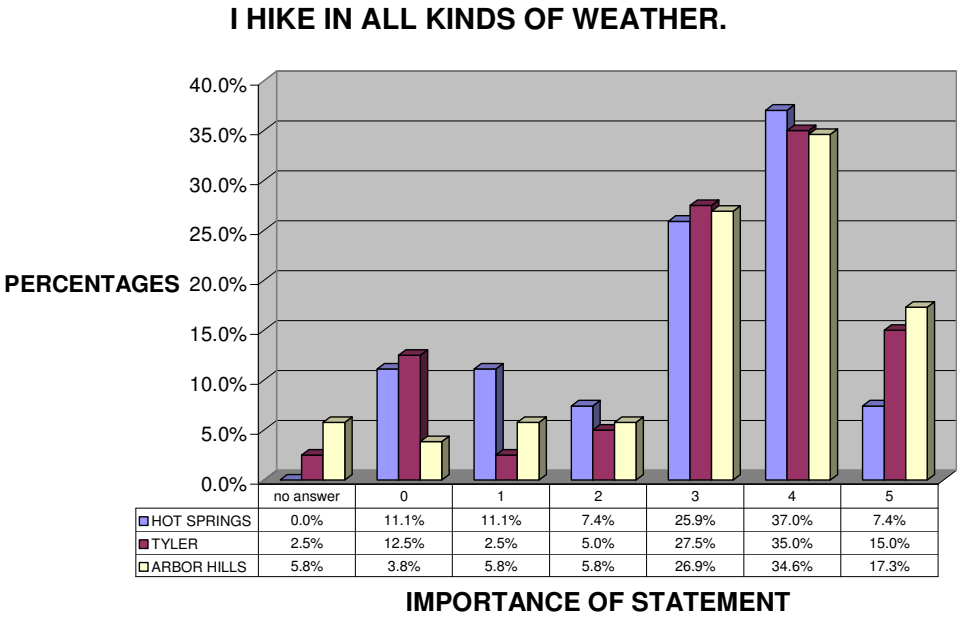
Fig. 4.89 Chart of Trail Question 40b

4.2.2.12 Hiking Conditions



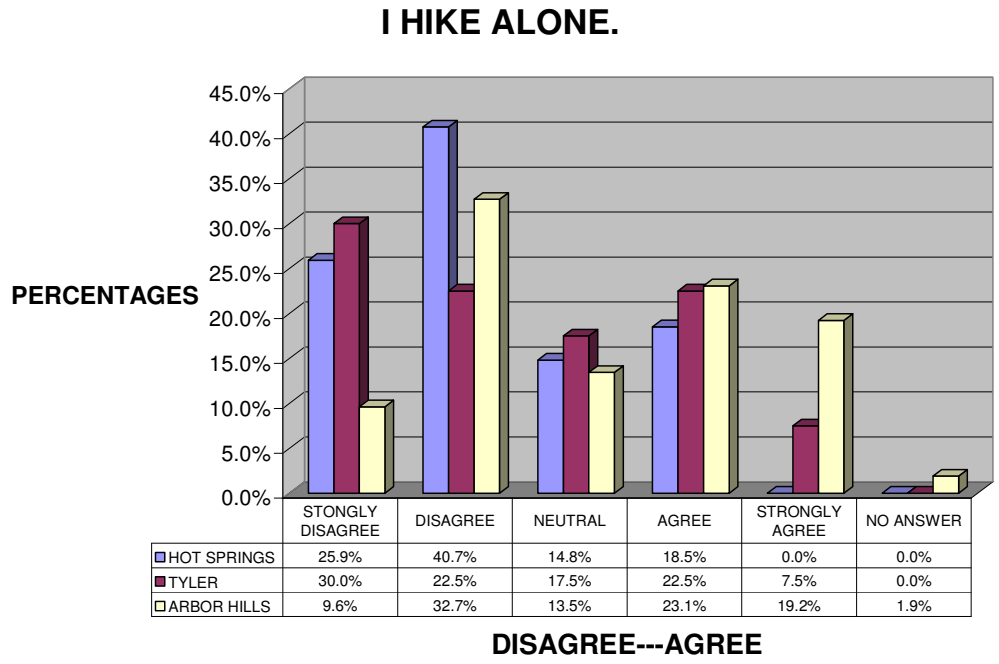
	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	7.4%	37.0%	3.7%	44.4%	7.4%	0.0%
TYLER	7.5%	20.0%	12.5%	42.5%	17.5%	0.0%
ARBOR HILLS	3.8%	17.3%	5.8%	51.9%	19.2%	1.9%

Fig. 4.90 Chart of Trail Question 41a



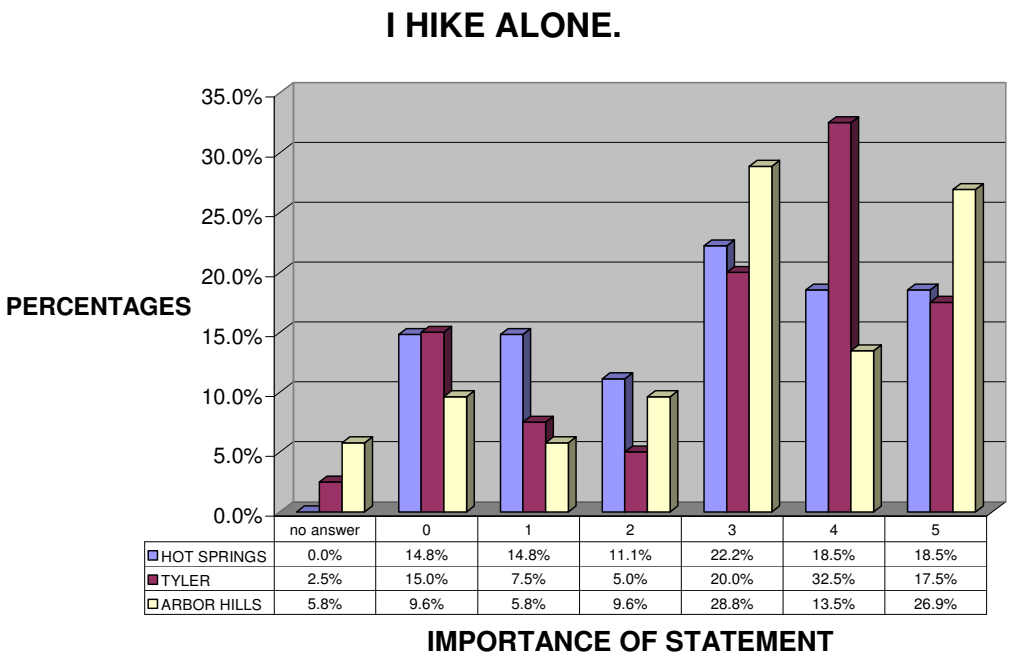
	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	11.1%	11.1%	7.4%	25.9%	37.0%	7.4%
TYLER	2.5%	12.5%	2.5%	5.0%	27.5%	35.0%	15.0%
ARBOR HILLS	5.8%	3.8%	5.8%	5.8%	26.9%	34.6%	17.3%

Fig. 4.91 Chart of Trail Question 41b



	STONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	STRONGLY AGREE	NO ANSWER
HOT SPRINGS	25.9%	40.7%	14.8%	18.5%	0.0%	0.0%
TYLER	30.0%	22.5%	17.5%	22.5%	7.5%	0.0%
ARBOR HILLS	9.6%	32.7%	13.5%	23.1%	19.2%	1.9%

Fig. 4.92 Chart of Trail Question 42a



	no answer	0	1	2	3	4	5
HOT SPRINGS	0.0%	14.8%	14.8%	11.1%	22.2%	18.5%	18.5%
TYLER	2.5%	15.0%	7.5%	5.0%	20.0%	32.5%	17.5%
ARBOR HILLS	5.8%	9.6%	5.8%	9.6%	28.8%	13.5%	26.9%

Fig. 4.93 Chart of Trail Question 42b

4.2.3 Open-ended Question Responses

These are the written responses to a few open-ended questions on the survey, where they could express their main concerns and compliments about the trails.

- What would you like to see changed to the trail, to make it a better experience?
- What would you like to see added to the trail, to make it a better experience?
- Is there anything you wish to comment on, that was not previously addressed?

Forty percent of the survey participants did not give answers to the open-ended questions. However, sixty percent of the participants gave several comments about several topics. Some of these topics mentioned apply only to that particular park. Given the opportunity to speak freely and anonymously about topics that are of interest to them, researchers are able to gain insight into which topics are very important to many of the hikers. The comments are separated into the three parks, and then split into five categories in order to get a good picture of the interest in a particular topic. The categories are:

- Comments about how convenient the trails are to the town. (Hot Springs National Park only)
- Comments and suggestions about the trails.
- Comments and suggestions about maintenance.
- Comments and suggestions about signage and information.

- Comments and suggestions about pet issues.

4.2.3.1 Comments about Hot Springs National Park

User's comments about how convenient the trails are to the town.

1. I really enjoyed the trail. I am an out of state visitor and was happy to find a trail near a city's major attractions and hotels.
2. The Hot Springs trail system is very unique because it encompasses the wilderness as well as the town. The trails are part of the main walk of the community, not only tourists and visitors but locals and people visiting the rehabilitation center use the trails.
3. It's good.
4. I thought this trail was great- nice to have such beauty in the middle of town- I wouldn't change anything.
5. I thought the trail was great- I do not think it could get any better. It was amazing.
6. It is a good urban trail situation.
7. No, I thought it was terrific the way it is. This was my first visit to Hot Springs and it was a nice surprise to find access to such a trail within a short distance of a relatively urban area.
8. I enjoy using the trails, however I do not use them (Hot Springs downtown area) during the evening or early dawn, do to the beggars and drug addicts.

User's comments and suggestions about the trails.

9. There is an apparent lack of a trail of medium difficulty other than following the vehicle road. At Hot Springs National Park the "Promenade trail" is short and refreshing; the "Peak trail" is relatively short, but very difficult for older hikers. A moderate trail in the natural area would be welcome.
10. I would like to see more natural (semi-improved) trails at all parks.
11. Distances needed to be listed at the trailhead and adjoining entrances. We had limited hiking time and chose not to use the upper trails for fear we could not finish in time.

User's comments and suggestions about maintenance, signage, pets and other amenities.

12. Signage with amount of time to drive or hike from the park
13. Signage describing flora/fauna.
14. More educational information (signs) regarding trees, vegetation, wildlife, birds, etc. Water fountains, maybe?
15. There were two restrooms on the promenade that have been closed because of misuse – very regrettable. Can't think of any other changes needed.
16. Perhaps more water fountains – I was here in August with 102 degree temps – and I was often thirsty.
17. More guide people.
18. The available of dog waste bags for those people who don't bring their own poop bags. It may not make them pick up after their dogs but it could. Signage-

to pick up after your dogs, maybe. Most people are responsible and respectful but if they have forgotten a bag they can't pick up after their pet.

19. This park had roads for vehicles which really took away from the natural scenery; I encountered 40 cars to every one hiker on the trail. I think this also speaks of the laziness that has become more common in our society.
20. More daily maintenance, bad weather, erosion to be fixed.

4.2.3.2 Comments about Tyler State Park

User's comments and suggestions about the trails.

1- Please, as a landscape architect never pave, gravel, or woodchip a trail. One of my favorite trails in the Daniel Boone National park in Kentucky recently had half of its surface graveled, every cyclist and hike has complained about it. Instead put the money toward proper trail construction and maintenance, providing drainage for wet areas and avoiding excessively steep slopes that will erode. Paved trails should be saved for short loops marked for the disabled.

2- Longer trails, add more trails in different areas, trail and nature markers

3- Hiking trail is good, but this park has enough area to add other hiking trails.

4- Need improved trail for kids hiking and biking. The EZ trail that is there hasn't been trimmed or opens for the kids to enjoy the park wildlife.

5- Bicycle/hiking trails are too rough and washed out in some areas which need to be repaired or the trail moved. Need more trails for bikes in the easy to A type trail.

6- Wider trails. More trails. Longer trails.

7- More trails and bigger trails.

8- The trails I've been on are very challenging which is good to build muscle and endurance, but the very large rocks and roots and potholes are very dangerous. Other than that it's a great place to come and get in shape.

9- Nice shade on trails.

10- More of it- more hills.

11- The other trails I hike do not allow bikes on them.

12- New trails would be great. It is a wonderful park

13- Alternate routes allowing for shorter or longer hikes.

14- More hiking trails that do not allow bikes.

15- Need more challenging inclines and declines. Trails that do not cross through camp sites would be an improvement.

16- Make more trails and trail options.

17- Better bridges.

18- Nothing to be done. I like the trails very much. There is something for all levels of hikers and bikers.

19- More trails. We need more trails on every level: local, state, and national. Tyler and all of east Texas are full of beautiful trees and views that aren't really taken advantage of. I wish we had more local, long trails on private lands.

20- We walk on the road; I would like to see the traffic reduced to one way. One lane counterclockwise only for vehicles and use the other lane for walkers and bicycles and please keep the speed at 20 mph and better enforced.

21- Due to the snakes on the trails, I mostly use the road now. It would be nice to close off one side of the road for hikers, joggers, and bikers.

22- It would also be better if there was some separation of bikers and hiking trails, but that takes money and maintenance, so I understand why there is one trail for both.

User's comments and suggestions about maintenance.

23- Trim undergrowth back from trail.

24- Trailhead pavilion.

25- Fix trail where big rocks and big roots so easy to get around

26- Shelter at the trailhead

27- Trim trail edges.

28- Shade at parking lot/ trailhead.

29- Some trail vegetation needs trimmed.

30- Shelter at parking lot.

31- Fix some of the creek bridges.

32- Big ruts from bikes need to be smoother.

33- Use less sand to fill holes

34- Fix washouts on Loop B.

35- Trees trimmed where they are not so close together.

36- Pot holes to be fixed on Loop B

37- Trailhead shelter at the parking lot.

38- Add new scenery and a waterfall

39- Trim low tree branches out of the way.

40- It's actually a compliment: not letting mountain bikes on the trail when they are wet has really reduced erosion, Good job by park management.

41- It would be nice to have water periodically along the trail.

42- Need the length of each trail marked at trailheads.

43- Animal and vegetation signage. Local wildlife information.

44- Tyler State park is a wonderful place; they just need to maintain the trail a little better. Maybe take a tip from Colorado's Southwestern Conservation Corps and get the "users" involved with up keep. I would volunteer.

45- We could learn a little about trail maintenance thru trails 2000 in Colorado. Trails 2000 leaves the trial natural but keeps it from eroding completely.

46- For these trails simply trimming the bushes back would make them great.

47- More signs, better and more detailed maps.

48- Less sand and gravel in the low spots. Tyler uses sand on the trails low areas to prevent the ground from getting muddy. However, I think gravel would be a much better choice.

49- Perhaps arrows or directions for shortest/ fastest way out to road in case of emergency.

50- Make the trail safe from snakes. Clear away some of the growth that is growing over the trails. Put some interesting signs along the way describing the trail and the animals that live on the trail.

User's comments and suggestions about signage.

51- Very beautiful park but got confused reading the trail map

52- Signs at all intersection of trails

53- Markers to identify trees and plants, etc.

54- More trail signs

55- Better signage- You are here signs- better more accurate map of trail

56- Better trail maps posted at trails.

57- Maps showing "You are here" and arrows along the trails.

58- Need wildlife information.

59- More signs and put them on the trail map.

60- Signs telling where you are located on map.

61- I'm not a skilled hiker, but more signage designating "you are here" or direction to trailhead would be beneficial.

62- More signage- trailheads marked with numbers and mileage of loops detailed on trail and trail maps. Example: I am at #17 on Loop C, I've hiked "x" number of miles and have "y" number of miles before I finish.

63- I would like more information on what wildlife to expect to see as well as plants

4.2.3.3 Comments about Arbor Hills Nature Preserve

User's comments and suggestions about the trails.

1- Need mountains!!- Just kidding. For Plano it is a great park.
2- I wish more towns/counties would maintain a place like this as opposed to those little parks in subdivisions!
3- All in all this is a great place to go in the middle of too much concrete!
4- Our regular park is Greenbelt and it is closed due to flooding, so this is an excellence alternative for me.
5- More trails by the streams and away from the paved trails.
6- I am concerned about being hit by a bicycle when I hike the unpaved trails.
7- Don't pave too much!!
8- More trails.
9- Just bigger if possible, otherwise it's quite nice.
10- It's a great place and I overall really enjoy it. Thanks to whoever made it happen?
11- Park is in excellent condition.
12- Make the paths crushed granite.
13- I enjoy the trials in the park.
14- Build us new/more parks like Arbor Hills.
15- More trails.
16- More developed trails.

17- I would like to see more parks in all areas like Arbor Hills, with an emphasis on natural areas and hiking.

18- Nothing to do- I like nature! No signs and man-made crap!!

19- More trails.

20- Longer trails in mileage.

21- I think that the park needs several spots where the access to the creek is more comfortable. People come to the water anyways, so it would be wise to make it less intrusive for the vegetation and the bank of the creek.

22- We need more parks like Arbor Hills that have a variety of trail types for the different type of users.

23- More hiking trails that are not paved.

24- Expand the park.

25- Keep bikers off the pavement; it's already bad enough they have taken over the dirt trails (particularly on the weekends).

26- Cedar Ridge Preserve (south of Joe Pool Lake) (is a good example of a perfect hiking park.

27- The park is a good blend of nature preservation and public recreation facility. Improvements should be kept to a minimum in order to preserve the landscape, and enhance the experience of being in nature.

28- Expand this park, it is too small.

29- More scenic views.

30- Longer trail for bicycling on paved surface maybe 10 miles.

31- Painted centerline on paved trails.

32- More restrictions on bikers creating new trails.

User's comments and suggestions about the trails cont.

33- The trails are great, I can't think of anything to change.

34- I think this is an excellent trail.

35- More trails.

36- Safety on the trial and in the parking area is key for me, especially because I tend to go alone or with another girl. There are so many nice trails in our area, but Arbor Hills is one that's readily accessible since most of the others are under water right now.

37- I prefer the natural (non-concrete) trail. Erosion of those trails is a major concern in the West Plano environment. The trail could use the placement of stone to reduce erosion in some areas and provide a natural setting.

38- Additional "semi-improved" trails.

39- Buy the property next door and make it bigger!!

40- Speed limit for bikers on the paved trails.

41- City of Plano does a great job offering this to the public!

User's comments and suggestions about maintenance.

42- Filling in ruts caused by dried out mountain bike mud puddles. I would like to volunteer to improve the trail and would like to know who to contact.

43- Add a few more trash cans for the dog waste and people trash.

44- A few more stations with dog bags to encourage people to pick up after their dogs!

45- Few more benches to sit on.

46- Another restroom in the middle of the trail system.

47- There are markers with numbers on them I guess for certain vegetation, but no way to know what it is marking!!!

48- Better amenities like more water available.

49- . More water fountains.

50- More trash containers along the trail.

51- Paved trail gets muddy after heavy rains, needs cleaned and culverts installed.

52- On non-paved natural trails need erosion control?

53- More water fountains.

54- More benches.

55- More restrooms.

56- More water fountains.

57- Drinking fountains needed.

58- More benches.

59- Cutting back vegetation on semi-improved trails

60- Provide water within the park (near the covered observatory at the halfway mark)

61- Cut back the poison ivy!!

62- Maintain trail as natural as possible, trees, vegetation.

63- Less or no disruptive construction- bulldozing.

64- Don't put rock and concrete on the trail stream bottoms, it makes the park less natural and makes the fish disappear.

65- More resting stops

66- More water fountains along the trails.

67- The outer trails have some erosion that needs to be addresses. The concrete trails are maintained and are in excellent condition.

68- Better restroom maintenance.

69- Water fountains along the trail.

70- Cleaner bathrooms.

71- Water fountain by lookout tower.

User's comments and suggestions about signage and information.

72- It would be nice to label loops with colors or letters, also nice to have mileage markers on the loops for the dirt trails.

73- Markers showing bail out points back to concrete trail.

74- More info on vegetation.

75- Signage next to the markers to explain what they are for

76- Rules and policies posted more clearly

77- Info about the trees or the views. ID the plants, etc.

78- Better signs on the trails showing you are.

79- Hiking distances.

80- Have someone to measure the trail for accuracy.

81- Info on vegetation and uses

82- Place wooden block on the trees along the path showing which way is back to trailhead. Maybe number them or put colored arrows (on the off beaten paths)

83- Possibly a sign (picture) showing and describing what poison ivy looks like. Kids and adults need to be educated on it, besides knowing “leaves of three, let it be”. Also point out different vegetation and trees, kids study trees in school.

84- I would like to see mile markers on both improved and semi-improved trails with trail maps available at the park.

85- Signs that clearly map the trails while you are on them.

86- Signs that prohibit dogs and their excrement.

87- Signs with botanical names of trees along the trail.

88- Pamphlets with good maps.

89- More information on wildlife, plants, trees, etc.

90- More signage describing the surroundings as well as mile markers

91- More signs on distances.

92- Information on source of creek (natural spring, etc.)

93- More information about this area (if it was a ranch, natural terrain, etc.)

94- Information about animals in this area, birds, etc.

95- More information on distance of each trail.

96- Distance and difficulty of each trail, how far to the lookout tower.

97- Information on birds, wildlife, etc.

98- More clear directional signs to tell bikers and hikers which way to go on mixed use trails. I would like to know length of trails.

99- Mile markers on trail that correspond to the map.

User's comments and suggestions about pet issues.

100- Dog park.

101- No pets allowed!

102- Too much dog feces on and next to the paved trail. Need enforcement of existing dog waste laws?

103- Get the dog poop off the trail.

104- No dogs allowed. Owners do not pick up and I was attacked while on the trail.

105- Enforce the leash law. Person with two dogs is a perfect example. He keeps dogs off leash in back of trail areas (backcountry) and dogs are out of control.

106- Need less dog poop on the trails.

107- More remote trash cans and dog poop bags! I sometimes walk my dogs at the park and I am diligent about picking up my dog poop. Others are not so conscientious

108- (I don't have a dog) More dog poop responsibility posts with bags.

109- Litter is a big problem- but how do you enforce it? There are doggie bags around the parking lot, but you still have to watch your step! I guess it is a matter of education and more trash cans.

110- The greatest drawback to hiking trails like Arbor Hills is the fact that many dog owners do not cleanup after their pets. It would be nice if there was a way to enforce this.

111- Allow dogs without leashes in early am.

112- Bikers don't warn pedestrians – safety concern for all the little ones.

113- Not all the dogs are on leashes.

114- More responsible bike patrons- warning the walkers.

115- One more bathroom at the end of the park.

116- Recycle bins alongside the trash cans.

4.2.4 Overview of Charts and User Comments

An overview in the following charts can be drawn concerning demographics, trail design, maintenance, and design opportunities for landscape architects. The quantity of comments on some of the topics in the open-ended questions allows us to draw conclusions what other topics are of major importance to the users of the trails.

4.2.4.1 Demographic Overview

The demographic research gives a clear picture of the users of the trail systems by gender, race, income, education level, type of household, and age.

- The White/Anglo race was between seventy-eight to ninety-five percent of the trail users.

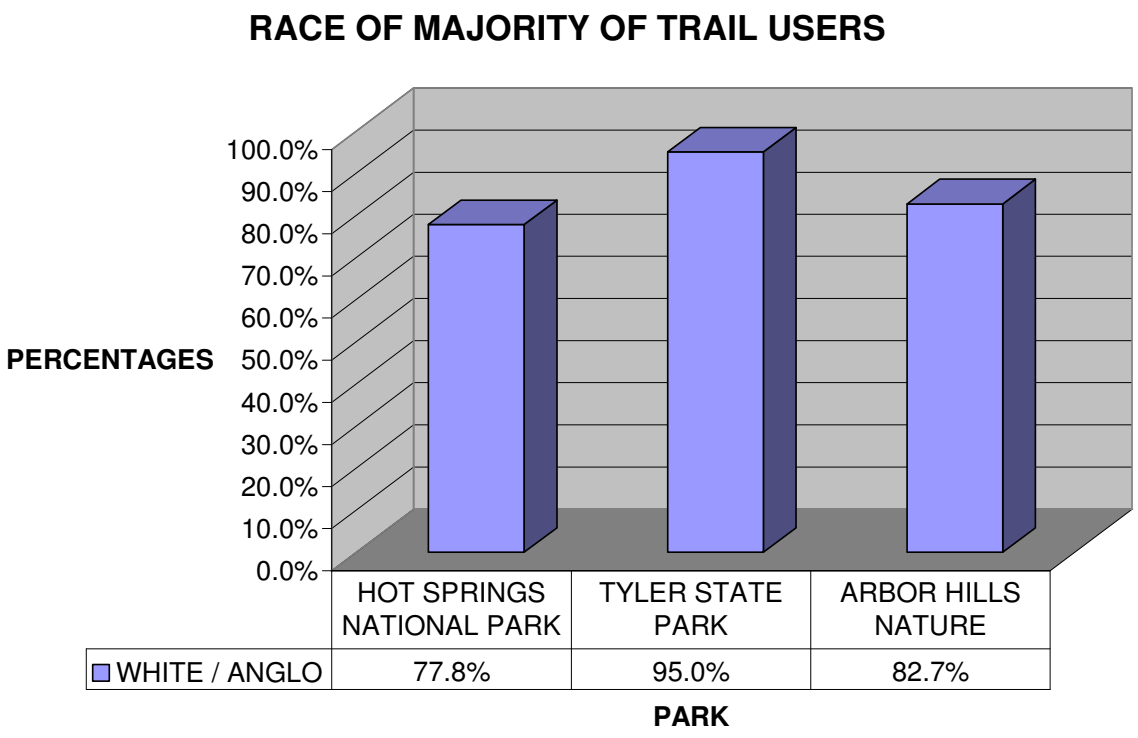


Fig. 4.94 Chart 1 of Demographic Overview

- Male and female trail users are equally represented.

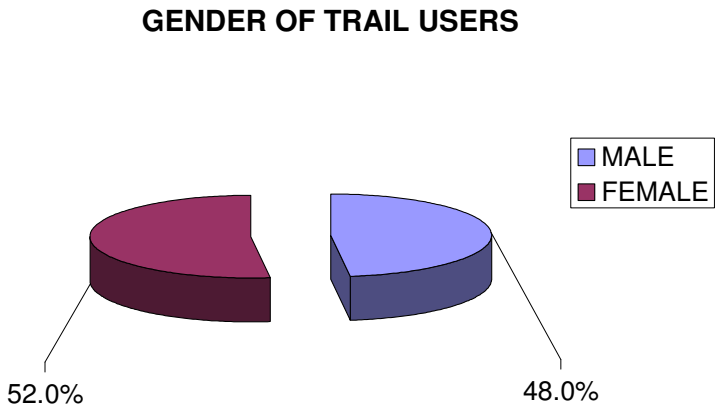


Fig. 4.95 Chart 2 of Demographic Overview

- The age of the majority of hikers in all three parks was from thirty to fifty years of age covering fifty-one to eighty-four percent of the users.

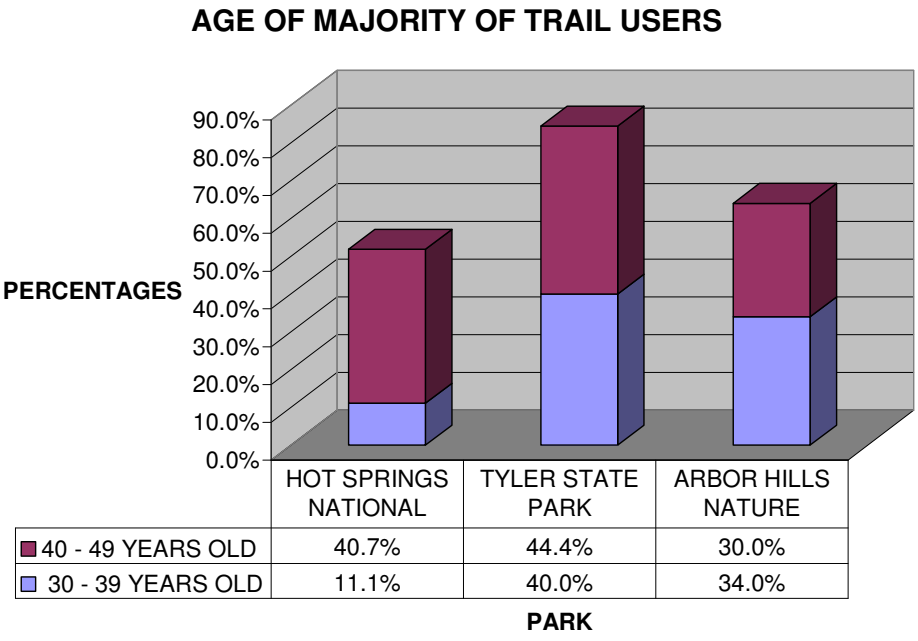


Fig. 4.96 Chart 3 of Demographic Overview

- Seventy to eighty percent of the households are a couple with thirty to forty-five percent with children. Observation of the trail users in the three parks showed that there were many that hiked with friends instead of with their spouses, in the Arbor Hills Nature Preserve, many were in groups of four or five. The trail users in the Tyler State Park were split between couples and groups of friends. In Hot Springs National Park, being a vacation destination spot, hikers were in family groups. Some were a couple only, but most had children with them.

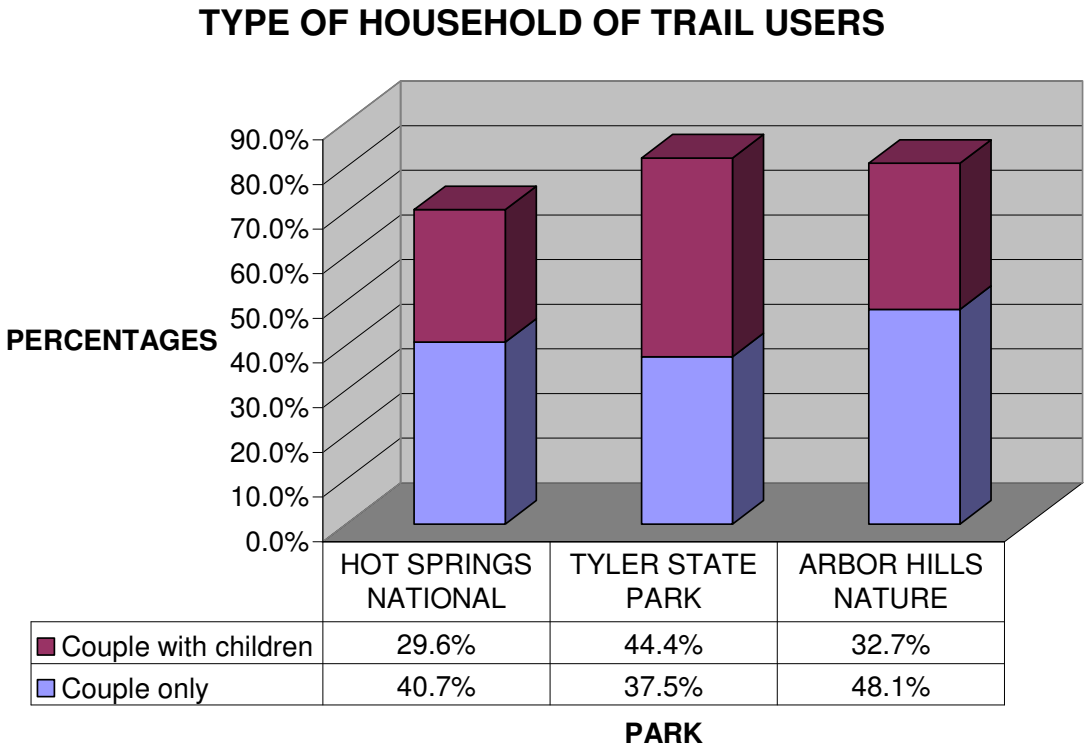


Fig. 4.97 Chart 4 of Demographic Overview

- Trail users in the three different parks are very well educated. Over forty percent have a bachelor's degree; fourteen to thirty-five percent have a degree of master's; Ph.D., or M.D. Arbor Hills Nature Preserve being located in Plano, which is the corporate headquarters for many high-tech companies, has a population of highly educated citizens. Many of the trail users I talked with in the Tyler State Park came from Dallas–Fort Worth or Austin areas, which are cities in Texas which have large populations of well-educated people. Hot Springs National Park draws visitors from all parts of the United States and the world, which reduces the education levels, but the percentage of higher education is still high.

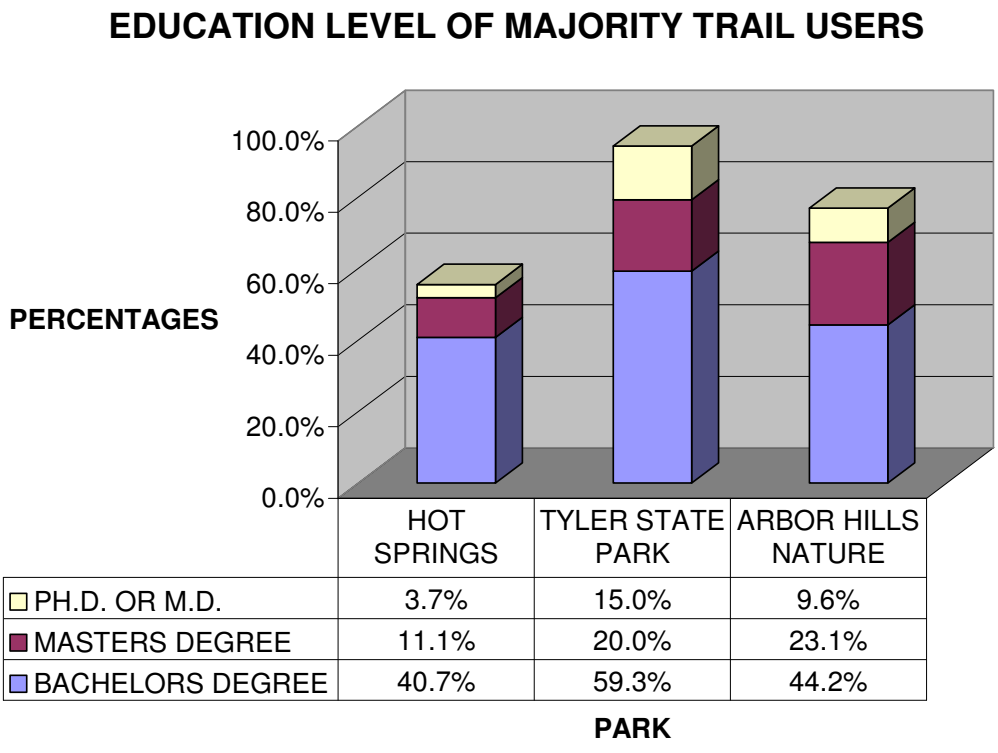


Fig. 4.98 Chart 5 of Demographic Overview

- Seventy-nine percent of Arbor Hills trail users have incomes over $60,000 with forty-six percent have income levels over $125,000. Eighty-seven percent of Tyler State Park users have incomes over $60,000. Fifty-nine percent of Hot Springs users have income over $60,000. These levels of income correspond to the education levels previously charted.

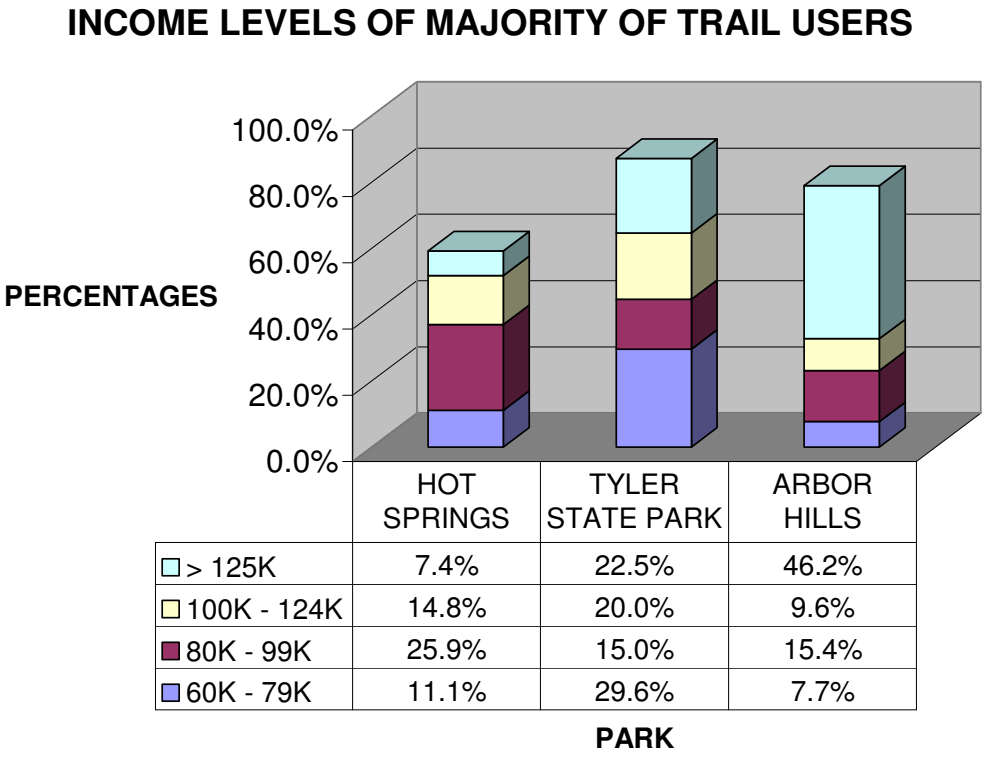


Fig. 4.99 Chart 6 of Demographic Overview

- Sixty percent of the national park trail users hike very little - two to five times a year. These people appear to only hike when they go on vacation. The park has a large turnover of visitors, which keeps the trails occupied. Eighty-five percent of state park trail users hike eleven or more times a year. This park is a weekend getaway spot for many who visit this park, so they come several times a year. Eighty-five percent of the regional park trail users are the largest group hiking over eleven times a year; many we spoke to said they come twice a week, which is fifty times a year. Being within walking distance of a large residential area, keeps the park full of visitors.

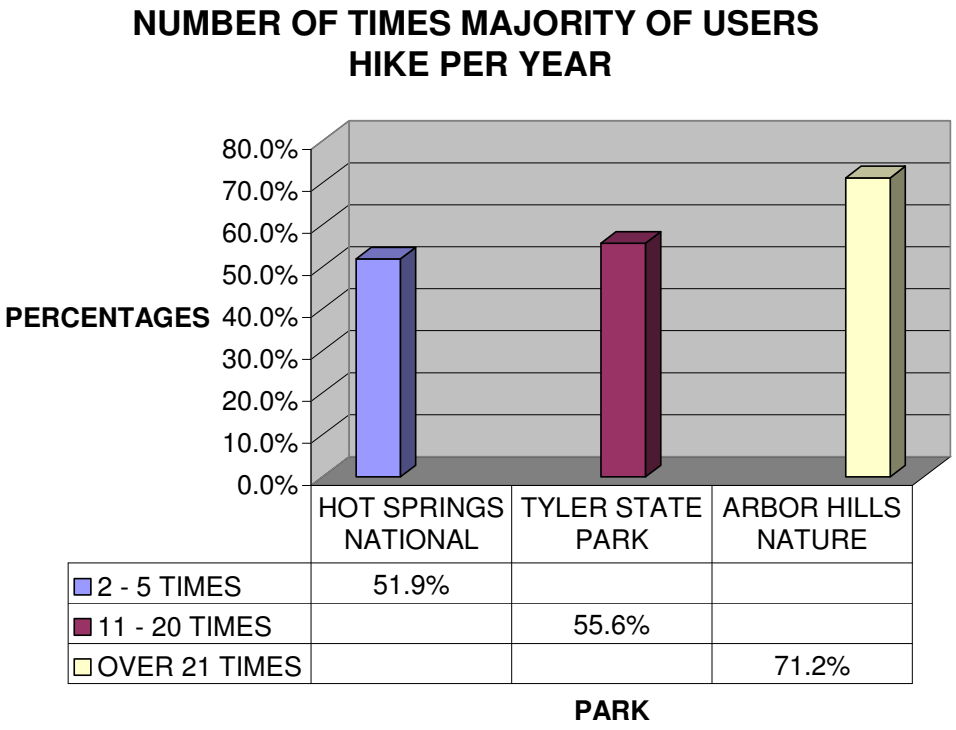


Fig. 4.100 Chart 7 of Demographic Overview

- Fifty-five percent of the national park trail users are visiting from other cities, states, and countries and hike the same trail only one to two times, but the citizens living close to the area hike over twenty-one times. The percentages of state park trail users that hike the same trails are even across the board, from just a couple of times to over twenty-one times. Fifty-six percent of the regional park trail users hike the same trail over twenty-one times. Most of the people we talked with use the trail weekly for exercise.

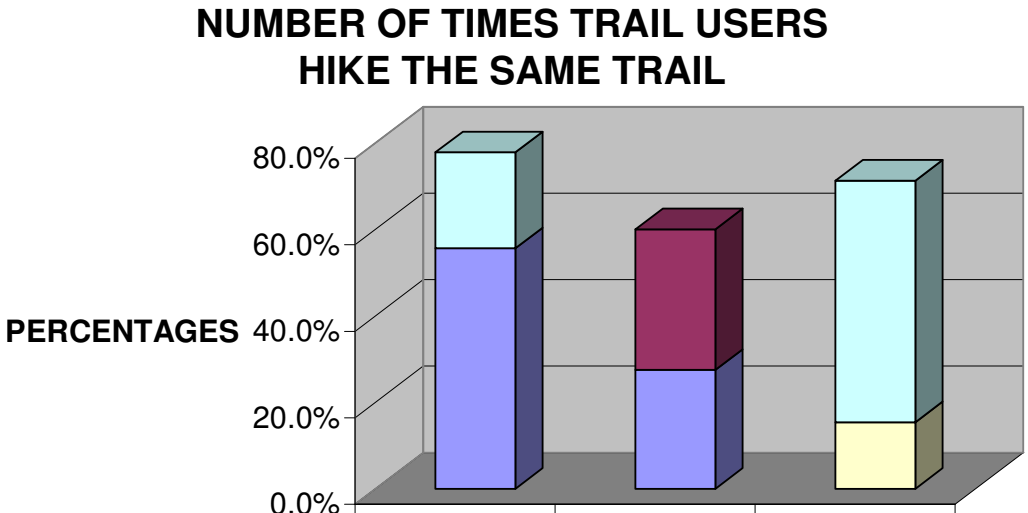


Fig. 4.101 Chart 8 of Demographic Overview

4.2.4.2 Trail Questions Overview

The overview of the responses to the "importance of the statement" questions which were charted in the previous chapter, show that over fifty percent of the users thought these were important statements to consider on the survey by giving a three or higher score on the surveys.

This is the overview of the trail questions which were grouped in Chapter 4.2.2 and charted from strongly agree to strongly disagree. This overview compares how the majority of the trail users for each park responded to the statements. The majority of the trail users ranked each of the statements a three or higher on a zero to five scale.

- In all three parks, sixty-two to ninety percent of the hikers also hiked in national, state and regional parks.
- Fifty percent of the trail users say they are compelled to visit other parks when they read advertising about their trail systems. They feel the written descriptions about the trail in these parks are adequate. They stated that advertising was not the main reason they chose to come to the park. In conversations with the trail users, most of the people came to the park due to the recommendation of a friend who had hiked the trails.
- Over eighty-seven percent in the state and regional park said that the trail system is the reason they come to the park. In the national park only fifty-nine percent of them agreed. The national parks have many other attractions for the visitors.

Fig. 4.102 Natural surface trail

- Seventy-five percent of the trail users prefer natural soil trails to concrete-surfaced trails. Over sixty percent of the trail users did not prefer the wood chip surface trails and the same percentage was neutral about using crushed granite. The national park users did not go into the backcountry trails. Based on conversations with the hikers, they did not schedule enough time to go on that kind of a hike. The state park and regional park trail users were neutral about going into the backcountry trails. Only twenty percent of the users felt strongly about going into the backcountry trails.

- In all three parks, seventy-four to one hundred percent of the trail users agree that they come to view the scenery and vegetation. Over sixty-two percent agree they hike in order to view wildlife.
- In all three parks, over ninety-two percent agree they hike to improve their health, and agree their stress level is reduced by hiking during the week after getting out into the park.
- The trailheads at all three parks ranked above sixty percent that they had adequate parking close to the trails and the landscaping around the trailhead was kept up adequately. The existing restroom facilities are adequate in conjunction with the trails. The amenities along the trails and at the trailhead are adequate for fifty percent of the users.
- In all three parks the trail users considered themselves safe when hiking.
- The Hot Springs trail users, over forty percent, strongly agree trails that are of one to three miles long are best; Tyler State Park and Arbor Hills Park strongly agree that trails of three to six miles long are preferred.
- The trail surface is maintained adequately in the regional and national park; they have more concrete trails and crushed granite trails. The trails in the state park are natural soil and need more maintenance.

Fig. 4.103 “YOU ARE HERE” sign along the trail

- Only the national park was above ninety-five percent concerning informational signs, and “YOU ARE HERE” signs along the trails. Among the state and regional parks, only thirty percent thought that there were enough signs along the trail.
- Fifty-two to seventy percent will hike in all kinds of weather. The majority in each park do not hike alone.

Fig. 4.104 Picnic area in Hot Springs National Park

- All of the trail users in the three parks agree there are enough picnic areas. The trail users pick up trash when they see it.
- The vegetation along the trail is maintained better in the regional and national park; over eighty-six percent believe it is adequate. In the state parks only fifty percent believe it is adequate.
- All three parks had enough signs to the trailheads. In all three parks, over fifty percent thought there needed to be more signage describing the vegetation and wildlife of the area. Forty percent would like to see more pamphlets available about the trails.

Fig. 4.105 Resting bench along the trail

- The national park trail users agree by seventy-seven percent that there are enough resting places along the trail. The percentage goes down for the state and regional park to sixty and fifty percent, respectively.
- Only the state park users show sixty-two percent that would like to see the existing trails improved. The state park users would like to see more trails in the park by eighty-five percent and the regional park users by forty-six percent percentage.
- Over forty-two percent of trail users in the regional and state park said they have been on trails that are better.

4.2.4.3 Trail Users Comments Overview

This research survey gave the opportunity for trail users to address in their own words topics they felt were very important to include in this research. Suggestions and comments were received in each of the three parks and reducing the comments down to an overview gives the following comments for each park. Many of these comments were mentioned several times on the surveys:

Hot Springs National Park:

- Several comments were received expressing gratitude for the park providing hiking trails close to the downtown area of the town.
- Signage is needed describing the flora, and fauna.

Fig. 4.106 Semi-improved trail with crushed granite surface

- The users would like to see more medium difficulty, semi-improved trails in the park.

Fig. 4.107 Signage with distances

- Signage is needed with distances to drive and hike in the park.
- Signage is needed to remind people about picking up after their dogs.

Tyler State Park:

- Users want more trails and longer trails.
- Users need alternate trails (short-cut trails in case of emergency).
- Bridges need regular maintenance

Fig. 4.108 Bridge that needs repair

Fig. 4.109 Trailhead that needs a shelter in Tyler State Park

- Trailhead at parking area needs a covered shelter with picnic tables.

- Trail markers with distances and trail name need to be on map

Fig. 4.110 Trail markers

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Fig. 4.111 & 4.112 Vegetation grown over trail edges

- Maintain the trail edges by cutting back vegetation, especially the poison ivy. This will also make the hikers feel safer from snakes along the trail.

- There needs to be more “YOU ARE HERE” signs along the trails.

Fig. 4.113 “YOU ARE HERE” sign

Fig. 4.114 Signage about vegetation and wildlife areas

- There needs to be more signage about the vegetation, wildlife, and trail markers.

Fig. 4.115 Trail maps need improvement similar to River Legacy Park

- Trail maps need to be available of and add trail markers on map
- There needs to be trimming of low tree branches over the trail.
- Additional drinking water fountains need to be along the trail.

Arbor Hills Nature Preserve:

Fig. 4.116 Trail bench

Fig. 4.117 Trash can

- Add more benches along the trail for resting.
- Add more trash cans along the trails
- Add water drinking fountains along the trail, and add more restrooms at the far ends of the park.
- Expand the park size if at all possible.
- Users want longer trails, over three miles long preferred.
- Users need more trails of all types, especially natural soil trails
- Cut back vegetation on semi-improved trails from the edges.
- Cut back poison ivy vines. Add information sign about poison ivy.
- More signs about lease laws and picking up after dogs, and more doggie bag stations are needed.
- Users need enforcement signs directing owners to keep dogs on leashes.
- Do more maintenance on the semi-improved trails; fill in ruts.

- Users need more informational signs about the trees, plants, wildlife, and trail distances.

Fig. 4.118 Trail map – not available at park and sign with no information

- Pamphlets with good maps that describe vegetation and trail markers that match the trail system available at the park.

Fig. 4.119 Dog park

- Dog parks are needed so dogs have a space to run free of their leashes.

4.3 Summary of Research

This chapter on the research data collected showed the individual questions charted by park concerning demographics, trail questions, and the open-ended question responses. The next phase presented charts as an overview of the demographics, trail design, maintenance, and related health questions. The quantity of comments on some of the topics in the open-ended questions allowed for consolidating the responses into five categories for further analysis.

The overview of the demographic research gives a clear picture of the users of the trail systems to be White/Anglo race, couples with or without children, thirty to fifty years of age, and their education level is bachelor's degree or better and with an income over $60,000. The overview of the trail questions revealed the trail users' preference for natural soil trails, the need for trails of both one to three miles long and three to six miles long, the need for regular maintenance along the trail edges as well as the trail surface, more signage of informational type and directional type, and more resting benches. The overviews of the open-ended question responses were echoing the trail question responses, mainly in the need for more trails, regular maintenance along the trails, more shade structures, and added signage on the trail systems. The users have indicated that these issues need more attention for existing trail systems and new trail systems.

CHAPTER 5

CONCLUSIONS

This study has shown, through trail users surveys, which groups are using the trail systems, and what elements of trail design they consider the highest priority. This chapter looks at six key elements, and shows the value of this study to landscape architects.

5.1 Conclusions

This study has shown that a well-designed trail system has key elements that need to be addressed. There are six key elements:

Surface - Signage - Shade - Safety - Structures - Scenery

Surface - Natural soil trails are preferred over other surfaces. The best possible solution for parks is to have a few short trails with concrete surfaces and multiple longer trails that are natural soil. The overview pointed out that seventy-five percent preferred natural soil surface. The number and length of the trails depends on the available park acreage.

Signage - Most of the improvements needed in the trail systems revolve around signage. The National Park Service has done the best job in providing signage, but the other park systems have much room for improvement. More “YOU ARE HERE” signs are needed along the trails. Only thirty percent of trail users thought there were enough

of these types of sign. Mile markers are needed, as well as informational signs for trees, vegetation, and wildlife. Only fifty percent of users thought there were enough informational signs for the vegetation and wildlife of the area. This is a problem that needs to be fixed since over eighty percent go to the trails to view the vegetation and wildlife. REI donated some signs and some web space online to describe some sites that are marked by a numbered sign posts in Arbor Hills Nature Preserve, but the information is not available at the park. Informational signs at the sites are needed in all parks. Tyler State Park does not have any informational signs about wildlife or vegetation along the trails. Maps of the trails need to be accessible at the parks and have all the trail markers on the map. Tyler has trail maps, but the maps need to be updated to show mile markers, creek crossings and "You Are Here" signs. At the trailheads, the large "You Are Here" signs need to be replaced in the Tyler State Park and sign structures rebuilt.

Shade – Most trails have trees that are large enough to provide shade for the users. Trail systems that are new need to plant trees large enough to give some shade right away. In the southern states shade is a must in the summer time to protect the trail users from the extreme heat. Structures can also provide shade along the trail or at the trailhead where trail users eat and socialize; Tyler State Park parking area is one such location that was mentioned several times by the users that needs a structure. Drinking water can also be located at the trailheads.

Safety – Regular maintenance of the trail edges is very important for the users to feel safe from poisonous and thorny vegetation, and animals; this was addressed in

the many users' comments from the Tyler State Park and the Arbor Hills Nature Preserve. Signage about the poisonous vegetation and animals also adds to the safety factor of the hikers. Trail surface maintenance is important especially in a few areas of the trail in the Tyler State Park that can have erosion problems.

Structures – Shade and protection from wet weather are the reasons there needs to be structures at the trailheads and at destination points that are miles from the trailhead. Building restroom facilities at the farthest points of a trail system was mentioned in the Arbor Hills Nature Preserve surveys. Benches for the hikers to rest need to be added; this was stated multiple times in the open-ended question comments and fifty percent in the trail questions agreed.

Scenery - The survey results confirm that over seventy-four percent of the hikers come to the trails to view the scenery and vegetation, and that sixty-two percent come to see wildlife. The informational signs describing the history, views, vegetation and wildlife add to the hiker's experience. Clearing the vegetation is sometimes necessary to achieve an exceptional view of the landscape.

Even though the majority of trail users like the trail system, the study shows there is still room for improvement. If seventy percent of the trail users are happy with the trail and the amenities that go with it, then that says thirty percent of the users see a need for improvement. Landscape architects could be missing out on some opportunities to improve the trail systems for the users, and improve the public awareness of the profession of landscape architects.

Many park departments are looking for additional finances to improve park safety and maintenance, and to add new amenities. Some parks have found that volunteers can improve the regular maintenance on the trail systems and leave their trail budgets for financing the purchase of materials, consultants, and major building projects, instead of labor costs. Ouachita Mountain Hikers is such a club in Arkansas which hikes in many different parks. They hike in Hot Springs National Park and have a volunteer agreement with the park to perform litter patrol along Gulpha Gorge Road four times a year. Individuals also assist the National Park by adopting most of the trails within the park. The club also maintains 10.4 miles of trail located in Flatside Wilderness of the Ouachita National Trail.

This study has shown that people from all over the country who enjoy hiking, hike in all three of the different parks when they have the opportunity. Over ninety-two percent agreed that they hike to improve their health and reduce their stress level. The similarities in these parks suggest that the majority of the users are of the White/Anglo race, couples with or without children, thirty to fifty years of age, and their education level is bachelor's degree or better with an income over $60,000.

Looking for user participation in the maintenance of the trail systems, the group of users which the study has shown to be the majority of the hikers should be approached first. Additional groups to be approached are hiking clubs that are located in the area of the park. Volunteerism is a great way to preserve a park trail system and by establishing hiking groups or clubs continued organized support for the park trail system is fulfilled. This study shows the user's perceptions of the different hiking trail

systems. It also shows what desired features are common among all trail users, regardless of park size and location.

5.2 Value of the Study to Landscape Architects

In 1993, the American Society of Landscape Architects (ASLA) listed twenty-four percent of its membership as public practitioners. The National Park Service and local park departments provide the most employment opportunities in the public sector (Rogers, 1997). In most cases working for a public-sector client involves a third party, that being the general public. In many cases public meetings are required and even mandated by ordinances to establish communication with the public about the project. The trust developed with communication of ideas and public input will guide the project to be successful (Rogers, 1997). Communication comes in a variety of forms.

This study communicates the users' perceptions and value of the trail system in three different parks, which apply to other existing trail systems. The study exposed six key elements: surface, signage, shade, safety, structures, and scenery which were discussed in the previous section. This study also proves the need for follow-up communications with the users, since the percentage of users that were dissatisfied with these key elements when looking at signage issues and the need for maintenance, which is a safety issue. The development of the best trail system possible in any given location depends on follow-up communication which comes in many forms; surveys, telephone conversations, and meetings with users, park superintendents and hiking clubs. These follow-up communications promote relationships with the users, the general public and the parks departments.

> "Without question, developing and maintaining personal contacts is a key to job development and a successful long-term practice for the professional landscape architect" (Rogers, 1997).

These relationships give the landscape architect design opportunities on the trail system, in the whole park, and on other private and public projects in the community.

Fig. 5.1 Design opportunities – hand rails, observation towers, retaining walls

> "Definition of Landscape Architecture:
> Landscape Architecture is the profession which applies artistic and scientific principles to the research, planning, design, and management of both natural and built environments. The resulting environments shall serve useful, aesthetic, safe, and enjoyable purposes" (Rogers, 1997).

Providing a successful public project means that the project meets the needs and desires of the majority of the users while being aware of the natural environment and protecting it, and providing an aesthetically pleasing and safe project within the restrictions of the budget, time, and all laws and regulations that apply.

APPENDIX A

FIELD NOTES

The trail users were inquisitive when approached about my research. They immediately began telling things they liked and disliked about the trails. Explaining the survey to them, they realized they would have the opportunity to give their input and suggestions in the open-ended questions on the survey and some of the things they were interested in were addressed in specific questions. They stated they did not have a lot of time and were not interested in standing there filling out a survey, but since they could take it with them, they would fill it out later. They were eager to participate in the survey. Many stated they remembered when they had to complete research for their thesis and wanted to help with this project.

These are the field notes for the three parks; Arbor Hills Nature Preserve, Hot Springs National Park, and Tyler State Park. These were all taken on the weekends between 6:30 a.m. and 7:00 p.m. in the months of late July, August and early September. Weather conditions varied slightly from location to location, ranging from light rain and temperature in the eighties to party cloudy to clear skies with the temperature over one hundred degrees. Field notes and photographs were taken at the trailheads and along the trails. The trail users were talkative and interested in my research. They asked questions about the research, The University of Texas at Arlington, and whether the park management would be receiving a copy of the comments. They stated they hoped the park management would take their comments seriously and make changes to the trail system.

Fig. A.1 Arbor Hills Nature Preserve – Cloudy and rainy weather

The weather conditions varied from raining and cool to very hot when visiting the parks. The morning started with rain when visiting Arbor Hills Nature Preserve. They were launching a hot-air balloon from the parking area. There was no breeze, so the balloon went up easily. There were people out that morning enjoying the cool rain as they exercised around the trail system. Then the sun came out and the humidity and the temperature began to rise. The number of people out on the trails dropped as it got later in the afternoon. The ones that were left in the park were under shade where they could find it.

Fig. A.2 Hot Springs National Park – Clear and hot weather

The weather in Hot Springs, Arkansas was sunny and very hot. The process of handing out surveys started early in the morning when most people are hiking. Many people were first time visitors to the park. Giving directions to the different trails in the park was a good way to strike up a conversation about the surveys. It got hot very early in the morning, and some people were not going to hike as far that day as they thought they would due to the heat. The later it got in the day fewer people were out because it was 104 degrees by 2:00 p.m. Even the park ranger came by from time to time making sure there was plenty of water to drink. Most of the people hiking in Hot Springs were families with children, which was not the case in the other parks.

The weather in Tyler, Texas, at the state park was warm but bearable. The breeze and the shade from the trees in the trail areas provided a nice temperature for the hiker to enjoy the hike and the scenery. The Tyler State Park has trails that are for hikers only and trails that can be used by both hikers and bikers.

Fig. A.3 Tyler State Park – Biker on Trail

Looking at the trail map, hikers go counterclockwise and the bikers go clockwise on the loop trails. This helps the two groups know that they are sharing the trail and reduces the number of collisions; unfortunately, not everyone was following these guidelines. At several locations, when hiking the trail later in the day, the trail was shared with the hikers and bikers. There was no problem with them on the trail at the same time because bikers come toward the hikers, so seeing them or hearing them was not a problem. If they had come up behind, by going the same direction on the trail, it would be much harder to hear them and there would be more accidents with bikers. The bikers said they have no problem sharing the trail with the hikers, if they go the right

direction. The Tyler State Park is one of the best places for the mountain bikers to ride in Texas, which was expressed by several bikers that came from other parts of Texas. Several of them did both the hiking and the biking. Some of the hiking groups on the trails in Tyler numbered as many as ten people, which was different than in the other parks. Most of the groups in the other parks were of two or three people.

One hiker came back to the trailhead parking area to eat his lunch. He went over to his car, removed his lunch bag and drink, and came across the parking lot to the picnic bench in the parking area.

Fig. A.4 Tyler State Park – Picnic bench in parking area

This picnic bench was only protected from the automobiles by concrete blocks around it and it had zero shade. He sat down and began eating. He stayed there only about three minutes. He gathered up his lunch and went back and sat in his car to finish. He was burning up sitting out in the sun. The picnic bench was not used by anyone else the whole weekend. Several people mentioned the need for more shade at the trailhead.

While waiting in the parking area to hand out surveys, the opportunity to talk with several of the different users of the hiking trails presented itself. There were users hiking, jogging, biking, and walking/hiking with their dog, and one person was going on the trail with a unicycle.

Fig. A.5 Tyler State Park – Unicycle going to the trail

This was one of the most difficult things I had seen. After hiking these trails, experiencing some of the sections that are steep and rough, using a unicycle on the trails takes a tremendous amount of skill. When talking with him about the unicycle, he said he had been riding the trails for three years. He was extremely skilled. The trail users that do both hiking and biking enjoy both, but say going on foot gives the person the greatest opportunity to enjoy the many small things in nature that you would miss at 30 M.P.H. on a bicycle.

APPENDIX B

ANSWER KEYS FOR SURVEYS

Table B.1 Demographic Survey, Page 1, Answer Key

Questionnaire: Trails in Parks

SURVEY ANSWER KEY

1 How many times a year do you hike on trails?
- a ☐ Less than 2 times
- b ☐ 2 to 5 times
- c ☐ 6 to 10 times
- d ☐ 11 to 20 times
- e ☐ 21 or more times

2 The trail you hiked today, how many times have you hiked it before?
- a ☐ Less than 2 times
- b ☐ 2 to 5 times
- c ☐ 6 to 10 times
- d ☐ 11 to 20 times
- e ☐ 21 or more times

3 What is your age? **MUST BE AT LEAST 18 YEARS OLD**
- a ☐ 18 - 20
- b ☐ 20 - 29
- c ☐ 30 - 39
- d ☐ 40 - 49
- e ☐ 50 - 59
- f ☐ 60 or more

4 Which one of the following best describes your race or ethnic origin?
- a ☐ Hispanic/Mexican American
- b ☐ Black/ African American
- c ☐ White/ Anglo
- d ☐ Asian
- e ☐ Other (please describe)_____

5 What is your sex?
- a ☐ Male
- b ☐ Female

6 If there are children living at home, do you bring them on the hikes?
- a ☐ Yes
- b ☐ No

7 Which of the following best describes your household?
- a ☐ Live alone
- b ☐ Single parent with children
- c ☐ Couple
- d ☐ Couple with children
- e ☐ Multi-family
- f ☐ Other (please describe) _____

8 What was the last level of school completed?
- a ☐ High school diploma
- b ☐ Junior college or partial college
- c ☐ Technical college or business school diploma
- d ☐ Bachelors degree
- e ☐ Masters degree
- f ☐ Ph.D.

9 Adding all income of your household, which of the following categories best describes your 2006 gross income total?
- a ☐ under $20,000
- b ☐ $20,000 to $39,999
- c ☐ $40,000 to $59,999
- d ☐ $60,000 to $79,999
- e ☐ $80,000 to $99,999
- f ☐ $100,000 to $124,999
- g ☐ $125,000 and up

Table B.2 Demographic Survey, Page 2, Answer Key

10 Do you have any disabilities? (If no, please go to question #13)

a ☐ Yes

b ☐ No

11 If you have a disability, are you able to enjoy the trail. (If no, please answer the next question.)

a ☐ Yes

b ☐ No

12 What would you like to see changed to the trail, to make it a better experience?

ANSWERED IN THE OPEN-ENDED QUESTION SECTION

13 Have you hiked on better trails in this park or another park?

a ☐ Yes

b ☐ No

14 What would you like to see added to the trail, to make it a better experience?

ANSWERED IN THE OPEN-ENDED QUESTION SECTION

15 Is there anything you wish to comment on, that was not addressed previously?
Please, comment below concerning improvements to the trail systems in the park.

ANSWERED IN THE OPEN-ENDED QUESTION SECTION

Table B.3 Trail Survey, Page 1, Answer Key

Questionnaire : Trails in Parks

SURVEY ANSWER KEY

RESEARCH # :_____

	Statements	Please circle the number that describes how you agree or disagree with the statement.					Please circle the number that describes the relative importance of the statement to you.					
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Not Important	>>>>>>>>>>>>>>>				Very Important
1	I hike in regional/ county parks.	-2	-1	0	+1	+2	0	1	2	3	4	5
2	I hike in state parks.	-2	-1	0	+1	+2	0	1	2	3	4	5
3	I hike in national parks.	-2	-1	0	+1	+2	0	1	2	3	4	5
4	I prefer concrete surfaced trails. (Improved Trails)	-2	-1	0	+1	+2	0	1	2	3	4	5
5	I prefer natural soil trails. (Semi-Improved trails)	-2	-1	0	+1	+2	0	1	2	3	4	5
6	I prefer decomposed granite trails. (Semi-Improved trails)	-2	-1	0	+1	+2	0	1	2	3	4	5
7	I prefer wood chip trails. (Semi-Improved trails)	-2	-1	0	+1	+2	0	1	2	3	4	5
8	I prefer going into the backcountry (Unimproved Trails)	-2	-1	0	+1	+2	0	1	2	3	4	5
9	There are adequate written descriptions about this trail in books and pamphlets for this park.	-2	-1	0	+1	+2	0	1	2	3	4	5
10	Advertising describing the trails attracted me to this park.	-2	-1	0	+1	+2	0	1	2	3	4	5
11	The trails are why I come to this park.	-2	-1	0	+1	+2	0	1	2	3	4	5
12	I hike in order to view the scenery and vegetation.	-2	-1	0	+1	+2	0	1	2	3	4	5
13	I hike to improve my health.	-2	-1	0	+1	+2	0	1	2	3	4	5
14	My stress level is reduced by hiking on the trails.	-2	-1	0	+1	+2	0	1	2	3	4	5
15	Hiking on the trails makes me feel better (In general- REFRESHED) during the week after hiking.	-2	-1	0	+1	+2	0	1	2	3	4	5
16	I hike in order to view the wildlife.	-2	-1	0	+1	+2	0	1	2	3	4	5
17	Advertising (books, pamphlets, TV ads) of the trails in other parks compels me to visit other parks.	-2	-1	0	+1	+2	0	1	2	3	4	5
18	There are enough informational signs along this trail.	-2	-1	0	+1	+2	0	1	2	3	4	5
19	Hiking is not the primary reason for coming to this park.	-2	-1	0	+1	+2	0	1	2	3	4	5
20	The trailheads are accessible to nearby parking.	-2	-1	0	+1	+2	0	1	2	3	4	5
21	There is adequate parking at the trailhead.	-2	-1	0	+1	+2	0	1	2	3	4	5

Table B.4 Trail Survey, Page 2, Answer Key

RESEARCH # :_____		Please circle the number that describes how you agree or disagree with the statement.					Please circle the number that describes the relative importance of the statement to you.					
	Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Not Important	>>>>>>>>>>>>>>>				Very Important
22	There is enough signage in the park to the trailheads.	-2	-1	0	+1	+2	0	1	2	3	4	5
23	There is enough signage along the trails ("YOU ARE HERE" signs).	-2	-1	0	+1	+2	0	1	2	3	4	5
24	I pick up litter along the trail when I see it.	-2	-1	0	+1	+2	0	1	2	3	4	5
25	I feel safe hiking the trails.	-2	-1	0	+1	+2	0	1	2	3	4	5
26	There are adequate amenities at the trailhead and/or along the trail (such as benches, drinking water, restrooms, shade).	-2	-1	0	+1	+2	0	1	2	3	4	5
27	Landscaping by the trailhead parking areas is adequately maintained.	-2	-1	0	+1	+2	0	1	2	3	4	5
28	The existing restroom facilities in conjunction with the trails are adequate.	-2	-1	0	+1	+2	0	1	2	3	4	5
29	I would like to see more picnic areas in the park.	-2	-1	0	+1	+2	0	1	2	3	4	5
30	I prefer trails one to three miles long.	-2	-1	0	+1	+2	0	1	2	3	4	5
31	I prefer trails three to six miles long.	-2	-1	0	+1	+2	0	1	2	3	4	5
32	I would like to see more trailheads with parking areas.	-2	-1	0	+1	+2	0	1	2	3	4	5
33	I would like to see more written information in the form of pamphlets about the trails.	-2	-1	0	+1	+2	0	1	2	3	4	5
34	I would like to see more signage along the trails describing the vegetation and wildlife.	-2	-1	0	+1	+2	0	1	2	3	4	5
35	The vegetation along the trails is maintained adequately.	-2	-1	0	+1	+2	0	1	2	3	4	5
36	The trail surface is adequately maintained.	-2	-1	0	+1	+2	0	1	2	3	4	5
37	There are enough resting places along the trails.	-2	-1	0	+1	+2	0	1	2	3	4	5
38	I would like to see more trails in the park.	-2	-1	0	+1	+2	0	1	2	3	4	5
39	I would like to see the existing trails improved.	-2	-1	0	+1	+2	0	1	2	3	4	5
40	I have been on other trails that are better.	-2	-1	0	+1	+2	0	1	2	3	4	5
41	I hike in all kinds of weather.	-2	-1	0	+1	+2	0	1	2	3	4	5
42	I hike alone.	-2	-1	0	+1	+2	0	1	2	3	4	5

APPENDIX C

HOT SPRINGS NATIONAL PARK DATA

Table C.1 Hot Springs National Park, Demographic Data

DATA SHEETS FROM SURVEYS

Hot Springs National Park | **Demographic survey - 'WHO IS USING THE HIKING TRAILS?**

SURVEY NUMBER

Question #	2	4	7	16	21	22	23	25	26	27	30	40	42	49	50	54	55	56	65	67	70	91	93	94	95	96	97
1	e	b	e	d	b	b	b	e	e	c	d	b	b	b	b	b	b	a	c	e	e	b	b	c	b	b	a
2	e	a	e	c	a	a	b	e	e	e	a	a	b	a	a	a	a	a	c	a	a	b	b	e	a	a	a
3	e	d	f	f	d	d	d	e	f	d	b	d	b	e	e	d	d	d	e	b	c	d	d	c	e	b	c
4	a	b	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	b	c	c	c	c	c	c	b	d	a
5	b	b	a	a	b	a	b	a	b	b	a	b	b	a	a	a	b	b	b	a	b	b	a	a	a	b	a
6	b	b	b	a	b	a	b	x	x	a	a	b	x	b	b	a	a	a	b	b	x	b	a	a	a	b	a
7	c	c	a	c	c	d	d	c	c	f	d	c	a	c	c	d	d	b	d	f	a	c	c	d	a	a	d
8	c	c	a	f	e	d	d	d	d	d	b	d	c	d	a	d	a	c	e	a	d	a	a	e	a	d	d
9	c	f	f	e	e	e	d	e	e	b	b	f	b	d	d	g	x	b	g	b	a	c	c	f	c	e	e
10	b	b	b	b	b	b	b	b	b	a	b	b	b	b	b	b	x	b	b	b	b	b	b	b	b	b	b
11	x	x	x	x	x	x	x	x	x	a	x	x	x	x	x	b	x	x	x	x	x	x	x	x	x	a	x
12	a	a	x	a	x	x	x	x	a	a	a	x	x	x	x	a	b	a	x	x	a	x	x	x	a	x	x
13	b	b	b	x	b	b	b	b	a	b	a	a	b	a	a	b	x	x	a	a	a	b	b	b	a	x	a
14	a	x	a	x	a	x	x	x	x	a	a	x	x	a	x	x	x	a	x	a	a	x	x	x	a	x	x
15	a	x	x	a	a	x	x	x	a	a	a	x	x	x	x	x	x	x	x	x	a	x	x	x	x	x	x

Table C.2 Hot Springs National Park, Trail Data (Agree/Disagree)

DATA SHEETS FROM SURVEYS																											
Hot Springs National Park									AGREE OR DISAGREE WITH STATEMENT																		
SURVEY NUMBER																											
Question #	2	4	7	16	21	22	23	25	26	27	30	40	42	49	50	54	55	56	65	67	70	91	93	94	95	96	97
1	0	+1	0	+1	+1	0	-1	0	0	0	+2	+1	+1	+1	+1	+1	0	+1	+1	+1	+1	+1	-1	+1	+1	-1	+1
2	0	+1	0	+1	+1	+1	-1	-1	+1	0	+2	+1	+1	+2	+2	+1	0	+1	+1	+1	+1	+1	+1	+1	+1	+2	-1
3	0	+1	0	+1	+1	+1	-1	+2	-1	0	+2	+1	+1	+2	+2	+1	0	+1	0	+1	+1	+1	+1	+1	+2	+2	0
4	-1	+1	+1	-2	0	+1	-1	0	0	+1	+2	+1	0	-1	-1	-1	+1	0	-1	-2	0	+1	+1	+1	+1	0	0
5	+1	0	+2	+1	+1	0	+1	+2	0	+1	0	0	+1	+1	-2	+1	-1	0	+1	+1	+1	0	-1	+2	+1	0	+2
6	-1	-1	+1	+1	0	0	0	0	+1	+1	+1	+1	+1	0	+2	-1	-1	-2	0	+1	+1	0	+1	0	0	0	0
7	-1	-1	+1	+1	+1	-1	+1	+2	-1	0	+1	-1	-1	+1	+1	-1	-1	-2	+1	+1	0	-1	-1	0	-1	0	0
8	0	-1	-1	0	0	-2	-1	+2	-1	+1	0	-1	+1	0	0	0	-1	-1	+1	+2	0	-1	-1	0	0	0	+1
9	-2	0	+2	+2	0	+1	+1	+2	0	+2	0	+1	+1	0	0	+2	+1	+2	+1	0	0	+1	+1	+1	+2	+1	-1
10	0	-1	-2	0	-1	+1	+1	-2	-1	+1	-1	0	-1	-1	-1	0	+1	+2	0	0	+1	0	+1	+1	+1	0	0
11	+1	+1	+2	+1	+1	+2	0	-2	+1	+1	-1	-1	0	-1	-1	+2	+2	+2	0	+1	0	0	0	+1	+1	+2	+1
12	+1	+1	+1	+2	+1	+1	+1	+2	+1	+1	+1	+2	+2	+2	+2	+2	+2	+2	+1	+2	+1	+1	+1	+1	+1	+1	+1
13	+2	+2	+2	+2	+1	+2	+1	+2	+2	+1	+2	+1	+1	+2	+1	+2	+1	+2	+1	+1	+1	0	+1	+1	+2	0	+1
14	+2	+2	+2	+2	+1	+2	+1	+1	+1	+2	+2	+1	+1	+2	0	+2	+1	+2	+1	+1	+2	+1	+1	+1	+1	+1	+2
15	+2	+2	+2	+2	+1	+2	+1	+1	+1	+2	+2	+1	+1	+1	+1	+2	-1	+2	+1	+2	+2	0	+1	+1	+2	+1	+1
16	+2	+1	+1	+2	+1	+1	0	0	+1	+1	+2	+1	+1	0	-1	+2	+1	+2	+1	+2	+1	0	-1	0	0	0	+1
17	+2	+1	-2	+1	0	0	0	0	-1	+1	+1	+1	+1	+2	+1	+1	-1	+2	0	0	+1	+1	+1	+1	+2	+1	+2
18	-1	+1	+2	0	0	+1	+1	+2	-1	+1	+1	+1	+1	-1	-1	+2	+1	+1	+1	0	0	+1	+1	+1	+1	+1	+2
19	-2	0	0	-1	0	+1	0	+1	+1	+2	+2	+1	+1	+2	+2	-1	-1	+1	+1	+2	0	+1	+1	+1	+1	+2	0
20	+1	+1	+2	-1	+1	0	+1	+2	+2	+2	+1	+1	0	+1	+1	+2	+2	+2	+1	0	+1	+1	+1	+1	+2	+2	+2
21	+1	+1	+2	0	0	0	0	+2	+1	+2	+2	+1	0	+1	+1	+2	+2	+2	+1	0	+1	-1	+1	0	+2	+2	+2
22	-1	+1	+2	+1	0	+1	+1	+2	0	+1	+1	+1	+1	-1	-1	+2	+1	+2	+1	-1	0	+1	+1	+1	+1	+1	+1
23	-1	+2	+2	+1	0	+1	+1	+2	0	+1	0	+1	0	0	0	+1	+1	+2	+1	-1	0	+1	0	+1	+2	+1	+1
24	+1	+2	-2	+2	0	0	0	-1	+1	+2	+2	+1	+1	0	-1	+1	+1	+1	-1	+1	+1	+1	-1	+1	+2	-2	+2
25	0	+2	+2	+1	+1	+1	+1	+2	+1	+1	+2	+1	+1	+1	+1	+2	+1	+1	0	+2	+1	+1	+1	+1	+2	+1	+2
26	-1	+2	+1	+2	-1	+1	+1	-1	+1	+1	+2	+2	+2	+1	+1	+2	+1	+1	+2	+1	+1	+1	+1	+1	+2	0	0
27	-1	+2	+2	+2	+1	+1	+1	+2	+2	+2	+2	+2	+2	+1	+1	+2	+2	+2	+1	+1	+1	+1	+1	+1	+2	+1	+1
28	+1	+2	+2	0	-1	+1	+1	-1	+1	+1	+2	+1	+1	+1	+1	0	+2	0	+2	+1	+1	-1	-1	0	+1	0	+1
29	0	+2	0	0	-2	0	0	-1	0	0	0	+1	0	0	0	-1	-1	0	+1	0	0	0	+1	+1	+2	0	0
30	-1	+1	+2	+2	+1	+1	+1	+1	+2	0	+2	+2	+2	+2	+2	+2	+2	0	+2	+1	+1	+1	0	+1	+1	+1	0
31	+1	+2	0	+1	-1	+1	0	-1	-2	0	+1	+1	0	+1	0	0	-1	0	0	+2	+1	0	0	+1	0	+1	+2
32	+1	+1	0	0	0	+2	0	-1	0	0	0	0	+1	0	0	0	-1	+1	+1	0	0	+1	0	+1	0	+2	0
33	+1	+2	+1	0	-1	0	-1	-2	+1	0	0	0	-1	+1	+1	0	-1	+2	0	0	0	+1	0	+1	0	+2	+1
34	+2	+1	+2	+1	+1	0	-1	+2	+2	0	+1	0	+1	0	-1	0	+2	+2	0	-2	0	0	+1	+1	0	+1	+1
35	+1	+1	+1	+2	+1	+1	+1	+2	+1	+1	+1	+1	+2	0	0	-1	+2	+2	+1	+1	+1	+1	+1	+1	+2	+2	+1
36	+1	+2	+1	+2	+1	0	+1	+1	+2	+1	+2	+2	+2	+1	+1	+1	+2	+2	+2	+1	+1	+1	+1	+1	+2	+2	+1
37	+1	+2	+2	+2	-1	+1	+1	+1	+1	+2	+2	+2	+2	0	0	+1	+2	0	+2	+1	+1	+1	0	+1	+2	+1	-1
38	+1	+1	0	-1	0	0	0	-1	0	+1	+1	0	0	-1	0	-1	-1	0	+1	+2	+1	0	0	+1	0	0	+1
39	+1	+1	+1	0	0	0	-1	-1	0	0	0	0	-2	0	-1	-1	-1	0	-1	-1	0	0	0	+1	0	-1	0
40	0	0	-2	0	0	0	0	-1	+1	0	+2	+1	-1	+2	+2	-1	-1	0	+1	+2	0	-1	-1	-1	+1	0	0
41	-2	+1	+2	+1	+1	+1	-1	+1	-1	+1	+2	+1	+1	-1	-1	-1	-1	-2	+1	+1	+1	-1	-1	-1	0	-1	+1
42	+1	0	-2	+1	-1	-1	-1	-2	-2	0	-1	-1	-2	+1	-2	0	-2	+1	0	-1	+1	-1	-1	-1	-1	-2	-1

Table C.3 Hot Springs National Park, Trail Data (Importance of Statement)

DATA SHEETS FROM SURVEYS

Hot Springs National Park | **Importance of statement surveys**

	SURVEY NUMBER																										
Question #	2	4	7	16	21	22	23	25	26	27	30	40	42	49	50	54	55	56	65	67	70	91	93	94	95	96	97
1	3	4	0	5	3	3	1	4	2	2	4	3	1	3	2	3	3	4	4	3	4	3	4	4	4	0	3
2	3	4	0	5	4	3	1	5	2	2	5	3	2	5	3	3	2	5	4	3	4	3	4	3	4	0	2
3	3	4	0	4	4	4	2	2	1	2	5	3	2	5	3	4	3	2	2	3	4	3	4	3	5	0	3
4	1	4	0	1	1	4	2	1	3	3	4	3	1	1	1	4	5	5	2	4	3	3	4	4	4	0	3
5	3	0	1	4	4	2	2	4	2	3	4	1	2	3	0	4	3	5	4	4	3	2	4	4	3	0	3
6	1	0	0	3	1	2	2	1	3	2	4	2	1	1	5	4	4	2	2	4	3	2	1	4	3	0	0
7	1	0	0	4	4	4	2	4	2	2	5	1	3	2	3	4	4	1	4	4	3	1	1	4	2	0	0
8	3	1	0	3	1	4	1	4	1	2	3	1	1	0	0	4	4	1	4	5	3	0	1	4	0	0	1
9	4	4	2	5	0	3	3	5	4	3	4	3	4	4	4	4	4	1	4	0	2	4	4	3	5	4	1
10	4	4	2	4	0	3	3	4	1	3	4	1	3	3	3	2	4	1	2	0	3	5	4	3	4	1	0
11	4	5	5	4	3	4	2	4	4	3	4	0	1	2	2	4	5	5	2	4	2	4	4	3	4	1	3
12	4	4	5	5	4	4	2	5	4	3	4	4	2	5	4	4	5	5	4	5	4	3	4	2	5	4	2
13	5	5	5	4	4	4	2	5	5	3	5	3	3	5	4	4	4	5	4	3	4	3	4	2	5	1	4
14	5	5	5	4	4	5	3	4	5	5	4	4	2	4	1	4	4	5	4	3	5	3	4	2	4	1	3
15	5	5	5	4	4	5	3	5	5	5	4	4	2	4	3	4	3	5	4	5	5	4	4	2	5	1	1
16	4	3	4	5	4	3	2	3	4	3	4	4	3	2	1	4	4	5	4	5	4	3	4	2	0	0	1
17	4	5	0	3	0	3	2	3	1	3	4	4	2	5	3	4	2	5	2	0	3	5	4	3	5	3	2
18	4	5	5	3	0	4	3	5	4	3	3	4	2	4	4	4	4	4	4	0	3	4	4	3	4	4	3
19	4	3	2	4	0	3	3	4	3	3	5	4	3	5	5	4	4	2	4	4	3	4	4	3	4	0	0
20	4	5	5	4	0	4	2	5	5	4	5	4	2	5	5	4	4	3	4	0	3	4	5	3	5	5	3
21	4	5	5	4	0	3	3	5	5	4	5	4	1	4	4	4	4	3	4	0	3	5	5	3	5	5	1
22	3	4	4	4	0	4	1	5	1	4	5	4	1	5	4	5	4	5	3	2	3	5	5	4	4	3	3
23	3	5	5	3	0	4	3	5	1	4	3	4	2	4	4	3	4	5	3	0	4	5	5	4	5	4	3
24	4	5	0	5	0	3	1	5	4	5	5	4	4	3	2	3	4	5	1	4	4	3	5	3	5	0	5
25	3	5	5	5	3	5	1	4	5	5	5	4	4	5	5	5	4	5	1	5	5	5	5	5	5	5	3
26	1	5	4	5	2	3	3	5	4	4	5	5	4	4	4	5	4	5	5	3	5	5	5	4	5	3	5
27	1	5	5	4	1	3	3	5	5	5	5	5	4	3	3	5	5	5	4	3	3	5	5	3	5	3	3
28	1	5	5	4	2	3	3	4	5	4	5	4	4	4	4	0	5	5	5	3	4	5	5	4	4	3	4
29	1	5	5	4	0	2	1	3	1	3	3	4	3	2	2	3	1	1	4	0	3	4	4	4	5	0	0
30	1	2	0	5	1	4	2	4	4	2	3	5	3	5	4	3	5	2	5	4	4	3	3	4	4	0	3
31	4	5	0	4	3	3	1	2	0	2	2	4	3	4	3	2	1	2	3	4	4	3	3	4	0	0	3
32	4	4	1	3	0	4	1	1	3	2	2	2	4	3	1	2	1	4	4	0	3	4	4	4	0	4	0
33	3	5	4	3	0	3	0	1	4	2	0	0	2	4	3	2	1	4	2	0	3	4	4	4	0	2	3
34	5	4	5	4	1	3	0	5	5	2	2	0	3	3	1	2	5	4	3	4	3	3	4	3	0	2	3
35	1	4	5	4	1	4	2	5	5	2	4	4	4	3	3	1	5	2	4	3	4	4	4	4	5	3	1
36	4	5	5	5	1	3	3	5	5	3	3	5	4	4	5	4	5	1	5	4	4	5	5	4	5	3	1
37	3	5	5	5	1	4	3	4	4	3	5	5	3	2	1	4	5	3	4	1	4	5	3	4	5	3	2
38	3	4	3	3	0	2	2	3	1	3	3	0	3	1	1	3	1	5	4	5	4	3	3	4	0	0	3
39	4	4	5	2	0	4	1	3	1	3	0	0	3	1	1	3	4	5	5	4	3	4	3	4	0	0	0
40	3	3	5	3	0	3	0	2	2	3	5	3	1	2	4	3	1	5	4	1	3	4	5	2	2	0	0
41	4	4	5	4	1	3	0	4	1	4	4	4	3	3	3	3	1	5	4	3	4	4	3	2	0	0	2
42	4	1	2	4	3	2	0	0	1	3	5	4	1	0	5	3	0	3	4	2	5	5	5	3	1	3	4

APPENDIX D

TYLER STATE PARK DATA

Table D.1 Tyler State Park, Demographic Data

DATA SHEETS FROM SURVEYS

Tyler State Park

Demographic survey - WHO IS USING THE HIKING TRAILS?

SURVEY NUMBER

Question #	4	5	7	8	10	12	14	15	16	17	19	21	22	23	24	25	28	35	39	40
1	d	b	d	c	c	c	c	c	d	d	d	d	e	e	d	c	e	c	e	b
2	c	d	d	a	b	c	b	b	c	b	b	b	e	e	a	a	b	a	b	a
3	d	e	c	c	d	c	d	c	c	c	c	d	b	c	d	d	e	e	d	d
4	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	a	c	c	c
5	a	a	a	b	a	a	a	b	a	a	b	a	a	b	b	a	b	b	b	b
6	a	a	x	x	x	x	x	x	a	a	x	x	a	a	x	b	x	b	x	b
7	d	d	c	a	c	c	c	c	d	d	a	c	c	c	c	d	c	d	a	a
8	d	f	d	a	d	e	d	d	e	d	d	d	a	b	f	d	b	e	f	a
9	x	f	d	b	e	e	e	c	e	d	c	d	f	f	g	g	d	g	g	d
10	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b
11	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
12	x	a	x	a	a	a	x	a	a	x	x	x	a	a	x	x	a	a	x	x
13	b	a	a	a	a	b	a	a	b	b	a	b	a	a	a	b	a	a	a	a
14	x	a	a	a	a	a	a	a	a	x	a	x	a	a	a	x	a	x	a	a
15	x	a	a	x	a	a	a	a	x	x	x	x	a	a	a	x	a	x	a	x

Question #	46	48	62	63	66	68	71	72	73	74	77	82	83	86	87	90	94	96	98	100
1	c	e	d	d	a	d	b	b	d	e	b	d	d	e	d	d	e	e	c	c
2	a	e	e	e	a	c	a	a	d	e	a	b	b	a	b	d	e	e	b	b
3	c	d	c	b	e	b	c	c	c	c	b	d	d	c	c	b	f	e	d	e
4	c	c	c	c	c	c	c	a	c	c	c	c	c	c	c	c	c	c	c	c
5	b	b	a	b	a	a	b	a	b	a	a	b	a	a	b	b	a	b	b	b
6	b	a	x	x	b	x	a	a	x	b	x	a	a	b	x	b	b	b	b	b
7	f	d	f	a	d	a	d	d	c	c	c	d	d	a	a	f	a	b	c	c
8	d	f	d	d	b	f	e	e	b	b	e	e	e	d	f	d	b	a	d	d
9	f	g	b	c	e	c	f	f	f	f	d	g	g	e	g	d	x	x	g	d
10	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b
11	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
12	a	x	a	a	x	x	a	a	x	a	a	x	x	a	a	x	x	a	a	x
13	a	a	a	b	b	a	a	a	a	a	a	a	a	a	a	a	b	b	x	a
14	x	a	a	x	x	x	a	a	a	a	a	a	a	a	a	x	x	x	x	x
15	x	a	a	x	x	x	a	a	a	a	a	x	x	a	x	x	a	a	x	x

Table D.2 Tyler State Park, Trail Data, Page 1, (Agree/Disagree)

DATA SHEETS FROM SURVEYS																														
Tyler State Park													AGREE OR DISAGREE WITH STATEMENT																	
SURVEY NUMBER																														
Question #	4	5	7	8	10	12	14	15	16	17	19	21	22	23	24	25	28	35	39	40	46	48	62	63	66	68	71	72	73	74
1	+1	+1	+1	0	+2	+2	+2	+1	0	+1	+1	0	+1	0	+1	+2	+1	+1	+1	+1	+2	+1	+1	+1	-2	+2	+1	+1	+1	+1
2	+1	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+1	+1	+2	+1	+1	+2	0	+2	+1	+1	+2	-2	+1	+1	+1	+1	+2
3	+1	0	+1	+1	+1	+1	0	+1	0	+1	+1	+2	+2	+1	+1	0	-2	-1	+1	-1	0	+2	+1	0	-2	+1	+1	+1	+1	+2
4	-2	-1	-2	-2	-1	0	-1	0	+1	-1	0	0	-2	-2	-2	-2	+2	+1	-1	-1	-2	-1	+1	-2	-2	-2	-1	-1	-1	-2
5	+2	+2	+2	+1	+2	+1	+1	+1	0	+1	+1	+1	+2	+2	+1	+2	0	0	+2	+1	+2	+2	-1	+2	+2	+2	+1	+1	+2	+2
6	+2	0	+1	0	+1	+1	+1	+1	+1	+2	+2	+2	+1	-1	+1	-1	0	+1	+1	+1	+1	+1	+1	+1	0	0	+1	0	0	-2
7	+2	0	-1	-2	-1	-1	-2	-2	-2	-2	-1	-1	+1	-1	+1	+1	+1	0	-1	-1	-2	+1	-2	-1	0	+1	0	+1	+1	-2
8	-1	+2	+1	+1	+1	+1	+1	+1	0	+1	-1	-2	+2	+2	+2	-1	-1	-1	+1	-2	+1	+1	-2	+1	0	+1	0	+2	+2	+2
9	+1	+1	-1	-2	-1	0	0	-1	0	0	0	0	+2	0	+1	-1	-1	-2	0	0	0	+1	+2	+1	+2	0	-1	0	+1	+1
10	-1	+1	+1	0	0	0	0	0	0	0	0	0	+2	0	-1	-1	-2	0	0	-1	0	0	+2	-1	+2	0	0	0	0	0
11	+2	+1	+2	+2	+1	+2	+1	+2	+2	+2	+2	+2	+2	+2	+1	-1	+2	+1	+2	+1	+1	+2	-1	+2	+1	+2	+1	+2	+2	+2
12	-1	+1	+2	+1	0	+1	-1	+2	+1	+1	+2	+2	0	+1	+1	+1	+1	+1	+2	+1	+2	+1	+2	-1	-2	+1	+2	+2	+2	+2
13	+2	+1	+2	+1	+1	+1	0	+1	+2	+1	+2	+2	+2	+2	+1	+2	+1	+1	+1	+2	+2	+2	+1	+1	-2	+1	+2	+1	+2	+2
14	+1	+1	+2	+2	+1	+1	+1	+2	+2	+2	+2	+1	+2	+1	+1	+1	+1	+1	+2	+2	+1	+2	+2	+1	-2	+2	+2	+2	+2	+2
15	+1	+1	+1	+2	0	+1	+2	+2	+2	+2	+2	+1	+2	+2	+1	+1	+1	+1	+2	+2	-1	+2	+2	+2	-2	0	+2	+1	+2	+2
16	-2	+1	+1	+1	+1	0	+1	+1	+1	+1	+2	+1	+2	+2	+1	0	0	0	+2	-1	-2	+2	+1	-1	-2	+1	+1	+1	+2	+2
17	+1	0	+2	+1	+1	+1	0	0	+1	+1	+1	0	0	-1	+1	-1	-1	+1	+1	+1	+1	+1	+1	+2	+2	0	0	0	0	+1
18	+1	-1	-1	-1	-1	-2	+1	0	-1	-2	-2	-1	+2	+2	-1	-1	-1	-2	-2	-1	-1	+1	+2	+1	-1	+1	-1	0	0	+1
19	-2	+1	-2	+2	+2	-2	-2	-2	-2	-2	-2	-2	0	0	-2	+1	-2	-2	-1	0	-2	+1	-1	-2	+2	+1	-1	-2	+2	+1
20	+2	+1	+1	+2	+1	+2	+2	+2	+2	+1	+1	+1	+2	+2	+1	+1	+1	0	+2	+2	+1	+2	+2	+2	+2	+1	+1	+1	+1	+2
21	+2	+1	-1	+2	+2	+2	+2	+2	+2	+1	+1	+1	+2	+2	+1	+1	+1	0	+2	+2	+1	+2	+2	+2	+1	+1	+1	0	0	+1
22	+1	+1	-1	-1	0	0	0	0	0	0	+1	+1	+1	+1	-1	-1	-1	-2	+1	+1	-1	+1	+2	-1	+1	+1	-1	0	-2	+1
23	+1	0	-2	-1	-1	-1	-1	-2	-2	-2	+2	-1	+1	-1	-1	-2	-1	-2	-2	+1	-2	+1	+1	+1	-1	0	-1	-1	0	-1
24	-1	+1	+1	+2	+2	+2	+2	+2	+2	+2	+2	+1	+2	+2	+1	+1	0	0	+1	0	-1	+2	+1	-1	0	-1	0	0	+2	+1
25	+1	+1	+1	+2	+2	+1	+2	+2	+1	+2	+1	+1	+2	+2	+1	+1	0	+1	+1	+1	+1	+2	+2	+1	0	0	+1	+1	+2	+1
26	-1	+1	-1	-2	-1	-1	-1	-2	-1	-1	-1	-1	0	0	0	-1	+1	+1	+2	+2	+1	+1	+2	-1	+1	0	+1	+2	0	+1
27	0	+1	+1	+1	+1	+2	+1	+1	+1	+1	+1	+1	+1	+1	+1	0	0	+1	+2	+1	+1	+1	+2	0	0	+1	0	0	-2	+1
28	+1	0	-1	-1	-1	+1	+1	+1	+1	+1	+1	+1	+1	+2	+1	0	+1	0	+2	+2	+1	+1	+1	+1	+2	+1	+1	+1	0	+1
29	0	0	-2	-2	-2	-1	-1	-1	-1	-1	0	0	0	0	0	-1	0	0	0	-1	0	0	-1	0	0	0	0	-1	+1	0
30	+1	+1	-1	+1	+1	+2	+1	+1	+1	+1	+2	+1	+2	+2	-1	+2	0	0	+1	+2	-1	+1	0	+1	-2	+1	+2	+1	+2	0
31	+1	+1	+2	0	+2	+1	+2	+2	+2	+2	+1	+2	+2	+1	+1	+1	+2	+1	+2	+2	+2	+1	+2	+2	-1	+2	+1	+2	+1	0
32	+1	+1	+1	+1	+1	+1	+1	+1	0	+1	+1	0	0	0	0	0	+1	+1	0	+2	0	0	+1	0	0	0	0	0	+1	-1
33	-1	+1	+2	0	0	0	0	+1	0	+1	0	+1	0	0	+1	+1	+1	+1	+1	-1	+1	0	+1	+1	0	0	+2	+1	0	0
34	-1	+1	+2	+1	+1	+1	0	0	+2	+2	+2	+1	0	-1	+1	+1	0	+1	+1	0	0	0	+2	0	0	0	+2	+1	+1	-1
35	0	+1	-1	-1	0	-1	-1	+1	0	-1	-1	+1	-1	-1	+1	0	0	+1	+2	0	+1	+1	+1	+1	+1	+1	+1	+1	-2	0
36	+1	+1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	0	+1	+1	+1	+1	+2	+1	+2	+1	+2	+1	-1	+1	+1	+1	-2	0
37	0	+1	-1	+2	0	0	-1	-1	0	0	0	-1	0	0	0	+1	+1	-1	-1	+1	-1	0	+1	0	-1	+1	+1	+2	-1	+1
38	-1	+1	+2	+2	+2	+2	+2	+1	-1	+1	+2	+1	+1	+1	+1	0	+2	-2	0	-1	-1	+1	+2	+2	+1	0	+1	+1	+1	+2
39	+1	+1	+1	+1	+1	+1	+1	+1	+2	+1	+1	+1	+2	+1	0	+1	+1	0	+1	0	-1	0	+1	-1	+1	+1	0	0	+1	-1
40	-1	+2	+2	0	+1	0	+2	0	+1	0	0	0	0	0	0	0	+2	-1	+1	0	+1	+1	+2	-1	0	+1	+1	+1	+1	+1
41	-1	+1	+1	+1	+1	+2	0	+2	0	0	0	+1	+1	+1	+1	-1	+2	-2	+1	-1	-1	+1	+1	-1	-2	+1	-1	-2	+1	+2
42	+1	0	-1	+2	-1	0	-1	+1	-1	-2	+2	+1	0	+1	-1	-2	0	-2	-1	-2	-2	+1	0	+1	-2	+1	-2	-2	0	0

Table D.3 Tyler State Park, Trail Data, Page 2, (Agree/Disagree)

DATA SHEETS FROM SURVEYS

Tyler State Park — **Importance of statement**

SURVEY NUMBER

Question #	4	5	7	8	10	12	14	15	16	17	19	21	22	23	24	25	28	35	39	40	46	48	62	63	66	68	71	72	73
1	x	4	5	4	4	5	5	4	2	4	4	3	4	3	4	4	4	4	0	3	3	4	4	0	0	5	4	3	4
2	x	5	5	5	4	5	5	5	4	5	5	5	5	4	4	4	4	4	0	3	3	5	4	0	0	4	4	4	4
3	x	5	3	4	3	4	3	4	3	4	4	5	5	4	4	2	4	1	1	2	3	5	3	0	0	2	4	4	4
4	x	0	4	5	5	3	4	3	4	4	4	3	5	0	0	4	2	4	1	3	5	2	4	4	0	5	3	2	0
5	x	5	5	5	5	4	4	3	3	4	4	4	5	5	2	4	4	3	5	3	5	4	4	4	0	5	4	4	5
6	x	2	3	4	4	4	4	4	4	4	5	5	4	1	2	2	3	4	3	3	4	2	4	4	0	0	4	3	3
7	x	2	4	5	3	3	5	4	5	5	2	3	4	1	2	3	3	0	2	3	4	2	4	4	0	5	3	4	4
8	x	5	4	4	4	3	3	4	3	4	2	0	5	5	4	3	3	0	2	4	4	3	4	4	0	4	2	5	4
9	x	3	5	5	3	3	3	3	3	4	3	3	5	3	3	3	5	5	2	3	3	4	5	3	0	3	3	4	3
10	x	3	4	3	3	3	3	3	3	3	1	3	5	2	1	2	3	3	0	3	3	3	3	2	0	0	2	3	3
11	x	4	5	4	4	4	4	5	5	5	5	5	5	5	4	2	5	4	4	4	4	5	5	5	0	5	4	5	5
12	x	4	5	3	3	3	3	5	4	4	5	5	4	3	4	3	3	4	5	4	5	4	4	2	0	4	5	5	5
13	x	4	5	3	4	4	3	4	5	4	5	4	5	5	4	5	3	4	4	5	5	5	4	2	0	5	4	4	5
14	x	4	5	4	4	4	3	5	5	5	5	4	5	3	3	4	3	4	5	5	4	5	5	2	0	4	5	5	5
15	x	4	4	4	4	4	4	5	5	5	5	4	5	4	3	4	3	4	5	5	3	5	5	2	0	0	5	4	5
16	x	4	3	4	3	3	3	4	4	4	5	4	4	5	4	3	3	3	5	4	2	5	3	0	0	2	3	4	5
17	x	3	4	4	4	4	3	3	4	4	3	3	4	0	4	2	3	4	3	4	4	3	4	4	0	0	2	3	3
18	x	3	4	4	5	5	3	3	4	5	5	4	4	4	3	2	5	0	5	4	4	4	5	3	0	2	2	4	3
19	x	4	3	5	5	5	5	5	5	5	5	5	4	1	2	3	5	3	0	4	4	3	4	0	0	4	3	1	5
20	x	4	4	3	4	5	5	4	5	4	4	4	5	5	0	3	4	3	4	4	4	5	5	3	0	1	4	4	3
21	x	4	4	3	5	5	5	4	5	4	4	4	5	4	1	3	4	3	3	4	5	5	5	3	0	1	4	3	3
22	x	4	4	4	3	3	3	3	3	3	3	4	4	4	3	3	4	5	3	4	4	4	5	3	0	2	3	3	5
23	x	3	5	5	4	4	4	5	5	5	5	4	3	0	4	2	4	5	5	4	4	4	4	4	0	0	3	2	3
24	x	4	4	5	5	5	5	5	5	5	5	4	5	5	4	3	4	3	3	3	4	5	4	1	0	1	3	4	5
25	x	4	4	5	5	5	5	5	4	5	4	4	4	5	4	4	4	4	4	4	5	5	5	5	0	2	4	4	5
26	x	4	5	5	4	5	4	4	4	4	4	4	3	0	0	3	4	4	3	4	5	3	5	3	0	0	4	3	3
27	x	4	3	4	4	4	4	4	4	4	4	3	5	4	3	3	2	4	3	4	4	4	4	0	0	0	2	2	5
28	x	3	5	4	4	4	4	4	4	4	4	3	4	5	1	3	4	3	4	5	5	4	3	3	0	1	3	4	3
29	x	3	4	4	4	3	3	3	3	3	3	3	1	2	0	2	2	3	2	3	3	3	3	1	0	0	2	2	3
30	x	4	4	4	4	5	4	4	4	4	5	4	4	5	1	4	4	3	3	4	3	4	4	2	0	2	4	4	3
31	x	4	5	3	5	4	5	5	5	5	4	5	4	3	3	3	5	4	3	4	5	4	5	2	0	5	4	5	3
32	x	4	4	4	4	3	4	3	3	4	4	3	2	3	2	2	4	4	2	4	3	3	3	3	0	0	3	3	4
33	x	4	4	1	2	3	3	3	3	4	2	3	2	3	2	3	4	4	3	5	4	3	5	3	0	0	5	4	2
34	x	4	5	4	3	4	3	3	4	5	5	4	1	1	1	4	3	4	4	3	2	3	5	0	0	2	5	4	4
35	x	4	5	3	2	4	4	4	4	4	4	4	5	5	3	2	4	4	4	3	5	4	4	4	0	1	4	4	4
36	x	4	5	3	4	4	4	4	3	4	4	4	5	5	2	4	5	4	4	4	5	4	5	4	0	3	4	4	4
37	x	4	4	3	3	3	3	3	3	3	3	3	2	5	0	3	4	4	3	4	4	3	4	1	0	0	4	4	3
38	x	4	5	5	5	5	5	3	3	4	4	3	4	4	2	3	5	4	1	4	4	5	5	4	0	0	4	5	4
39	x	4	4	4	4	4	4	4	4	4	4	4	5	5	0	2	4	3	3	3	4	3	3	3	0	2	3	2	4
40	x	5	4	3	3	3	4	3	3	3	3	3	2	3	0	3	5	4	2	3	3	4	3	1	0	2	3	4	3
41	x	4	4	4	4	5	3	4	3	3	3	4	3	4	3	1	5	0	2	4	3	4	3	0	0	2	4	0	3
42	x	3	4	4	4	3	5	4	5	5	4	4	2	4	4	4	3	0	4	5	4	4	4	0	0	1	3	0	3

Table D.4 Tyler State Park, Trail Data, Page 1, (Importance of Statement)

DATA SHEETS FROM SURVEYS

Tyler State Park — **Importance of statement**

SURVEY NUMBER

Question #	4	5	7	8	10	12	14	15	16	17	19	21	22	23	24	25	28	35	39	40	46	48	62	63	66	68	71	72	73
1	x	4	5	4	4	5	5	4	2	4	4	3	4	3	4	4	4	4	0	3	3	4	4	0	0	5	4	3	4
2	x	5	5	5	4	5	5	5	4	5	5	5	5	4	4	4	4	4	0	3	3	5	4	0	0	4	4	4	4
3	x	5	3	4	3	4	3	4	3	4	4	5	5	4	4	2	4	1	1	2	3	5	3	0	0	2	4	4	4
4	x	0	4	5	5	3	4	3	4	4	4	3	5	0	0	4	2	4	1	3	5	2	4	4	0	5	3	2	0
5	x	5	5	5	5	4	4	3	3	4	4	4	5	5	2	4	4	3	5	3	5	4	4	4	0	5	4	4	5
6	x	2	3	4	4	4	4	4	4	4	5	5	4	1	2	2	3	4	3	3	4	2	4	4	0	0	4	3	3
7	x	2	4	5	3	3	5	4	5	5	2	3	4	1	2	3	3	0	2	3	4	2	4	4	0	5	3	4	4
8	x	5	4	4	4	3	3	4	3	4	2	0	5	5	4	3	3	0	2	4	4	3	4	4	0	4	2	5	4
9	x	3	5	5	3	3	3	3	3	4	3	3	5	3	3	3	5	5	2	3	3	4	5	3	0	3	3	4	3
10	x	3	4	3	3	3	3	3	3	3	1	3	5	2	1	2	3	3	0	3	3	3	3	2	0	0	2	3	3
11	x	4	5	4	4	4	4	5	5	5	5	5	5	5	4	2	5	4	4	4	4	5	5	5	0	5	4	5	5
12	x	4	5	3	3	3	3	5	4	4	5	5	4	3	4	3	3	4	5	4	5	4	4	2	0	4	5	5	5
13	x	4	5	3	4	4	3	4	5	4	5	4	5	5	4	5	3	4	4	5	5	5	4	2	0	5	4	4	5
14	x	4	5	4	4	4	3	5	5	5	5	4	5	3	3	4	3	4	5	5	4	5	5	2	0	4	5	5	5
15	x	4	4	4	4	4	4	5	5	5	5	4	5	4	3	4	3	4	5	5	3	5	5	2	0	0	5	4	5
16	x	4	3	4	3	3	3	4	4	4	5	4	4	5	4	3	3	3	5	4	2	5	3	0	0	2	3	4	5
17	x	3	4	4	4	4	3	3	4	4	3	3	4	0	4	2	3	4	3	4	4	3	4	4	0	0	2	3	3
18	x	3	4	4	5	5	3	3	4	5	5	4	4	4	3	2	5	0	5	4	4	4	5	3	0	2	2	4	3
19	x	4	3	5	5	5	5	5	5	5	5	5	4	1	2	3	5	3	0	4	4	3	4	0	0	4	3	1	5
20	x	4	4	3	4	5	5	4	5	4	4	4	5	5	0	3	4	3	4	4	4	5	5	3	0	1	4	4	3
21	x	4	4	3	5	5	5	4	5	4	4	4	5	4	1	3	4	3	3	4	5	5	5	3	0	1	4	3	3
22	x	4	4	4	3	3	3	3	3	3	3	4	4	4	3	3	4	5	3	4	4	4	5	3	0	2	3	3	5
23	x	3	5	5	4	4	4	5	5	5	5	4	3	0	4	2	4	5	5	4	4	4	4	4	0	0	3	2	3
24	x	4	4	5	5	5	5	5	5	5	5	4	5	5	4	3	4	3	3	3	4	5	4	1	0	1	3	4	5
25	x	4	4	5	5	5	5	5	4	5	4	4	4	5	4	4	4	4	4	4	5	5	5	5	0	2	4	4	5
26	x	4	5	5	4	5	4	4	4	4	4	4	3	0	0	3	4	4	3	4	5	3	5	3	0	0	4	3	3
27	x	4	3	4	4	4	4	4	4	4	4	3	5	4	3	3	2	4	3	4	4	4	4	0	0	0	2	2	5
28	x	3	5	4	4	4	4	4	4	4	4	3	4	5	1	3	4	3	4	5	5	4	3	3	0	1	3	4	3
29	x	3	4	4	4	3	3	3	3	3	3	3	1	2	0	2	2	3	2	3	3	3	3	1	0	0	2	2	3
30	x	4	4	4	4	5	4	4	4	4	5	4	4	5	1	4	4	3	3	4	3	4	4	2	0	2	4	4	3
31	x	4	5	3	5	4	5	5	5	5	4	5	4	3	3	3	5	4	3	4	5	4	5	2	0	5	4	5	3
32	x	4	4	4	4	3	4	3	3	4	4	3	2	3	2	2	4	4	2	4	3	3	3	3	0	0	3	3	4
33	x	4	4	1	2	3	3	3	3	4	2	3	2	3	2	3	4	4	3	5	4	3	5	3	0	0	5	4	2
34	x	4	5	4	3	4	3	3	4	5	5	4	1	1	1	4	3	4	4	3	2	3	5	0	0	2	5	4	4
35	x	4	5	3	2	4	4	4	4	4	4	4	5	5	3	2	4	4	4	3	5	4	4	4	0	1	4	4	4
36	x	4	5	3	4	4	4	4	3	4	4	4	5	5	2	4	5	4	4	4	5	4	5	4	0	3	4	4	4
37	x	4	4	3	3	3	3	3	3	3	3	3	2	5	0	3	4	4	3	4	4	3	4	1	0	0	4	4	3
38	x	4	5	5	5	5	5	3	3	4	4	3	4	4	2	3	5	4	1	4	4	5	5	4	0	0	4	5	4
39	x	4	4	4	4	4	4	4	4	4	4	4	5	5	0	2	4	3	3	3	4	3	3	3	0	2	3	2	4
40	x	5	4	3	3	3	4	3	3	3	3	3	2	3	0	3	5	4	2	3	3	4	3	1	0	2	3	4	3
41	x	4	4	4	4	5	3	4	3	3	3	4	3	4	3	1	5	0	2	4	3	4	3	0	0	2	4	0	3
42	x	3	4	4	4	3	5	4	5	5	4	4	2	4	4	4	4	3	0	4	5	4	4	4	0	0	1	3	0	3

Table D.5 Tyler State Park, Trail Data, Page 2, (Importance of Statement)

DATA SHEETS FROM SURVEYS

Tyler State Park — **Importance of statement**

SURVEY NUMBER

Question #	74	77	82	83	86	87	90	94	96	98	100
1	5	1	2	4	0	x	1	0	4	4	2
2	5	2	2	5	0	x	5	5	4	3	5
3	5	3	0	5	0	x	3	0	0	3	5
4	0	5	2	1	3	x	5	5	3	3	4
5	5	5	4	0	3	x	5	1	5	3	5
6	0	5	4	1	3	x	3	1	1	3	5
7	0	5	4	3	3	x	3	2	4	3	1
8	3	5	1	2	4	x	3	3	5	3	4
9	2	2	4	3	1	x	5	2	5	5	4
10	0	2	0	0	0	x	5	1	1	4	4
11	5	4	5	5	1	x	5	2	3	5	5
12	4	3	5	4	4	x	5	2	3	4	5
13	5	4	4	5	4	x	5	5	5	5	4
14	5	4	4	5	4	x	5	5	5	4	5
15	5	4	4	4	3	x	5	3	5	3	5
16	4	2	3	2	0	x	5	3	2	3	5
17	3	1	2	4	0	x	4	2	2	4	5
18	1	2	4	3	4	x	5	2	4	4	4
19	3	3	4	3	0	x	2	2	4	3	5
20	2	2	4	3	0	x	5	4	5	3	4
21	2	2	4	2	0	x	5	5	5	4	4
22	2	0	4	4	0	4	5	3	5	3	4
23	2	0	4	2	4	2	5	2	4	3	5
24	4	3	2	2	4	4	1	5	5	3	5
25	3	4	4	4	2	5	3	5	5	2	5
26	2	1	2	4	3	3	5	5	5	4	5
27	1	1	2	4	0	0	4	5	5	4	4
28	1	2	4	5	2	3	4	5	5	4	4
29	1	1	1	4	2	1	1	4	4	3	3
30	2	4	4	4	0	4	3	3	4	4	4
31	2	4	4	4	0	4	4	4	4	3	5
32	0	4	1	5	0	2	3	3	1	3	4
33	2	2	4	4	0	2	3	2	3	3	4
34	0	2	2	4	2	1	3	3	3	3	5
35	1	3	2	4	2	2	3	5	4	4	4
36	0	4	5	4	3	4	4	5	4	4	5
37	3	1	4	3	1	3	3	4	3	4	4
38	5	4	4	5	2	2	5	5	4	4	5
39	4	1	4	4	2	1	3	5	4	3	4
40	4	4	4	4	2	3	4	3	3	3	4
41	5	3	4	4	0	3	5	5	5	4	4
42	1	3	0	1	0	3	5	2	3	5	5

APPENDIX E

ARBOR HILLS NATURE PRESERVE DATA

Table E.1 Arbor Hills Nature Preserve, Demographic Data

DATA SHEETS FROM SURVEYS

Arbor Hills Nature Preserve | **Demographic survey - WHO IS USING THE HIKING TRAILS?**

SURVEY NUMBER

Question #	3	5	6	7	8	11	17	21	24	26	28	34	35	36	37	38	41	42	43	44	46	47	50	51	52	53	58	59	60	62	63	64	66	71	73	74	75	79	81	82	83	84	85	86	87	89	90	91	92	95	96	97
1	e	e	e	e	e	e	c	e	e	c	d	e	e	e	e	e	e	e	e	e	e	e	e	e	c	c	d	e	e	d	d	e	c	e	e	e	e	c	d	d	e	e	d	d	e	e	c	e	e	e	e	e
2	e	d	e	b	e	d	c	e	c	b	b	e	e	e	e	e	e	e	e	e	e	e	e	e	a	a	c	e	b	d	d	c	c	e	e	e	e	d	c	d	e	e	c	b	d	d	a	e	e	e	e	e
3	f	d	e	e	f	c	e	d	d	c	b	f	f	c	c	f	e	c	b	e	e	d	d	d	f	f	f	c	e	c	c	c	c	d	c	f	d	d	c	c	d	d	d	d	c	d	e	c	c	b	d	c
4	c	e	c	c	c	c	c	a	c	c	c	d	d	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	c	a	a	e	c	c	c	c	c	c	c	d	c	c	a	c	c	c	c	c	c	c	c	c
5	a	b	a	b	b	b	a	a	a	b	a	a	b	b	b	a	a	b	a	b	b	a	b	a	b	a	a	a	b	b	a	b	b	b	a	a	a	a	b	b	b	a	a	b	a	b	b	b	b	b	a	b
6	b	b	x	b	b	x	x	b	b	b	b	b	b	a	a	b	a	x	b	b	b	a	a	x	x	b	b	a	x	a	x	x	a	b	a	b	a	a	a	a	x	x	a	a	a	a	x	a	b	a	x	x
7	c	c	c	c	c	a	c	d	a	d	a	c	c	b	d	b	d	c	c	d	a	d	c	c	c	c	c	d	c	c	c	c	d	d	d	a	b	d	d	d	c	c	d	d	d	c	c	b	a	d	c	c
8	d	b	d	d	c	d	e	d	e	d	c	f	f	d	e	e	e	d	d	b	b	d	e	d	b	d	c	d	d	a	b	f	d	b	e	d	e	d	e	f	e	e	d	a	d	a	d	d	d	d	e	f
9	g	b	g	g	g	d	d	g	g	g	b	e	e	c	g	d	g	f	e	e	e	g	g	g	c	c	g	f	g	c	c	g	f	g	g	e	g	g	f	x	g	g	f	b	g	g	g	c	d	c	e	e
10	x	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	x	b	b	b	x	b	b	b	b	b	b	b	b	b	b	b	b
11	x	x	x	x	x	x	x	x	x	x	x	b	b	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	a	x	x	x	x	x	x	x	x
12	x	a	x	x	x	a	x	a	a	x	x	x	x	x	x	x	a	x	a	x	x	x	a	x	a	x	a	x	a	x	a	x	x	a	a	x	x	a	a	x	x	x	a	x	a	a	a	a	x	x	x	x
13	a	a	a	a	a	a	a	a	a	a	a	a	a	x	b	a	a	b	a	a	b	b	b	b	a	a	x	a	a	a	b	a	x	b	a	a	a	b	a	a	a	a	a	b	b	b	a	a	b	a	a	a
14	x	a	a	a	x	a	a	a	x	a	a	x	x	x	x	a	x	a	a	a	x	a	a	x	a	a	x	a	x	a	a	a	x	x	a	a	a	a	a	x	a	a	a	x	x	a	a	a	a	a	a	a
15	x	a	x	x	x	a	x	a	a	x	a	x	x	x	x	a	x	a	x	a	x	x	x	a	a	x	x	a	x	a	x	a	x	a	a	x	a	x	x	x	a	x	x	x	x	x	a	x	x	a	a

Table E.2 Arbor Hills Nature Preserve, Trail Data, Page 1, (Agree/Disagree)

DATA SHEETS FROM SURVEYS																															
Arbor Hills Nature Preserve													AGREE OR DISAGREE WITH STATEMENT																		
SURVEY NUMBER																															
Question #	3	5	6	7	8	11	17	21	24	26	28	34	35	36	37	38	41	42	43	44	46	47	50	51	52	53	58	59	60	62	63
1	+2	+2	+1	+1	+1	+2	+1	+1	+1	+2	+1	+2	+1	0	+1	+1	+1	-1	+2	-1	+1	+2	+1	+1	+2	+1	+1	+2	0	+2	+1
2	+2	+1	+1	+1	+1	+1	+1	+1	+1	-1	+1	-2	-2	0	-1	+1	0	-1	+2	-1	+1	+2	+1	+1	+2	+1	+1	+1	-1	+1	0
3	+2	+1	+1	+1	+1	+1	+1	+1	+1	-1	-1	-2	-1	0	+2	0	0	0	0	+1	0	+2	+1	+1	+2	+1	+1	0	-1	+1	-1
4	-2	-1	0	0	0	-1	-1	0	-2	+2	-1	+2	+2	0	0	-1	-2	+2	+1	0	-1	0	+1	+1	-1	+1	-1	0	0	+2	-1
5	+2	+2	+1	+1	+1	+2	+1	+2	+2	0	+2	+1	+1	+1	0	+2	+2	+1	+1	0	+1	+1	+1	+1	+2	+1	+2	+1	+2	-1	+1
6	-2	+2	+1	0	+1	+1	0	-1	+1	0	-1	-1	-1	+1	0	+2	+2	0	+2	0	+1	0	+1	+2	-1	+1	+2	-1	0	-1	+1
7	x	+1	+1	0	+1	+1	0	-1	+2	-1	0	-1	-1	+1	0	+1	+2	0	0	0	0	0	+1	+1	+2	+1	0	+2	-1	+1	+1
8	+2	+1	+1	-1	0	+2	+2	0	+2	-1	+2	-2	-2	+1	0	+1	+2	-2	-1	-1	0	+1	0	+2	-1	-1	+1	+1	-1	-1	+1
9	x	+1	+1	0	0	+1	0	-2	+1	-1	0	-1	-1	0	-2	+1	+1	-1	-1	-1	0	+1	-1	+1	0	-1	-1	+1	+1	+2	+1
10	+1	-1	+1	-2	0	0	-1	-2	0	-2	-1	-1	-1	-1	-2	-2	0	-2	0	-1	-2	-2	-2	0	0	-1	-1	-2	-2	+2	-1
11	+2	+2	+1	+2	+1	+2	+1	+2	+2	+1	+1	+2	+2	+1	+2	+2	+2	+2	+2	+1	+1	+2	+2	+2	+2	+1	+1	+2	+2	+2	+2
12	+2	+2	+1	+2	+1	+1	+1	+1	+2	0	+1	+2	+2	+1	+2	+1	+2	+1	+2	+1	+2	+2	+2	+2	+2	+2	+1	+2	-1	+1	+2
13	+1	+2	+1	+2	+1	+1	+1	+1	+2	+1	+2	+2	+2	+1	+2	+2	+2	+2	+2	+1	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2	+2
14	+2	+2	+1	+2	+1	+1	+1	+2	+1	0	+2	+2	+2	+1	+2	+2	+2	+2	+2	+1	+2	+2	+2	+2	+2	+1	+1	+1	+2	+2	+2
15	+2	+2	+1	+2	+1	+1	+1	+2	+1	+1	+2	+2	+2	+1	+2	+2	+2	+2	+2	+1	+2	+2	+2	+2	+2	+1	+1	+1	+2	+2	+2
16	+2	+1	+1	+2	+1	0	0	+1	0	0	+2	0	0	+1	+1	+1	+2	+1	-1	+1	+2	+2	+2	+2	+2	0	0	+1	0	-1	+2
17	+1	+1	+1	+1	+1	+1	0	-2	0	-1	0	0	0	+1	-2	+2	+1	0	-2	0	+1	-2	+1	+1	+1	+1	0	-1	0	+1	+1
18	0	-1	0	0	0	0	0	+1	0	-2	-1	+1	+1	0	-2	+1	0	-1	-1	-1	0	+1	+2	+2	-2	-1	-1	-1	-2	+2	0
19	-2	-1	-1	-2	-2	-1	-1	+2	0	-1	+1	-2	-2	+1	+1	-2	0	-2	-2	+1	-2	+2	-2	-2	0	-1	-2	-1	-2	+2	0
20	+2	+1	+1	+1	0	+2	+2	+2	+2	+2	+1	+2	+2	+1	+2	+2	+1	+1	+2	+1	+2	+2	+1	+1	+2	+1	+1	+2	+1	+1	+1
21	+2	+1	+1	+1	0	+2	+2	+2	+1	+2	+2	+2	+2	+1	+2	+2	+2	+1	+2	+1	+2	+2	+2	+1	+2	+1	+1	+2	+1	+2	+1
22	+2	+1	+1	+1	0	0	+1	+1	+1	-1	0	+1	+1	+1	-1	+2	+1	0	-2	+1	+1	+2	+2	+2	-2	0	x	+1	-1	+1	+1
23	-1	-1	-1	-2	0	0	-1	-2	+1	-1	0	+1	+1	0	-1	+1	+2	-2	-2	-1	0	0	+2	+1	0	-1	x	0	-1	+2	+1
24	+1	+2	+1	0	+1	+1	+1	+2	+1	-1	-1	+1	+1	+1	+1	+2	+2	+1	+1	+1	-1	-2	0	0	0	+1	x	-1	-1	-1	+2
25	+2	+2	+1	+1	+1	+1	+1	+1	+2	+1	+2	0	0	+1	+1	+2	+2	+1	+2	+1	+2	+2	+2	+1	+2	+1	x	+1	+1	+2	+2
26	+2	+2	+1	+1	+1	+1	+1	-1	+2	-2	+2	+2	+2	0	+2	+2	+1	-2	-1	+1	+2	+1	+1	+2	+1	+1	x	+1	-2	-1	+1
27	+1	+2	+1	+2	+1	+1	+1	+1	+2	+1	+1	+1	+1	+1	+2	+2	-1	+1	+1	+1	+2	+1	+2	+2	+2	+1	x	+1	0	0	+1
28	+1	+1	+1	+1	+1	+2	0	+1	+2	0	0	+2	+2	+1	+1	+2	-1	-2	-2	+1	+2	0	+2	+1	+2	+1	x	+1	-2	-1	+1
29	-1	-2	-1	-1	0	0	0	+1	-1	0	-2	0	0	+1	-1	-2	+1	+1	-2	-1	-2	+2	-1	-2	-2	-1	x	0	0	+1	+1
30	0	+2	+1	+2	+1	0	+1	0	-2	0	-1	-1	-1	+1	0	+1	-1	+2	+2	0	+2	+2	+1	+1	+2	+1	x	+1	+2	+2	+1
31	+2	0	0	0	+1	+2	+1	+2	+2	+1	+2	0	0	+1	+1	0	+2	0	+2	+1	0	+2	+2	+1	-2	-1	x	+2	0	+2	+2
32	0	0	-1	-2	+1	+1	+1	0	+1	0	+1	0	0	+1	0	-2	-2	0	-1	0	-2	-1	0	-2	0	-1	x	0	0	+1	+1
33	+1	+1	0	-1	+1	0	0	0	+1	+1	-1	+1	+1	0	-1	-2	-2	0	-1	+1	+1	-1	-1	0	+1	+2	x	-1	-1	0	+2
34	+1	+1	+1	-1	0	0	+1	+1	-1	+1	-1	0	0	+1	+1	-2	+1	+1	-2	+1	+1	-1	-2	0	+1	+2	x	0	+1	0	+1
35	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	-1	+1	0	+1	+1	+2	+1	+1	+2	+1	x	+1	-1	-1	+1
36	+2	+1	+1	+1	+1	0	+1	+2	+1	+1	+1	+1	+1	+1	+1	+1	-2	-1	+2	+1	+1	+2	+1	+1	+2	+1	x	+1	+1	+1	+1
37	+2	+1	+1	+1	+1	0	+1	-1	0	-1	+1	0	0	0	-1	+2	-1	-1	+1	+1	+2	+2	-2	+1	+1	+1	x	+1	-2	-1	+1
38	-2	+1	+1	+2	0	+1	+1	+2	-1	+2	+1	0	0	+1	0	-2	+2	+1	+2	0	0	-2	+2	-2	0	0	x	0	+2	+2	+1
39	-2	0	-1	+2	0	0	0	0	-1	0	0	+1	+1	0	+1	+2	+2	0	-1	0	-1	-1	+1	-1	-1	0	x	+1	+2	0	0
40	+2	+1	+1	+2	0	+1	+1	+2	+1	+1	+1	0	0	+1	0	+1	+2	0	+1	+1	-1	+1	-1	0	-1	+1	x	+2	+2	-1	0
41	+2	+1	+1	+1	+1	+1	0	+2	+2	-1	+1	-1	-1	+1	+1	+1	+2	+1	+1	+1	+1	+2	-1	0	-1	+1	x	+2	+1	+2	-1
42	0	+2	-1	-2	-1	+1	-1	+2	-1	-1	+2	0	0	+1	-1	+1	+2	+1	+2	+1	+1	+1	+2	-1	-1	-1	x	0	-2	+2	+1

Table E.3 Arbor Hills Nature Preserve, Trail Data, Page 2, (Agree/Disagree)

DATA SHEETS FROM SURVEYS

Arbor Hills Nature Preserve | **AGREE OR DISAGREE WITH STATEMENT**

SURVEY NUMBER

Question #	64	66	71	73	74	75	79	81	82	83	84	85	86	87	89	90	91	92	95	96	97
1	+2	+1	+1	+2	+2	+1	-1	+1	0	+1	+1	+1	+1	+2	0	+1	+1	+1	-1	+1	+1
2	+1	0	0	+2	+1	+2	-1	+1	0	+1	-1	+1	+1	0	0	+1	+1	0	-1	+1	0
3	+2	-1	+1	0	+1	+2	-1	+1	0	+1	+1	+1	+1	0	0	+1	+1	-1	+2	+1	+1
4	-1	+1	+1	0	0	0	+1	-1	+1	-1	+1	+2	+2	-1	+2	+2	0	0	+1	0	0
5	+2	0	0	0	0	+2	0	+2	+1	+1	+1	+1	+2	+1	0	0	+1	+1	0	+1	+2
6	+1	0	0	0	0	+1	0	0	+1	0	0	+1	-1	0	0	0	+1	0	0	+1	0
7	+2	0	0	+2	0	+1	-1	-2	0	+1	0	+2	0	-1	0	0	0	-1	0	+1	0
8	+2	-1	+1	+2	+1	+1	-1	+1	-1	+1	0	0	0	+2	-2	-1	+1	0	0	+2	0
9	-1	0	0	+2	+2	-1	+1	0	+1	0	+2	+1	+1	-1	+1	-2	+1	-1	-2	-1	0
10	0	0	-1	0	-1	-2	0	-2	0	-1	-2	-1	+1	-1	0	0	+1	-1	0	-1	-1
11	+2	+1	+1	0	+2	+1	+2	+2	+2	+1	+2	+2	+2	+1	+2	+2	+1	0	+2	+1	+1
12	+2	+1	+1	0	+2	0	+1	+2	+1	+2	+2	+2	+1	+2	0	+1	+1	+1	+1	+1	+1
13	+2	+1	+1	+1	+2	+2	+2	+2	+2	+2	+2	+2	+1	+2	+2	+2	+1	+1	+2	+2	+1
14	+2	+1	+1	+1	+2	+2	+2	+2	+2	+1	+1	+2	+1	+2	+2	+2	+1	+1	+2	+2	+2
15	+2	+1	+1	+2	+2	+2	+1	+2	+2	+1	+1	+2	+1	+2	+2	+2	+2	+1	+1	+2	+2
16	+2	-1	+1	0	+1	+1	-1	+2	+2	+2	+1	+1	+1	+1	0	+1	+1	+1	-2	+1	+1
17	+2	0	0	0	0	+1	+1	-1	0	+1	+1	+1	+1	+1	0	0	+1	+1	0	+2	0
18	-2	+1	-1	+2	+1	-1	+1	-1	0	+1	+2	+1	+1	+1	-1	-2	+1	0	-1	-1	0
19	-2	-1	-1	0	-2	+1	+1	-2	-2	+1	-1	-1	-1	-1	-2	-2	-1	+1	-1	-1	-2
20	+2	+1	+1	0	+1	+1	+2	+2	+1	+1	+2	+1	+1	+2	+2	+2	+1	0	+2	+1	+2
21	+2	+1	+1	0	+2	+1	+2	+2	+2	+1	+2	+2	+1	+2	+2	+2	+1	0	+2	+1	+2
22	-1	+1	-1	0	+1	-1	0	-1	+1	+2	+2	+2	0	-1	0	-2	+1	0	-1	+1	0
23	-1	+1	-1	0	0	-2	-1	-1	-1	+1	+2	-1	0	-1	-1	-2	+1	-1	-2	-1	-1
24	0	-1	+1	+2	-1	+1	-1	+2	+2	0	-1	0	0	+2	-2	+1	+1	-1	0	+2	0
25	+2	+1	+1	+2	+1	+1	-1	+2	0	+2	+2	+1	+1	+1	+2	+2	+2	0	-1	+2	+1
26	-1	+1	+1	+2	+2	+1	+1	+1	+1	+1	+1	+1	-1	+1	+1	+2	0	-1	-1	0	+1
27	+2	+1	0	+2	0	+1	+1	+2	+2	+1	+1	+1	0	+2	+1	+2	+1	+1	+1	+1	0
28	+2	+1	-1	+2	+1	+1	0	+1	+1	+1	-1	+1	-1	+1	+1	0	0	+1	0	+1	0
29	-1	0	-1	0	-2	0	-2	0	-1	-1	-2	-1	+1	+1	0	+1	+1	+1	+1	-1	-1
30	-1	+1	0	-2	0	+1	+2	+2	+1	+1	+1	+1	+1	+1	-1	+2	+1	0	+2	0	+2
31	+2	0	+2	+2	+1	+2	-1	+1	+1	+1	0	+2	-1	+2	+2	0	+1	+1	+1	+1	0
32	+1	+1	-2	0	-2	+1	0	0	+1	-2	+2	0	-1	-1	0	-1	+1	+1	0	0	-1
33	+1	-1	+1	-2	-2	+1	0	-1	0	-2	-2	0	0	+1	0	+2	0	+1	+1	0	0
34	+2	-1	0	-2	0	+1	0	+2	+1	-1	+1	+1	0	+1	0	+2	+1	+1	+2	+1	+1
35	+2	+1	+1	0	+1	+1	+1	+2	+2	+1	+1	+1	0	+2	+1	+2	+1	+1	+1	+1	+1
36	+2	+1	+1	0	+1	+1	+1	+2	+1	+1	+1	+1	0	+1	+2	+2	+1	+1	+1	+1	+1
37	+2	+1	0	0	+1	+1	+1	+2	+1	+1	-1	+1	-1	+1	0	-1	+1	-1	+1	+1	0
38	+2	-1	-1	0	-2	+2	0	+1	+2	-1	-2	0	0	+1	+2	+1	0	0	+1	-1	0
39	-1	-1	-1	0	-2	+2	0	0	+1	-1	-2	0	+1	0	0	0	0	+2	0	0	0
40	+1	0	0	+2	0	+2	0	+1	+2	+1	+2	0	0	0	0	+2	-1	+1	+1	0	+1
41	+1	-1	+1	+2	+2	+1	-2	+1	+1	+1	-2	+1	-1	+1	+2	+1	0	-1	+1	+1	+1
42	+1	-1	-1	+2	+2	+1	-1	-1	-2	-1	0	+1	-1	-1	+2	+1	-2	0	0	-1	-2

Table E.4 Arbor Hills Nature Preserve, Trail Data, Page 1, (Importance of Statement)

DATA SHEETS FROM SURVEYS

Arbor Hills Nature Preserve — **Importance of statement**

SURVEY NUMBER

Question #	3	5	6	7	8	11	17	21	24	26	28	34	35	36	37	38	41	42	43	44	46	47	50	51	52	53	58	59	60	62	63
1	5	5	4	3	x	4	1	3	1	1	4	4	4	3	0	4	3	0	3	2	3	3	4	5	5	4	3	4	1	4	3
2	5	4	3	3	x	4	1	3	1	1	4	1	1	3	0	4	2	0	3	2	3	3	4	5	5	4	3	3	0	4	3
3	5	4	3	3	x	4	2	3	1	1	2	0	0	3	0	4	2	0	3	2	3	0	4	5	5	4	3	2	0	4	3
4	5	3	3	2	x	1	4	3	5	4	4	5	5	3	4	5	1	4	5	4	4	0	4	2	1	4	1	3	2	5	3
5	5	5	4	4	x	4	4	4	5	1	4	4	4	4	0	5	5	2	5	3	4	0	4	2	5	4	4	4	4	3	4
6	4	4	4	1	x	2	3	0	5	1	4	4	4	4	0	5	5	2	4	2	4	0	1	2	5	4	4	4	x	3	4
7	x	3	4	1	x	3	3	0	5	0	3	2	2	4	0	4	5	2	3	2	0	0	0	2	0	4	1	5	x	5	4
8	5	4	3	1	x	5	5	3	5	0	5	0	0	4	0	4	5	2	2	0	0	0	3	5	4	3	3	4	x	1	3
9	x	3	4	2	x	3	1	3	1	4	3	0	0	3	4	4	0	0	1	2	0	2	0	3	1	4	1	2	1	5	3
10	3	3	4	1	x	3	1	3	1	4	3	0	0	3	0	0	0	0	1	4	0	0	1	2	0	4	1	1	0	5	2
11	5	5	4	4	x	5	2	5	5	4	4	5	5	4	5	5	5	4	5	4	4	5	5	4	5	4	3	3	5	5	3
12	5	5	4	4	x	3	2	4	3	3	3	5	5	4	5	4	5	3	4	4	5	5	5	4	5	5	3	4	3	4	4
13	4	5	4	5	x	4	3	4	5	5	5	5	5	4	5	5	5	5	5	4	5	5	5	4	5	5	4	4	5	5	4
14	5	5	4	3	x	4	2	5	4	3	5	5	5	4	4	5	5	5	5	4	5	5	5	4	5	4	3	3	5	5	4
15	5	5	4	4	x	4	2	5	4	3	5	5	5	4	5	5	5	5	5	4	5	5	5	4	5	4	3	2	5	5	4
16	4	4	4	5	x	2	2	4	4	1	5	0	0	4	3	4	5	3	3	4	5	5	5	4	5	3	0	3	3	2	4
17	3	4	4	3	x	3	1	0	2	1	3	1	1	4	0	5	0	0	2	2	5	0	3	3	1	4	0	0	1	3	3
18	3	3	3	2	x	2	2	x	3	4	2	4	4	3	3	4	1	3	4	4	3	0	2	5	5	4	1	2	3	5	3
19	x	3	1	2	x	1	3	5	3	0	4	2	2	4	4	4	0	5	2	4	5	0	1	3	1	4	0	1	0	5	3
20	x	3	4	4	x	3	2	4	4	4	4	4	4	4	5	3	4	4	3	4	5	0	1	3	5	4	3	4	3	5	4
21	2	3	4	4	x	3	4	4	4	4	5	4	4	4	5	5	4	4	4	4	5	0	1	3	5	4	3	5	4	5	4
22	3	3	4	0	x	3	2	4	1	3	3	3	4	4	2	5	0	3	4	3	3	0	0	4	0	4	x	3	2	4	3
23	3	3	2	0	x	2	2	4	2	4	3	4	3	4	2	3	3	5	4	4	2	0	0	4	3	4	x	2	2	4	3
24	5	5	4	2	x	4	3	5	5	2	5	2	3	4	5	5	5	4	3	4	2	0	3	4	3	4	x	1	3	1	5
25	5	4	4	5	x	5	3	4	4	5	5	5	5	4	5	5	5	5	3	5	5	5	5	5	5	4	x	4	5	5	5
26	5	4	4	4	x	4	3	x	2	5	5	5	5	3	5	5	4	4	4	4	5	3	5	5	5	4	x	3	5	5	4
27	3	4	4	5	x	1	2	4	1	4	4	4	4	4	4	5	3	4	2	4	5	3	3	4	1	4	x	3	2	4	2
28	2	4	4	4	x	2	3	4	4	4	3	5	5	4	4	5	4	5	4	4	5	3	5	4	3	4	x	3	5	4	2
29	4	1	2	0	x	1	2	3	4	0	5	3	3	4	3	5	3	3	1	2	5	4	5	0	0	2	x	2	3	4	2
30	3	5	4	4	x	3	3	4	4	3	4	4	4	4	3	5	2	3	5	3	3	5	5	4	5	4	x	3	5	5	2
31	5	3	3	0	x	5	3	5	4	3	5	3	3	4	3	4	5	3	5	4	3	5	5	4	0	2	x	3	3	5	4
32	3	2	2	0	x	3	3	3	3	0	4	2	2	4	3	4	3	3	1	2	0	4	1	4	0	2	x	2	3	4	3
33	3	2	3	0	x	2	1	3	1	3	0	3	3	3	4	4	2	0	1	3	4	0	0	3	0	5	x	1	1	3	5
34	4	4	4	0	x	1	3	4	2	3	0	2	2	4	4	4	3	4	4	4	4	0	0	3	4	5	x	4	4	2	4
35	4	4	4	5	x	2	2	4	3	3	4	4	4	4	4	4	3	3	5	4	5	5	3	4	4	4	x	2	4	4	3
36	5	3	4	4	x	2	1	5	3	3	4	3	3	4	4	5	5	3	5	4	5	5	3	4	5	4	x	3	4	5	3
37	5	3	4	3	x	1	1	4	2	3	4	4	4	4	4	3	4	4	3	4	5	0	3	4	4	4	x	1	4	4	3
38	5	4	4	5	x	3	2	5	2	4	4	2	2	4	4	4	5	4	5	3	3	2	5	2	0	3	x	2	5	5	3
39	5	3	2	3	x	2	2	4	2	2	4	4	4	3	4	5	5	3	3	3	3	0	3	1	0	3	x	2	5	3	4
40	3	4	4	3	x	3	2	5	2	2	3	2	2	4	3	4	5	0	3	3	3	3	5	3	0	3	x	4	5	4	3
41	5	4	4	3	x	3	2	5	4	4	4	1	1	4	3	4	5	4	3	3	3	5	3	3	0	4	x	5	4	5	3
42	4	5	2	0	x	3	2	5	3	2	5	1	1	4	5	0	5	5	3	2	3	0	5	3	0	4	x	5	0	5	3

Table E.5 Arbor Hills Nature Preserve, Trail Data, Page 2, (Importance of Statement)

DATA SHEETS FROM SURVEYS

Arbor Hills Nature Preserve — Importance of statement

SURVEY NUMBER

Question #	64	66	71	73	74	75	79	81	82	83	84	85	86	87	89	90	91	92	95	96	97
1	5	2	5	5	5	4	0	4	0	3	3	5	4	4	x	4	5	3	1	5	4
2	5	0	5	5	3	4	0	4	0	4	2	5	4	2	x	2	4	3	2	5	3
3	5	0	5	3	3	4	0	4	4	4	4	5	4	2	x	2	2	3	3	5	4
4	1	2	3	3	0	3	3	2	3	1	3	3	3	0	5	4	0	3	3	1	3
5	5	0	3	3	0	4	3	5	3	4	3	5	5	0	x	2	4	3	3	4	4
6	5	0	3	3	0	3	3	2	3	2	3	3	2	0	x	2	3	3	3	4	2
7	2	0	3	5	0	3	3	0	2	4	3	5	2	0	x	2	0	3	3	4	2
8	5	1	3	5	4	3	0	4	2	3	3	3	2	3	x	2	2	3	1	5	2
9	5	1	4	5	3	3	2	0	1	1	3	4	5	1	5	4	4	3	1	4	2
10	1	0	3	3	0	3	2	0	5	1	3	4	5	1	3	0	3	3	1	4	4
11	4	2	4	3	4	4	5	5	5	4	4	5	5	4	5	4	4	3	5	5	4
12	5	2	4	3	5	3	4	5	5	4	4	3	3	4	3	3	4	3	3	5	4
13	5	2	4	4	5	4	5	5	5	5	4	5	4	4	5	5	5	3	5	5	5
14	5	2	4	4	5	4	5	5	5	3	4	5	4	4	5	4	5	3	5	5	5
15	5	2	5	5	5	4	4	5	5	4	4	5	4	5	5	5	5	3	4	5	5
16	5	1	5	3	4	3	3	5	5	5	4	3	3	4	3	3	3	3	1	5	4
17	3	0	3	3	3	3	4	1	1	4	4	3	4	2	0	0	3	3	1	5	3
18	5	1	4	5	4	3	2	2	3	3	5	4	4	2	5	5	3	3	1	4	2
19	0	0	4	3	4	3	4	5	0	4	3	5	1	2	x	0	0	3	1	2	0
20	2	2	2	3	5	3	4	3	5	3	2	5	1	3	5	4	3	3	1	4	2
21	5	2	3	3	3	3	5	3	5	4	2	5	2	4	5	4	3	3	1	4	2
22	5	1	3	3	4	3	2	4	x	3	3	3	4	3	3	3	4	3	4	4	2
23	5	1	3	3	3	3	3	4	x	3	3	2	4	3	5	5	4	3	2	3	2
24	3	0	5	5	4	3	3	5	x	3	4	4	2	5	5	3	5	3	3	5	5
25	4	3	5	5	4	3	4	5	x	5	4	5	4	3	5	5	5	3	5	5	5
26	5	2	4	5	3	3	4	4	x	3	4	4	4	2	5	4	0	3	3	4	4
27	5	2	3	5	0	3	4	3	x	2	3	3	3	3	4	4	3	3	2	4	3
28	5	2	4	5	3	3	4	3	x	2	4	4	4	3	5	4	3	3	2	4	5
29	0	0	3	3	0	2	5	1	x	0	5	3	3	3	3	3	4	3	3	0	0
30	0	2	3	0	2	4	5	5	x	5	3	3	4	4	1	5	3	3	1	3	4
31	5	2	4	5	3	4	4	4	x	3	3	5	1	5	5	3	3	3	1	4	2
32	5	2	0	3	0	3	2	2	x	1	5	0	2	1	3	2	4	3	1	2	1
33	3	1	3	0	0	3	2	1	x	1	4	3	3	1	3	5	0	3	4	4	1
34	5	0	3	0	3	3	2	5	x	1	4	3	4	1	3	5	3	3	4	5	4
35	5	2	4	3	1	3	4	5	x	2	4	3	3	2	3	4	3	3	3	4	5
36	5	2	4	3	1	4	4	5	x	3	4	4	3	2	5	5	4	3	3	4	5
37	5	2	3	3	1	3	4	3	x	3	4	3	4	2	3	5	4	3	3	1	0
38	5	1	3	3	2	4	2	4	x	1	5	1	2	2	5	3	0	3	3	1	2
39	1	1	3	3	1	5	2	3	x	0	5	0	4	1	5	3	0	3	3	2	3
40	5	0	2	5	3	4	2	4	x	3	3	2	3	0	5	3	0	3	4	2	3
41	5	2	2	5	3	4	4	4	x	4	4	4	4	3	5	3	0	3	3	4	1
42	5	3	3	5	3	3	3	4	x	1	4	4	5	2	5	3	5	3	3	4	3

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BIOGRAPHICAL INFORMATION

Richard Wayne Hooker was born in Dallas, Texas in March 1953. After owning a successful business in manufacturing, he started taking horticulture classes which introduced him to the landscape architecture profession. He pursued his goal of a career in the landscape architecture profession by earning a Bachelor of Science in Architecture degree from The University of Texas at Arlington in December 2004 and a Masters of Landscape Architecture from The University of Texas at Arlington in December 2007. After graduation, Richard looks forward to continuing work in the area of park and trail design while completing the requirements for state licensing.