

On the Trail: A Path Towards a Better Trail System in Saratoga County

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Abstract

Americans are increasingly favoring walking and biking as a means of getting around. However, because American suburbs, towns, and cities lack infrastructure that support walking and biking, many Americans still rely on automobiles. Within the last few years, multi-use trails have emerged as a solution to retrofit the suburbs for greater walkability and bikeability, and make towns and cities more connected to the outdoors for both recreation and commuting.

Saratoga County is a good reflection of this national trend with over 1,000 miles of trails and very active trail planning. We sought to evaluate the Saratoga County trail system based on several conditions previously studied throughout the United States such as connectivity, safety, presence of adequate maps and signage, trails supporting multiple uses, and the level of public input into the planning process.

Our research addressed the following questions: How are people using trails in Saratoga County? What is the planning process for trails? What is the level of communication between the public and the trail planners? and How can the Saratoga County trail system be improved?

To conduct our research, we sent out a public online survey, conducted semi-structured interviews with municipal planners and community influentials, attended community trail planning meetings, and conducted a spatial- analysis of connectivity using GIS.

Our public survey indicated a desire for greater trail connectivity, better maps and signage, and a consolidated trail map. Semi-structured interviews and participant observation revealed strong communication between the public and trail planners during the planning process and challenges trail planners face during the planning and development process.

Our GIS analysis showed that the Saratoga County trail system is fragmented. There is also generally low connectivity, in suburban communities aside from Clifton Park, and in the more urban city plan, multi-use trails do not connect into the downtown areas.

Our recommendations to improve the Saratoga County Trail System include an improved online user friendly trail map, greater advertising post trail development, and better on the ground maps and wayfinding signs.

Table of Contents

I.	Introduction.....	3
	<ul style="list-style-type: none"> • What are Multi-Use Trails? • Benefits of Multi-Use Trails • What Makes Trails Successful? • Saratoga County Trail System • Study Purpose 	
II.	Methods.....	12
	<ul style="list-style-type: none"> • Public Survey • Semi-Structured Interviews • Participant Observation • GIS • Limitations 	
III.	Results.....	15
	<ul style="list-style-type: none"> • Public Survey • Semi-Structured Interviews <ul style="list-style-type: none"> - NGO - Municipal - County - Key Findings • Participant Observation • GIS 	
IV.	Discussion.....	25
	<ul style="list-style-type: none"> • Public Survey • Semi-Structured Interviews • Participant Observation • GIS • Evaluation of Trails in Saratoga County • Recommendations 	
V.	Conclusion.....	32
VI.	Acknowledgements.....	34
VII.	References.....	35
VIII.	Figures.....	37

I. Introduction

Over the last half century, American city and town planning has favored automobile travel by the building of suburbia. With a steadily increasing population, American cities and suburbs have sprawled out, creating a model of development that avoided population density, multi-use development, greenbelt land conservation, and walkability. For most Americans, walking or biking as a means of commuting is not a safe or physically viable option. Similarly, nature by way of open-spaces and public parks is largely inaccessible in the suburban model.

In the last fifteen years however, Americans have increasingly favored more walkable and bikeable communities. Over half of Americans wish they lived in more walkable communities (Leinberger, 2008). Since the late 1990's, the number of miles driven by Americans in their twenties have dropped from 20.8 percent to just 13.7 percent. (Speck, 2012). Relatedly, the number of nineteen-year old's who are getting their driver's licenses has decreased from 87 percent in 1983, to now 69 percent (Sivak, 2016).

But since most Americans are still living in suburbs, many urban planners and urbanists agree that the suburbs need to be retrofitted for greater walkability and access to open-spaces. Smart growth advocates for shifting public policy and planning to include walkable, bikeable, multi-use, and denser development. One way that cities, towns, and suburbs are implementing smart growth is through the use of multi-use trails (Morris, 2002). The development of multi-use trails helps achieve walkable and bikeable communities, and are increasingly being built throughout the United States in both urban and suburban communities (Shafer, 2000).

What are Multi-Use trails?

Multi-use trails are trails that accommodate many uses such as road biking, walking, mountain biking, dog-walking, and in some cases ATV's and cross-country skiing. Multi-use trails often have several types of paths including paved, gravel, and grass; they might also offer several amenities such as benches, water fountains, lights, and mile markers to account for different users. Most importantly, multi-use trails are successful when they are used for both recreation and transportation.

Benefits of Multi-Use Trails

With the increased building and planning of multi-use trails, there have been a multitude of studies showing the benefits of trails in their communities. These benefits include: public health, sustainability, and economic growth.

Public Health

Before multi-use trails were largely considered to be part of green infrastructure plans or used to excel smart growth objectives, trails were considered more of a luxury item in communities. Trails provided a place for people to recreate, bike, run, walk dogs, and be immersed in nature. The corollary is that the early studies on trails were mostly on health and fitness correlations to trails. In areas with trails, physical activity increases. A study in Indiana showed that 74% of the Monon Trail users lived within four miles of the trail, and 70% of the users indicated that their physical activity increased due to the trail (Lindsey, 2001).

Another study conducted in Atlanta showed that for every five additional minutes Atlanta-area residents drove each day, they were 3 percent more likely to be obese (Speck, 2012). People

reliant on automobiles for transportation and without the infrastructure to walk or bike, are less likely to get adequate daily physical activity.

Automobile emissions are also harmful for people, costing up to \$28 billion to \$531 billion in health costs (USEPA, 2001). With more people commuting on trails, the less trips are made by the automobile, which then reduces smog and improves air quality.

Sustainability

Multi-use trails that are planned within a transportation mindset, allow for people to use trails to get places instead of using automobiles. Saved automobile trips means less car exhaust emissions. In a National Household Travel Survey, over half of all trips are three miles or less, while 72 percent of those trips are driven in private vehicles (NHTS, 2009). This is significant because these short trips are able to be replaced by walking and biking, thus creating less car pollution.

The planning of multi-use trails, especially greenway trails, typically promotes better land use planning for the conservation of a town or city's greenbelt. Often the planning of municipal and county trail systems has to work with open-spaces around the city or town, because that is where people want trails. For this reason, during the planning process, these areas are zoned as open spaces, created as conservation easements, or marked as "preserved for future trail planning" (Ferraro, 2017).

Economic Growth

Trails also promote economic growth by connecting residents to business areas and improving real estate markets adjacent to trails. The National Park Service (NPS) studied three

rails-to-trails, one in an urban environment and two in rural environments. The study looked at how people visiting the trails in the rural area, and the daily users in the urban trail affected nearby businesses such as restaurants, lodging, biking equipment, retail, as well as real estate values. The rural trails that attracted more visitors had average daily expenditures between \$9.21 and \$11.02. The urban trail had an average user expenditure of \$3.21. The economic activity of the three trails generated roughly \$1.2 million annually (Moore, 1992). More recently, studies in urban environments have shown a significant correlation between bike paths in downtown areas increasing business sales as much as 48% (NYCDOT, 2008).

As mentioned previously in the NPS study, trails increase property values. Because more and more people want to live in walkable communities, real estate sites such as Zillow are calculating walk scores to show how walkable or bikeable the neighborhood is. Thus, the houses that are near trails or within well-connected street grids have greater values (Speck, 2012). A study in Wisconsin found that the lots that were adjacent to trails sold for nine percent more, and often sold quicker (Crompton, 2001).

What Makes Trails Successful?

A trail is successful when many people throughout a community use the trail for both recreation and for commuting. However, there are several social and physical factors that detract from trail usability. As the Rails to Trails Conservancy writes: “The current low rates of non-motorized trip making appear to exist not because of lack of desire, but rather because of the lack of infrastructure that supports non-motorized trips (Morris, 2002).

The Rails To Trails conservancy, a leading proponent of multi-use trails in the United States and a top research organization on trails, shows that a trail’s success can also be evaluated

on the basis of its physical features including connectivity, safety, signage, and support of many uses.

Connectivity of trails means two things: (1) when trails connect to other trails, it creates a more usable network, (2) when trails connect to several community amenities like public parks, downtown areas, shopping centers, libraries, transit stops, neighborhoods, etc., the trails are more used. For recreation, connectivity gives people options on where they can go and how long they can be on the trail for. People prefer to have longer trails or even short trails that connect to larger networks because they are able to continuously run or cycle without having to go on the road. For commuting, trail connectivity allows for people to use the trail continuously to get to many destinations. A trail that connects neighborhoods to community amenities allows for people to use trails to commute, decreasing automobile reliance for short commutes.

Safety is important because if people do not feel safe using the trail, they will not use the trail. The safety of a trail might be perceived based on several factors including proximity to traffic, amount of intersection crossings, difficult terrain, or going long distances without proximity to bathrooms, water fountains, or first aid.

Safety can be best addressed by a public opinion survey, so that areas of issue can be targeted more effectively. Safety can also be evaluated on the basis of a generalized gender divide between users, especially for biking infrastructure. A study on safety of bike lanes showed that the share of women cyclists in a city is a good indication of the level of safety of the bike lanes. Essentially, when there is a low share of women cyclists, the cycling is perceived as unsafe (Garrard, 2012).

Maps and signage allow for people to navigate by trail easily by knowing where trails are, where the trail connects to other trails, and how far they are from community amenities.

Wayfinding signs on the trail increase usership of trail solely from allowing people to know where the trails are. Maps should be provided both on the trails and online for an effective wayfinding system.

Multiple-uses allows for a wide variety of trail users. A trail that supports many uses has different amenities that allow for road bikers, mountain bikers, walkers, runners, dog walkers, and for both recreational users and commuters simultaneously. A trail that supports many uses might have different surface types like pavement, stone dust, or gravel, or might also have mile markers, benches, bathrooms, water fountains, etc. Essentially having multiple-uses is important for allowing for a wider demographic of people to use the trail.

Trails often fail when the trail planning and trail amenities do not reflect what residents want in a trail. Asking how the public uses the trails allows for the above features to be improved based on what people actually want. This allows for a more targeted approach to improving local trail systems. Unfortunately, public outreach is often overlooked in the planning process. A study on the public perception and user satisfaction of multi-use trails in Texas evaluated three trails through user surveys. The user satisfaction and perception surveys were used to analyze and determine consistent themes and trends in user satisfaction and perception. Through the survey, they found significant trail attributes that should be provided on multi-use trails. Ultimately, the study found that the user opinions of the trail were immensely valuable for improving current trail conditions as well as the development and design of new trails (Shafer, 1999).

Saratoga County Trail System

This study examines the trail system in Saratoga County, New York. Saratoga County is in upstate New York, situated alongside the Hudson River with the Adirondack State Park to its

North and the Albany area to its South. The county is mostly rural with several large public parks, tourist attractions, and towns and cities with varying populations and population densities. Saratoga County municipalities and county planners have made significant efforts to increase trail planning and building within the last twenty years.

Saratoga County has over 1,000 miles of trails including the Bog Meadow Brook Nature Trail, Champlain Canalway Trail, Railroad Run, Saratoga Springs Greenbelt Trail, Spring Run Trail, and the Zim Smith Trail (Saratoga, 2016). The list is expanding with both internal connector trail projects such as the Green Belt Trail, Palmertown Ridge Trail, The Champlain Canalway Trail, Erie Canal Greenway, Hudson River Trail, Kayaderosseras Creek-Fish Greenway, Alplaus Kill Greenway, Loop the Lake, The Long Path, Mid-County Equestrian Trail, Luther Forest Loop Trail, and the Mid-County Trail System (Behan Planning Associates, LLC (BPA) et. al., 2006). The county is also expanding trails to connect to the greater New York county trail network including the Mohawk Hudson trail and the recently proposed Empire State Trail.

Planning Documents

In 2006, Saratoga County released the *Green Infrastructure Plan for Saratoga County*. This plan is part of the ongoing effort to increase the public enjoyment of plentiful and healthy lakes, rivers, forests, farmlands, parks and preserves, and historic resources, otherwise known as its green infrastructure (BPA et. al., 2006). The overarching goal of the plan is to recognize and protect important open space resources in the community. These open space resources include “natural systems such as streams, wetlands and watersheds; working landscapes such as farms and managed forests; recreational and trail opportunities such as multi-use trails and fishing access; and cultural resources such as scenic and historic corridors,” (BPA et. al., 2006, p. Executive

Summary ii). The connection of these open spaces relies heavily on the implementation of conservation greenways, making trail development and implementation a priority in the county.

Outlined in the plan are goals for trails and recreation within Saratoga County. These goals include establishing and expanding parks or public access areas, creating waterway trail systems, and providing alternative transport options using the trail and greenway system that are accessible from high traffic areas. The forefront objective, and the one all the others work towards, is the creation of an “interconnected regional trail system throughout the country that provides a balanced diversity of appropriate trail experiences and uses and ensures compatibility with resource conservation goals,” (BPA et. al., 2006, p.32).

In addition to a county-wide goal of adding more multi-use trails, several of the cities and towns in Saratoga County have trail planning as a priority for sustainability in their respective comprehensive plans. Most of the larger towns and cities that have comprehensive plans including Saratoga Springs, Clifton Park, Ballston Spa, Wilton, Malta, Halfmoon, and the Town of Moreau, mention improving their municipal trail network for both recreation and transportation goals. Ballston Spa’s comprehensive plan calls for providing “adequate bicycle facilities and establishing a signed system of bicycle routes throughout the town (Town of Ballston Comprehensive Plan, 2005).” Ultimately, trail planning for both recreation and as a transportation network is a priority for the county and the municipalities.

Trail Study

Recently, Capital District Transportation Authority (CDTA) conducted a usership study that examined several of the larger trails in the Capital Region to study how many people use trails throughout the year and the demographic of who is using the trails. This study included several of

the significant trails in Saratoga County such as the Zim Smith Trail, the Spring Run Trail, and the Railroad Run Trail. For this study, data was collected through electronic counters and observational counts during 2-hour peak usage times for one week out of each month. The study found that the trails in Saratoga county were used throughout the year, with peak seasons in the summer and the spring. For example, the most used trail in this study in Saratoga County was Zim Smith Trail with over 130,000 annual trail uses.

The observational study found gender splits in trail usage for pedestrians, bicyclists, and overall users. The overall gender split for the Shenantaha Creek Park portion of the trail was 44% female and 56% male. For bicyclists, the gender split was 25% female and 40% male; for pedestrians, it was 19% female and 16% male. The other trails in Saratoga County showed similar gender splits.

Study Purpose

We sought to evaluate the Saratoga County trail system based on the previously mentioned conditions including connectivity, safety, presence of adequate maps and signage, trails supporting multiple uses, and the level of public input into the planning process. To evaluate the trail system, this research was driven by four main questions:

1. How is the public using trails in Saratoga County?
2. What is the trail planning process in Saratoga County?
3. What is the level of communication between the public and trail planners?
4. How can Saratoga County trail systems be improved?

II. Methods

We used a mixed methods approach for our research including both quantitative and qualitative research. Our research methods were triangulated through an online public survey, semi-structured interviews, participant observations and meetings, as well as a GIS spatial analysis (Creswell, 2007). Our sources of data were also triangulated through input from the public, community influentials, and archival data. Our online public survey was created using Qualtrics and was distributed to residents in Saratoga County. We spoke to NGOs, such as Sustainable Saratoga and Saratoga Plan, the City of Saratoga Springs, The Town of Clifton Park, Saratoga County, and promoters such as the Saratoga County Chamber of Commerce. We took data from our online survey to geocode survey respondents addresses. Additional GIS analyses evaluated the level of connectivity of the trail system.

Public Survey

The public survey gauged the public perception and opinion of the current Saratoga County trail system. We asked a variety of questions to better understand the public's usage and suggestions for trail improvements. The questions asked how residents use trails, and what would make the trails more attractive to be used by all user groups. Respondents were also asked their age and gender to better understand the demographic of trail users. Questions included formats such as yes/no, slider bars, multiple choice/choose all that apply, Likert scale and open-ended written responses.

Surveys were distributed online through Qualtrics and in person. To have our surveys reach an accurate sample population that represented Saratoga County, we posted the online survey to various Facebook trail user groups, asked NGOs to distribute the survey to their email lists, put

hard copy advertisements with a link to our survey in coffee shops around town, and created a Facebook advertisement within Saratoga County. The majority of surveys were completed online. All survey respondents were restricted to only Saratoga County residents.

The data collected from surveys was exported into excel to be analyzed. Data from the survey that was not going to be of use was deleted. Relevant data was separated into new excel sheets and sorted to reveal trends throughout respondent answers. We analyzed written comments from respondents for recurring themes and unique responses to understand the full picture of public opinion in the area (Creswell, 2007). Bar graphs, pie charts, and GIS maps were created to display key findings.

Semi-Structured Interviews

We conducted nine semi-structured interviews in person with a variety of organizations with unique involvement in the trail planning process or trail advocacy in Saratoga County. The interviews aimed to understand the planning process of trails, the challenges of trail-building, the costs of trails, and the level of coordination between NGOs, the public, and the planners. Interviews typically lasted between 30- 45 minutes and were recorded using a personal voice recorder. We transcribed our interviews and evaluated the interviews to gather common findings among trail planners, to understand their role in the trail planning process, and to recall key insights into trails in Saratoga County.

Participant Observations

We sat in on the Greenbelt Trail Committee Meeting, as well as the Countywide Trails Initiative committee meeting. This was to gain a perspective on the coordination efforts between

municipalities and NGOs in the trail planning process. We also observed and participated in the trail break out session of Pitney Meadows Farms Community Planning Meeting to understand the public's needs for trails in this location.

GIS

GIS was used to assess trail connectivity in Saratoga County and to geocode the survey respondents' addresses. All GIS processes were completed with ESRI's ArcMap in Skidmore College's GIS Lab.

First, each address collected in the public survey was geocoded to display the spatial distribution of survey respondents. For further GIS analysis, a shapefile of Saratoga County trails and trailheads from the New York State GIS clearinghouse were overlaid onto satellite imagery of Saratoga County. To locate where the population centers were in Saratoga County, ArcMap's Kernel Density feature was used. Within the window of the Kernel density feature, the Saratoga County parcel centroid data from NHGIS was put into the selected feature, and the density calculation was assessed based on the proximity of the data points to one another. This both targeted where population centers were and the population densities of the towns and cities.

To assess trail connectivity to public amenities, the Saratoga County parcels were filtered categorically into either residential, commercial, public facilities, or public parks. The resulting selections were made using the New York State Zoning Codes, designating the parcel type. Transit stops are also important public facilities. The CDTA bus stop locations were taken from the NYS Clearinghouse database, and then clipped to the shape of Saratoga County. These features were then spatially evaluated based on proximity to trails.

Limitations

One limitation to this study is the time restricted nature. Surveys and interviews were conducted from February, 2017 to May, 2017. This timeline gave us only four months to collect the extensive data necessary to accurately represent the population of Saratoga Springs. Ideally at least a year of data collection should be conducted.

The current theoretical nature of some of the trails being assessed by this study, such as the proposed Palmertown Ridge Trail, is another limitation of this study. Many of the trails which may increase connectivity have not been completed yet and are still in development stages which may limit the public's knowledge and use of these areas as a way to access open spaces. Another study should be conducted once the full connectivity of trails, outlined in the Saratoga County Green Infrastructure Plan is completed.

III. Results

Public Survey

Respondent Demographics

In total, 371 public surveys were collected. This is just under the representative sample size for Saratoga County which is 384. Responses were received from most towns in Saratoga County including, Corinth, Halfmoon, Burnt Hills, Round Lake, Clifton Park, Ballston Spa, Gansevoort and others (Figure 1). There was a heavy concentration of responses from Saratoga Springs, the main population center of the county. 62% of respondents identified as female, 37% identified as male, and 1% preferred not answer (Figure 2). The results came from a relatively even age distribution, however individuals below 18 to 25 years of age only made up approximately 9% of

the sample and those aged 26 to 35 years made up about 10% of the sample, all other age categories ranged from a representation of 19% to about 23% (Figure 3).

Key Findings

On average, survey respondents use trails 41 days per year, which can also be expressed as 3 to 4 times per month. Only 1% of respondents said that they never use the trail systems of Saratoga County (Figure 4). The majority of individuals indicated that they use trails for walking, hiking, and quiet time and relaxation. Snowshoeing, cross country skiing, dog walking, socializing, birdwatching, and mountain biking were some other notable uses for trails in Saratoga County. Only 13% of respondents indicated that they use trails for commuting purposes. The two choices with the highest percentage of responses for the question: “What prevents you from using trails in Saratoga County?” indicated that trails lack connectivity and that people do not know the location of trails (Figure 5). Other choices included that respondents did not have time to use trails, the trails are too far from the respondent’s home, and that there is a lack of access to trails (Figure 5). When asked “What amenities would encourage you to use trails in Saratoga County?” half of the respondents indicated the need for better maps and signage for trails (Figure 6). Additional choices included, longer trails, trails groomed for snowshoeing and/or cross-country skiing, bathrooms, paved trails, and trails designated for certain activities such as walking, running, biking, or use of motorized vehicles (Figure 6).

An ‘other’ option was provided for both questions where some notable and representative quotes included:

- “There needs to be a more comprehensive database of all trails, and better promotion” - Anonymous

- “I’m in love with all of the trails throughout the county, but there is just not enough fluidity amongst them to really ‘wow’ me” -Anonymous
- “I really wish there were a way to walk to a nature trail without having to walk through the city, or drive” -Anonymous
- “I would be more inclined to use other trails if there was some kind of online trail locator/map system that was easy to find and use” -Anonymous
- “Some are too short to be of interest or use to me as a cyclist” -Anonymous
- “Connectivity is key” -Anonymous

Semi-Structured Interviews (Figure 7)

We spoke to many individuals to gain a varied perspective of organizations throughout Saratoga County that have a role in the trail planning process. To get a full understanding of trail planning and development we interviewed individuals from NGOs, municipalities, and Saratoga County.

NGO

Sustainable Saratoga

We spoke to Geoff Bornemann who is a volunteer with Sustainable Saratoga. Sustainable Saratoga is a non-for-profit organization that promotes sustainable practices. They also promote the protection of natural resources through education, and action for the benefit of current and future generations in Saratoga Springs. They have been a leader in promoting awareness of environmental issues and promoting community engagement in minimizing ecological impact in Saratoga County. Sustainable Saratoga is interested in trail issues because it affects quality of life

and sustainability in the area. Bornemann explained that because Sustainable Saratoga has a constituency, they often help the grant process by writing letters of support when cities are working within a community (Bornemann, 2017).

Bornemann also spoke about the public need for safe routes and bike share programs. Safe trail routes are a problem for Saratoga that needs to be addressed because people cannot get safely to their destinations solely by trails and bike lanes. An example Bornemann mentioned was from Saratoga Springs downtown area to the track. This would help be very useful in the summer to safely get people from downtown to the track, without having to drive and find parking.

Saratoga PLAN

We interviewed John Kettlewell from Saratoga Plan, an organization that works with land conservancy and trail planning throughout Saratoga County. The organization helps to preserve land and nature, encourage outdoor recreation, and connect people to nature through trail networks. For projects, Saratoga PLAN often partners with municipalities and other organizations which Kettlewell believes is very important. They help provide planning assistance by finding ideal places for trails and planning key routes to preserved areas (Kettlewell, 2017). Saratoga PLAN's trails provide parking and signage; they also have the most consolidated trail map for Saratoga County on their website.

A significant concern for Saratoga PLAN is that for cities and towns in Saratoga County, many people cannot get to the downtown areas without a car, which is why trail development is needed (Kettlewell, 2017). Kettlewell suggested for businesses to encourage trail development for people to walk and bike to the business centers more often.

Lastly, Kettlewell stated that Saratoga Springs is responsive in the trail planning process, whereas other smaller communities are not as responsive with ideas for trails because of funding issues (Kettlewell, 2017).

Municipal

Peter Martin

Peter Martin, the supervisor for Saratoga Springs was very informative about the trail planning process. He stated that designing and building a trail is just as hard as designing and building roads. First, the trail has to be imagined by the designers and the public to create a vision for the trail. Then the original site planning is put into place, which includes talking to property owners, and hiring a planning firm. Building and designing a new trail takes a lot of engineering, including drainage and grading work. Property must be acquired, so property owners must be compliant for the process to continue. Once all the engineering and logistics are straightened out, the physical building of the trail can begin, which often involves grading the land and cutting down trees (Martin, 2017).

Peter Martin mentioned that the more unseen corollary issue is maintenance. Maintenance is important but remains a problem because of lack of funding and foresight for allocating budgets for coordinating maintenance efforts.

Another key issue Peter Martin raised was about the need for public support behind trails before they are built. He noted that there needs to be desire from the public to want to use new trails. Saratoga PLAN works to advertise meetings and trail projects for people to become involved in the planning process.

Christina Carton

Tina Carton works for the City of Saratoga Springs on land preservation and sustainability, and also sits on the Greenbelt Trail Committee. Tina Carton thought that one of the more significant obstacles for trail building is funding for both construction and maintenance. That is why when a new trail is being planned, the city tries to work with developers and property owners to help pay for amenities like sidewalks, lighting, benches, and parts of the trail. This alleviates the burden for municipal budgets.

The city is also looking at possible solutions to improve trail connectivity to the downtown area. Many of the trail's around Saratoga Springs were more designated as recreation, but could be connected with other trails to allow for more fluidity. When asked where she thought there needed to be more connections, she stated that Saratoga Lake needed trail connectors.

Carton was also very knowledgeable about the bike share program that will begin this summer, run by the CDTA. The bike share program will include four communities, which include Saratoga Springs, Schenectady, Troy and Albany. There will be 160 bikes for the first year and 20 hubs, which include three hubs in Saratoga Springs (Carton, 2017). Carton was very excited for this to be implemented and hopes that it will get more people commuting on bikes and more people on trails.

Todd Fabozzi

Todd Fabozzi sits on the Board of Planners for Saratoga Springs and is also a professional planner in the Capital Region. Fabozzi pointed out a key infrastructure principle for trails, which was that when trails are in place, people will use them and will ultimately affect the way people commute and recreate (Fabozzi, 2017). Because many suburban communities, more often than

not, do not have sidewalks, trails are even more important for giving people a means for walking and biking places. Similarly, he mentioned that trail connectivity is important for making this infrastructure more usable and safe.

Fabozzi also mentioned similar notion of the planning process where public outreach was important for Saratoga Spring's planning decisions, that grant writing takes a long time, and that funding is a huge obstacle to trail development.

Jennifer Viggiani / Rocky Ferraro

We spoke to Jennifer Viggiani and Rocky Ferraro, who were respectively a planner and a member of the planning board for the Town of Clifton Park. The Town of Clifton Park has advocated for trail connectivity for many years and also has a Trails Master Plan to help guide trail development. Because acquiring the land is often an obstacle for trail development, the master plan helps clearly plan land-use ahead of time, so that private landowners are more aware of having to accommodate for future trail development. For commercial property, there is usually not a problem with trail planning, but for private landowners, there is generally more opposition.

Jennifer also mentioned that many of the trail connectors are left blank so that developers can come in later and build them when the land becomes developed. Real Estate developers have realized that trails will increase property value, so for them, it is a wise investment (Viggiani, 2017). Ferraro also stated that developers are now offering to put in sidewalks when they are completing the development, which helps increase walkability and bikeability of neighborhoods. But in most cases, the town is not requiring sidewalks, but it is requiring trails where they have been planned.

Viggiani stated that more and more people are asking for better maps and signage and even wayfinding signs to let people know how far away they are from certain destinations. Clifton Park really values trails and are always trying to make more connections and trails for their community.

County

Jason Kemper

Jason Kemper, the director of planning at Saratoga County, discussed that the county helps with all aspects of the trail planning process including connectivity. The county planning office provides assistance to municipalities with any and all aspects of trail development. Kemper discussed that it is also important to coordinate with all cities and towns as a county planning office because each town and city have different levels of engagement with trails, and it is beneficial to have a more holistic planning organization to bring the county together with trail connectivity goals (Kemper, 2017). Kemper is also part of the Saratoga County Trail Committee, which works to settle conflicts between user groups, officials from municipalities, and NGOs.

Kathleen Fyfe

Kathleen Fyfe works for the Saratoga County Chamber of Commerce and is very active in promoting trails and healthy living in Saratoga County. The Chamber of Commerce is an advocate organization for community partnerships for projects invested in the local communities. They believe that if Saratoga communities are successful, the businesses will also be successful. For trails, The Chamber helps to find partnerships to help create trail connections to have a more robust trail system that people can use for recreation and transportation (Fyfe, 2017). Fyfe was also

excited about establishing a Saratoga County trail system that would also connect to New York's larger trail network.

Fyfe also mentioned that the different levels of organizations working on trail planning help trail projects improve. When there are problems or controversy, the projects have to be redesigned, worked on, and improved through a greater level of public engagement.

Key Findings

One of the main takeaways for the semi-structured interviews was how important it is for all user groups, planners, and NGOs to be involved in the planning and development of trails. It is important to gather everyone together to ensure that the needs of the public and municipalities are achieved. Secondly, many of the planners and organizations agreed that trail connectivity is important for creating a more usable and safe trail network for both recreation and commuting. Lastly, there are many common challenges to trails, yet the most consistent answer was that funding was the greatest obstacle for trail planning and development.

Participant Observations

We attended the Greenbelt Trail committee meeting as well as the Countywide Trail Initiative committee meeting, where community influentials gathered together to coordinate and resolve conflicts related to trail projects and future plans. This is very valuable because it allows for many community influentials to gather together and discuss what different communities want out of trails and to update everyone on trail development projects.

We also attended the trail break out session at the Pitney Meadows Farms Community Planning Meeting to gain perspective of the public's needs for possible trails on the farm.

Discussions on trails were about how the trails would be used, where they would go, what people wanted the surface type to be, and where the trail would connect to the Green Belt Trail and the neighboring Saratoga Springs Public High School and the YMCA. The Pitney Meadows Farms is a huge asset for the community that will be an ideal location for a small trail system.

GIS

In Saratoga County, there are over 1,000 miles of trails with an average trail length of around three miles. Trails in Saratoga County are concentrated in the center of the county along Interstate 87 and in concentrations near population centers and in large public parks. The western side of Saratoga County does not have as many significant trails (Figure 8). Our geocoded survey responses are also concentrated in the center of the county around Saratoga Springs (Figure 1).

Connectivity was assessed on two main principles: the first being that for good connectivity, trails should connect to other trails, and secondly trails should connect to key public amenities, like neighborhoods, public parks, transit stops, public facilities, and commercial areas including both downtowns and shopping centers. Regarding the first type of connectivity, the trail system in Saratoga County is fragmented, with lacking trail connectivity throughout the county and outwards to other counties in New York. Most individual trails do not connect to other trails or larger trail networks like to trail systems in public parks or larger projects like the Zim Smith Trail or the Green Belt Trail (Figure 8).

Trails also lack significant connectivity to public amenities. For many of the towns and cities in Saratoga County, the trail system does not connect to the downtown area, which most often has the most public amenities like bus stops, public libraries, population centers, etc. The cities and towns that had poor trail connectivity were Malta, Saratoga Springs, South Glens Falls,

Schuylerville, and Ballston Spa (Figures 9-13). Clifton Park had high connectivity with many trails going into the downtown shopping center, public amenities, and to the bus stops (Figure 14).

IV. Discussion

Public Survey

A few main trends were revealed through the public survey. The public tends to use trails for many purposes such as walking, running, hiking, biking, cross-country skiing, and even birdwatching. A public that uses trails for a variety of activities indicates a strong inclusive trail system. However, the minimal use of trails for commuting purposes indicates a lack of connectivity among trail systems throughout the county. Without connective routes the public will not view trails as an acceptable commuting alternative, this needs to continue to be addressed by Saratoga County trail planners and developers.

A significant number of Saratoga County residents were concerned with the lack of trail connectivity among existing trails and identified it as a factor preventing them from using the county trails. Another concerning factor preventing the public from using trails is that they do not know where trails are located. Whether they do not know where to find a trail locator or the trail locators are not effective needs to be addressed. Based on our survey results the public is unaware of online locators available to them, many respondents asked for better maps and signage as an amenity and explicitly stated the need for online trail locator systems. Our research this semester has revealed that such a system is available to the public however advertising of current trail locator systems as well as on the ground maps and signage at trailheads and throughout downtown areas needs to increase as discussed further in our recommendations.

Semi-Structured Interviews

Some challenges to developing trails in Saratoga County include the coordination between groups involved in the planning process. These challenges include gathering community influentials, the public, user groups, NGOs, and municipal and county planners together to talk with one another to discuss trail needs and happenings as well as land acquisition. As many of our interview respondents discussed, it can be a challenge to work with private landowners for easements for use of their property for trail development. Many are of opposition because they are afraid that it will be unsafe around their homes.

Environmental considerations must be taken into account when a trail is being designed so that a trail would not disturb an environmentally sensitive area. The biggest environmental issue to take into consideration is wetlands. Trail designers need to find a way to go around wetlands or build boardwalks through them to not distribute the environment in anyway.

Funding is the biggest challenge for trail development because without funding trails will not be built. This is an initial barrier to trail planning because at the outset, municipal planners have to hire an engineering firm to conduct initial cost estimates for construction. If the trail goes through a wetland or drainage basin, bridges and other drainage solutions are added on to the total cost of construction. But this initial surveying cost can pose too big a financial burden for municipalities to begin planning trails.

Grants are often used for the build and design of trails but applying for these grants can be a long process. Most grants are given by the state but there is opposition with this because some believe money should be going towards more pressing issues than trail development.

Some notable responses from our interviews included:

- "We want city wide trail connectivity... Connecting neighborhoods, open spaces, parks. We want people to get to destinations by trail" - Jennifer Viggiani
- "I think developers are realizing there is a market value for trails" - Jennifer Viggiani
- "Saratoga Springs is responsive, whereas other communities may not be as responsive with ideas for trails" - John Kettlewell
- "Businesses need to realize people like walking and biking. With trails closer to businesses, people will be more inclined to walk or bike to these places." - John Kettlewell
- "There is a county appointed trails committee that meets with the planning supervisors... Each Municipality sends people and everyone talks about what everyone else is doing... Connectivity is huge and gathering everyone together in these meetings is very useful to figure out what is going on" - Jason Kemper
- "Trails as economic development is huge, so it makes sense for us to have alternative opportunities for people, instead of having people get into their cars, and businesses recognize that." - Kathleen Fyfe
- "The Saratoga County Chamber is a little unique because we are heavily invested in our inner communities, because we believe that if our community is successful our businesses will also be successful." - Kathleen Fyfe
- "The public is there, the public wants it, It's the bureaucrats and engineers that say 'it's just the way we've done it for years.' It is costly, and there's limited focus for improvements. One of the key advantages is that it promotes smart growth. We are advocating that development to be focused in on the core area of the city, and with

density where people are able to walk and bike... That's the kind of smart growth policy we're advocating for." - Geoff Bornemann

- "There is a need for more trail connections, especially to Saratoga Lake. There are many users there but they feel that the roads are unsafe and that segments are missing, this is why we need more connectors and we are pushing the county to continue to work on this."- Christina Carton

Participant Observation

Participating in these meetings provided us with many connections to community influentials involved in the planning process. These meetings were a great stepping stone for us to make connections for interviews because of the wide variety of influentials who attended these meetings. We were also able to learn about wider capital region projects such as the bike share program. Watching the process of public interaction with community influentials was key to our research. The public had an effective role in trail planning by given time to suggest new locations for trails or trail connectors. Community influentials also looked toward the public for preferences of surface type and how the trails would be used. Trail planners took notes on public suggestions and took the time to listen to any concerns. These meetings gave us insight into public and trail planner interaction, which trails are most popular, and the current work being done on trails.

GIS

The average trail length of three miles is relatively short, especially for road cyclists who need longer stretches of trails for continuous riding. This was an issue that many of our survey respondents noted as a problem in Saratoga County, because they could not use trails for any

significant length. Because trails are on average short in Saratoga County, there is a greater need for trails connecting to other trails so that cyclists, runners, and other trail users can use the trails continuously as a trail network.

Because there are disconnected systems of trails such as in public parks like Moreau State Park and Spa State Park and in nature preserves, many of the Saratoga County residents have to drive to get to these trails. Many of the survey respondents wished that they could access these trails easier and without the need of their cars. This speaks to the need for greater connectivity from trail to trail, and trails going into population centers. (Figure 8) shows that Saratoga County has a fragmented trail system without much fluidity. It is important that connecting these small fragments of trails remain a priority for future trail planning.

For the cities and towns with low connectivity including Ballston Spa, Malta, South Glens Falls, Saratoga Springs, and Schuylerville, trail planning needs to incorporate trails into the transportation sections of their respective comprehensive plans. In these towns and cities, trails are concentrated in parks and nature preserves without connection to the population centers (Figure 9-13) Improving trail connectivity to these downtown areas, shopping centers and other community amenities would increase the usership of trails, especially for commuting.

Evaluation of Trails in Saratoga County

This study found that the trail planning process in Saratoga County is inclusive to the public, many trail planning committees, user groups, NGOs, and planners in Saratoga County. The trail meetings like the ones held by the Green Belt Trail, Pitney Meadows Farm, and the Countywide Trails initiative were especially effective in bringing the public into the planning

process. This was a significant advantage that Saratoga County has in planning effective trails that reflect what people actually want out of their trails.

However, many of the planners agreed that the trail system in Saratoga County needs to improve on the conditions we examined including connectivity, safety, adequate signage, and multiple uses. Only having 13% of trail-users use trails for commuting indicates that there is an issue in both connectivity and perhaps safety. The CDTA study also showed that for the Zim Smith Trail, Spring Run Trail, and Railroad Run, the gender divide for bicyclists is mostly male, which perhaps suggests a safety issue on these trails for bicyclists. Safe bicycle infrastructure should be further studied by municipal and county planners.

Signage and wayfinding is also a problem for the Saratoga County trail system. On site and online maps and sign need to be adequately provided to increase trail usership.

Ultimately, the Saratoga County trail system has a publicly inclusive planning process, yet many problems remain with safety, connectivity, adequate maps and signage, and the need for trails to work better for commuters.

Recommendations

After considering our survey, interview, and GIS findings we developed a few key recommendations:

1. Our first recommendation is in reference to the public's desire for a user friendly online trail map. Saratoga County does actually have an online trail map. It can be found under the explore section of Saratoga PLAN's website (Figure 15). The map includes markers for trailheads and preserves. When selected, each marker reveals a pop-up window which gives details of the trail or preserve location, features, length, and surface type. A

link to learn more is provided which brings the user to a page with a detailed paragraph summary of the trail and the activities permitted on it. There is also a link to a PDF file of the trail map available under the learn more section. While this map provides valuable information, there is room for improvement.

For example, the San Diego Hikers association has a similar online trail map with different colored markers to indicate trail difficulty (Figure 16). Green markers denote easy trails, blue are intermediate, and red markers are “for the pros” (San Diego Hikers Association, 2017, pg. 1). The site also provides an interactive detailed trail map instead of a PDF file and a more concise summary of the activities permitted on the trail by using easy to read icons that can be quickly referenced.

2. A significant portion of the Saratoga County residents seem unaware of the online trail map available to them. This can be remedied through advertising strategies such as posting the map or a link to the map on websites beyond just Saratoga PLAN’s. Potential websites to post on could include those associated with bike shops, outdoor activity stores, user group websites and Facebook pages, and websites targeted at tourists.

Paper copies of the map can also be distributed in downtown areas through coffee shops, community centers, public libraries, and outdoor activity stores. Posting of paper copies of the county wide trail map or a brochure of the trail map at trailhead would as be an effective method to spread the word even further. Kathleen Fyfe, from the Saratoga County Chamber of Commerce spoke with us about an initiative called Healthy Saratoga. This program works to promote parks, trails, and an active lifestyle to residents of Saratoga County with an overall goal of increased wellness throughout the county. The programs

homepage provides links to trail informational pages and could incorporate a link to Saratoga PLAN's trail map. Healthy Saratoga and the Saratoga County Chamber of Commerce would be an effective mode of promotion for the online trail map.

3. Many of the survey respondents wanted greater and more effective trail maps and signage. Saratoga County's lack of wayfinding signs and maps both online and on the trail, are a significant barrier for many people, including tourists, for using the trails.

Good way-finding signs show where trails are, where to connect to other trails, and the distances to places like community facilities. At trailheads, there should also be maps of the trail system. These factors should be considered when designing the maps and signage system in Saratoga County.

For Saratoga County to improve the trail system's usability, there should be a more unified sign system designed by a graphic design firm. Another option would be to use the signage for individual trails that work well and have that copied and applied county-wide. Unifying the way-finding signs would help connect the trail system together by planning routes through signage and maps more holistically. It would also allow for many of the smaller trails or small towns to be included in this effort.

V. Conclusion

Our research sought to understand how the public uses trails in Saratoga County, the trail planning process, the level of communication between the public and trail planners, and how trail systems in Saratoga County can be improved. Overall, trails in Saratoga County are used for a

variety of recreational purposes, yet there still remains a need to increase trail commuters by addressing remaining problems with connectivity, safety, and adequate maps and signage

Connectivity is key for the success of trails. More and more people want connections for both recreational and commuting purposes. This involves connecting trails to make them longer for recreational purposes so they can be of more of us to people who want to go on longer walks, runs or bike rides. Connectivity is also key for commuting because if there is no connections people will not use these connections to commute or if the connections are unsafe they will be less included to use them.

The trail planning process in Saratoga County has many outlets for public outreach and collaboration between user groups, NGOs, and other organizations. There is strong communication between the trail planners and the public during the planning process, however post development advertising of these trails can be improved. Once trails are development many people do not know that these trails exist of where they can locate them. This is why advertising of these trails should be improved. If people have no idea where to find trails, they will not be of us to the public.

Ultimately, trails are important for Saratoga County residents, businesses, and open spaces by promoting healthy lifestyles, increasing tourism, benefiting economic growth, and promoting sustainable solutions for transportation. Trails significantly improve community character throughout Saratoga County and are clearly a source of pride among county residents and are well used throughout the year.

Saratoga County is in a good position to improve its trail network with high levels of public support. In fact, 93% of our survey respondents want even more trails built throughout the county. Future trails should be planned and developed with greater public engagement, better connectivity,

and more accessible maps and signage to continue and further the success of the Saratoga County trail system.

VI. Acknowledgments

We would like to thank our mentor, Andrew J. Schneller, for all of his guidance and support throughout the duration of this project. We would also like to thank Kurt Smemo and Robert Turner for their leadership as professors. Thank you to all of those who participated in our semi-structured interviews and public survey, our research would not have been possible without your responses.

VII. References

- Behan Planning Associates, LLC et. al. (2006, November 21). Green Infrastructure Plan for Saratoga County.
- Bennett Midland, LLC. (2012). *Economic Benefits of Sustainable Streets*. NYCDOT
- Bornemann, G. Personal Interview. March 31, 2017.
- Carton, T. Personal Interview. April 5, 2017.
- CDTA. (2016). "Capital District Trail User Counts." Capital District Transportation Committee County Wide Trail Initiative. Participant Observation. April 20, 2017.
- Creswell, J. (2007). *Qualitative Inquiry & Research Design: Choosing Among Five Approaches*. Thousand Oaks: Sage Publications.
- Crude Oil Production. (2015). Retrieved
- Crompton, J. L. (2001). "Perceptions of How the Presence of Greenway Trails Affects the Value of Proximate Properties." *Journal of Park and Recreation Administration*, 19(3), 114-132.
- Fabozzi, T. Personal Interview. April 2, 2017
- Ferraro, R. and Jennifer Viggiani. Personal Interview. April 10, 2017.
- Fyfe, K. Personal Interview. March 31, 2017.
- Garrard, J., Handy, S., & Dill, J. (2012). Women and cycling. *City cycling*, 211-234.
- Greenbelt Trail Committee. Participant Observation. March 2, 2017.
- Kemper, J. Personal Interview. April 19, 2017.
- Kettlewell, J. Personal Interview. April 3, 2017.
- Leinberger, C. (2008, July 21). "Making Cities More Walkable." Interview by Alex Chadwick. Day to Day, NPR. Radio. Transcript
- Lindsey, G., & Nguyen, D. B. L. (2004). Use of greenway trails in Indiana. *Journal of Urban Planning and Development*, 130(4), 213-217.
- Martin, P. Personal Interview. March 31, 2017.
- Moore, R. (1992, February). "The Impacts of Rail-Trails: A Study of the Users and Property Owners from Three Trails." Pennsylvania State University. National Park Service.
- Morris, H. (2002, September). Trails and Greenways: Advancing the Smart Growth Agenda. Rails to Trails Conservancy.
- National Household Travel Survey. (2009). U.S. Department of Transportation Federal Highway Administration.
- Pitney Meadows Farm Community Planning Meeting. Participant Observation. March 5, 2017.

- Saratoga. (2016). *Multi-Use Trails*. Saratoga.com. Accessed October 15, 2016 from <http://www.saratoga.com/adventures/multi-use-trails/>
- Saratoga PLAN. (2017). *Explore*. Accessed April 5, 2017 from <http://www.saratogaplan.org/explore/>
- Shafer, C., Lee, B., Turner, S., Hughart, M. (1999, May). *Evaluation of Bicycle and Pedestrian Facilities: User Satisfaction and Perceptions on Three Shared Uses Trails in Texas*. Texas Transportation Institute
- Sivak, M. (2016, January). "Recent Decreases in Proportion of Persons with a Driver's License Across All Age Groups." The University of Michigan Transportation Research Institute.
- Speck, J. (2012). *Walkable City: How Downtown Can Save America, One Step at a Time*.
- The Town of Ballston Spa. (December, 2005). "Town of Ballston Final Draft Comprehensive Plan." Prepared by Landscape Architects, Architects, Engineers and Planners, P.C.
- USEPA. (2001). "Our Built and Natural Environments: A Technical Review of the Interactions Between Land Use, Transportation, and Environmental Quality." U. S. Environmental Protection Agency. Publication # EPA-231-R-01-002. Washington, D.C.

VIII. Figures

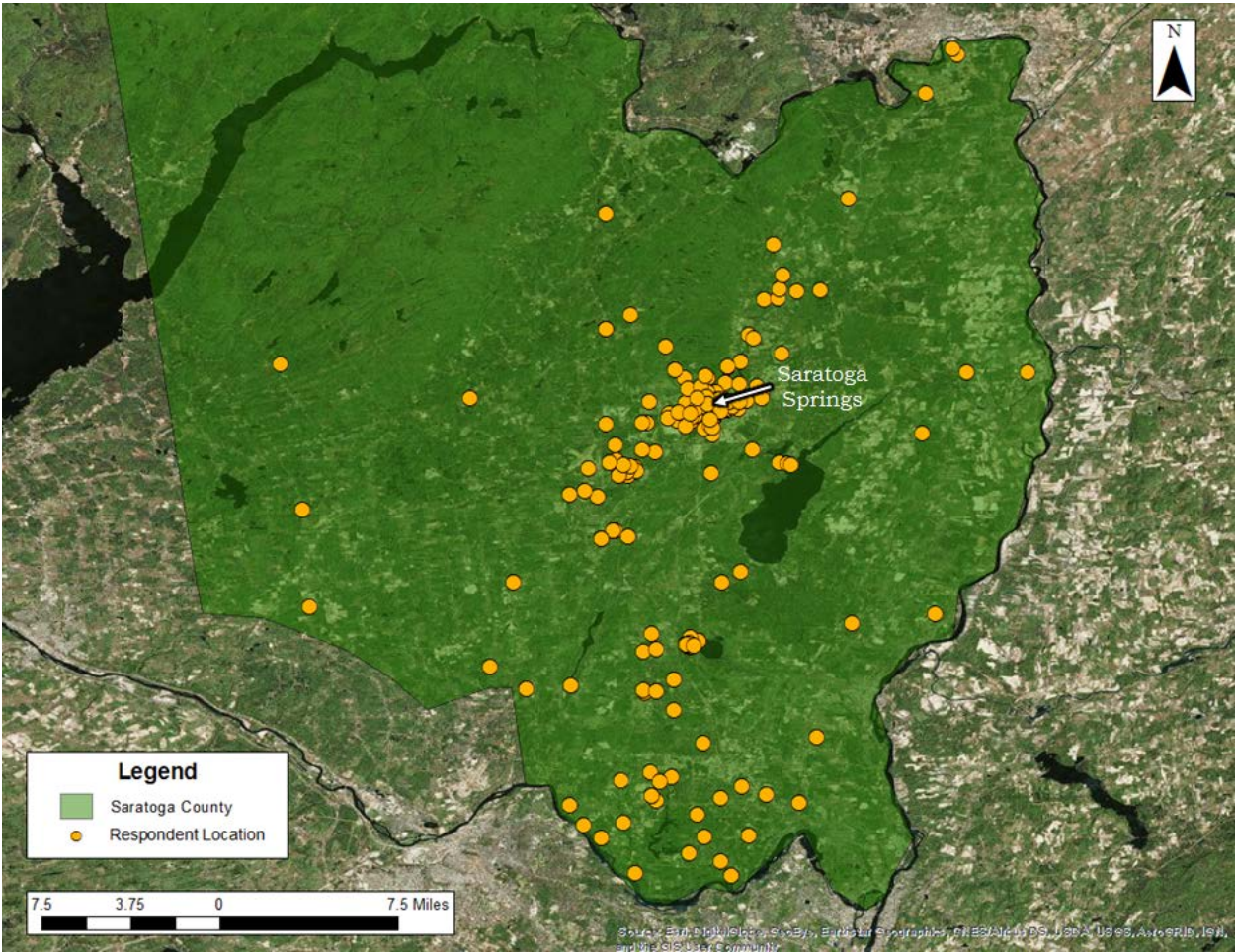


Figure 1. Survey respondent residence map

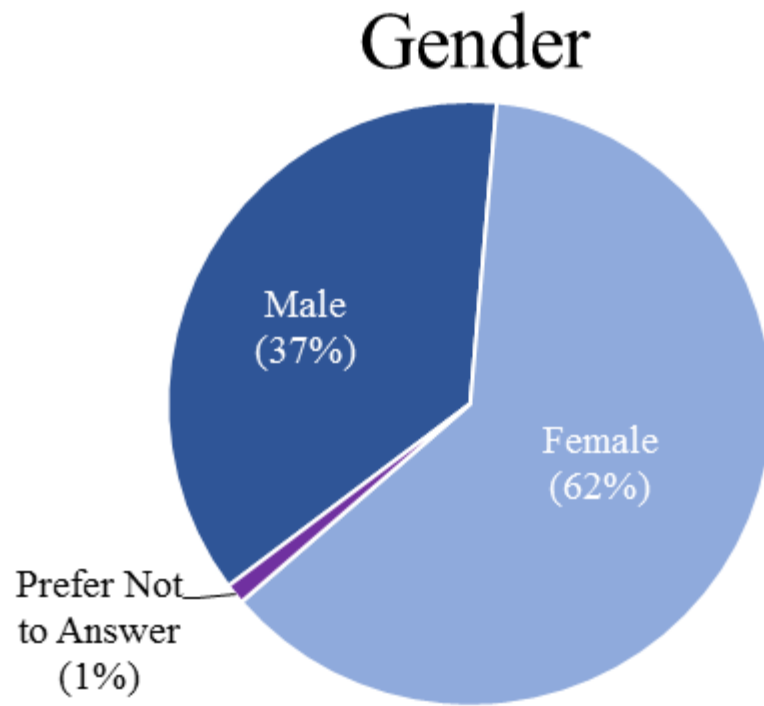


Figure 2. Gender distribution of online public survey respondents.

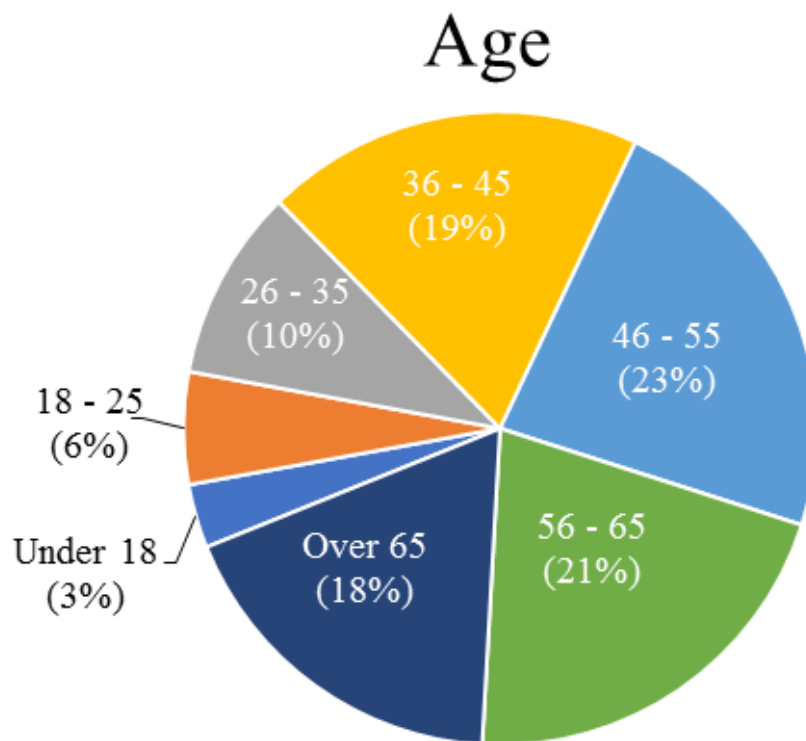


Figure 3. Age distribution of online public survey respondents

How often do you use trails in Saratoga County?

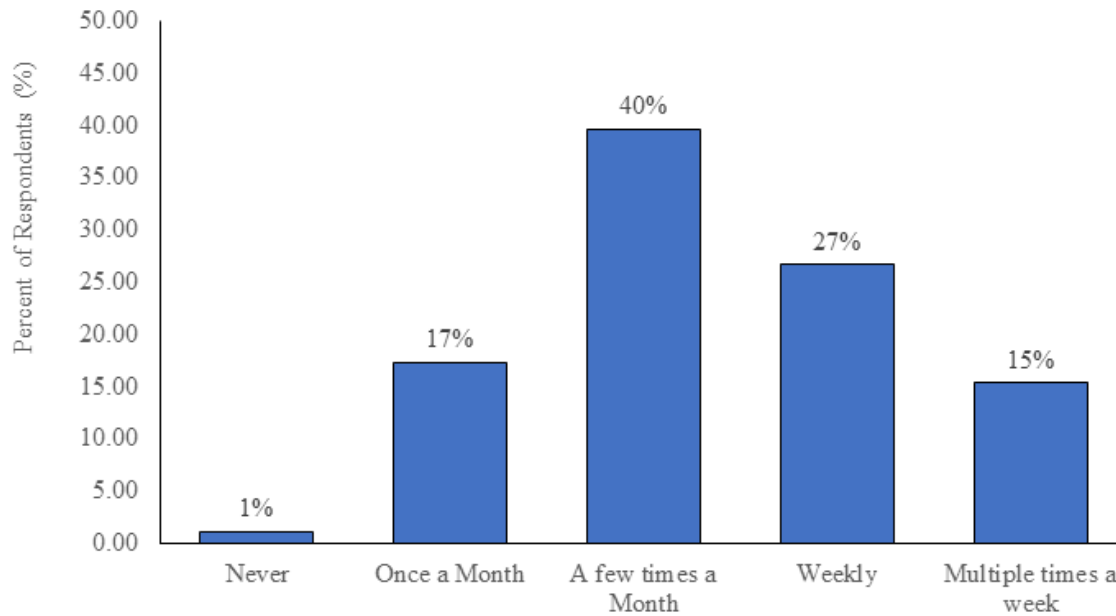


Figure 4. Survey responses to the questions “How often do you use trails in Saratoga County?”

What Prevents You From Using Trails in Saratoga County?

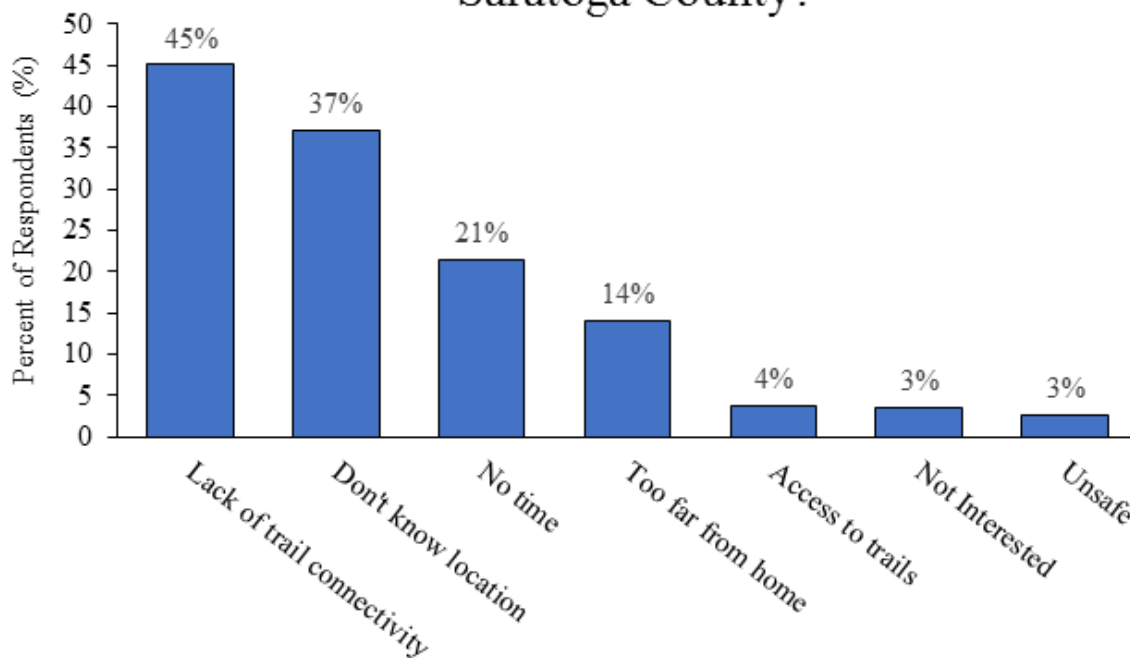


Figure 5. Survey responses to the question “What prevents you from using trails in Saratoga County?”

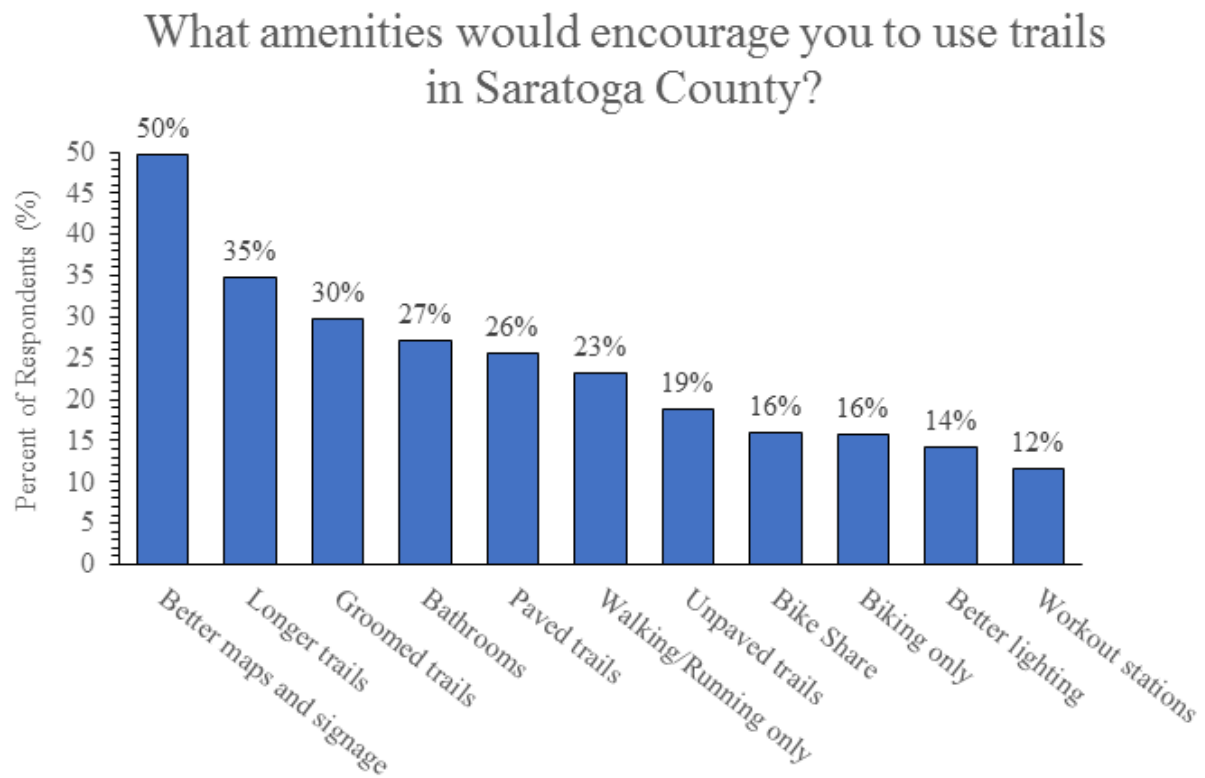


Figure 6. Survey responses to the question “What amenities would encourage you to use trails in Saratoga County?”

NGOs	Organization
Geoff Bornemann	Sustainable Saratoga
John Kettlewell	Saratoga PLAN, <i>Constituent Engagement Director</i>
Municipalities	
Peter Martin	City of Saratoga Springs, <i>Supervisor</i>
Todd Fabozzi	Saratoga Springs Board of Planners
Tina Carton	City of Saratoga Springs, <i>Parks, Open Land, and Historic Preservation/Sustainability Coordinator</i>
Jennifer Viggiani	Town of Clifton Park, <i>Open Space Coordinator</i>
Rocky Ferraro	Town of Clifton Park, <i>Former Executive Director of the Capital District Regional Planning</i>
County	
Jason Kemper	Saratoga County, <i>Director of Planning</i>
Kathleen Fyfe	Chamber of Commerce, <i>Vice President of Community Development</i>

Figure 7. List of semi-structured interviews conducted

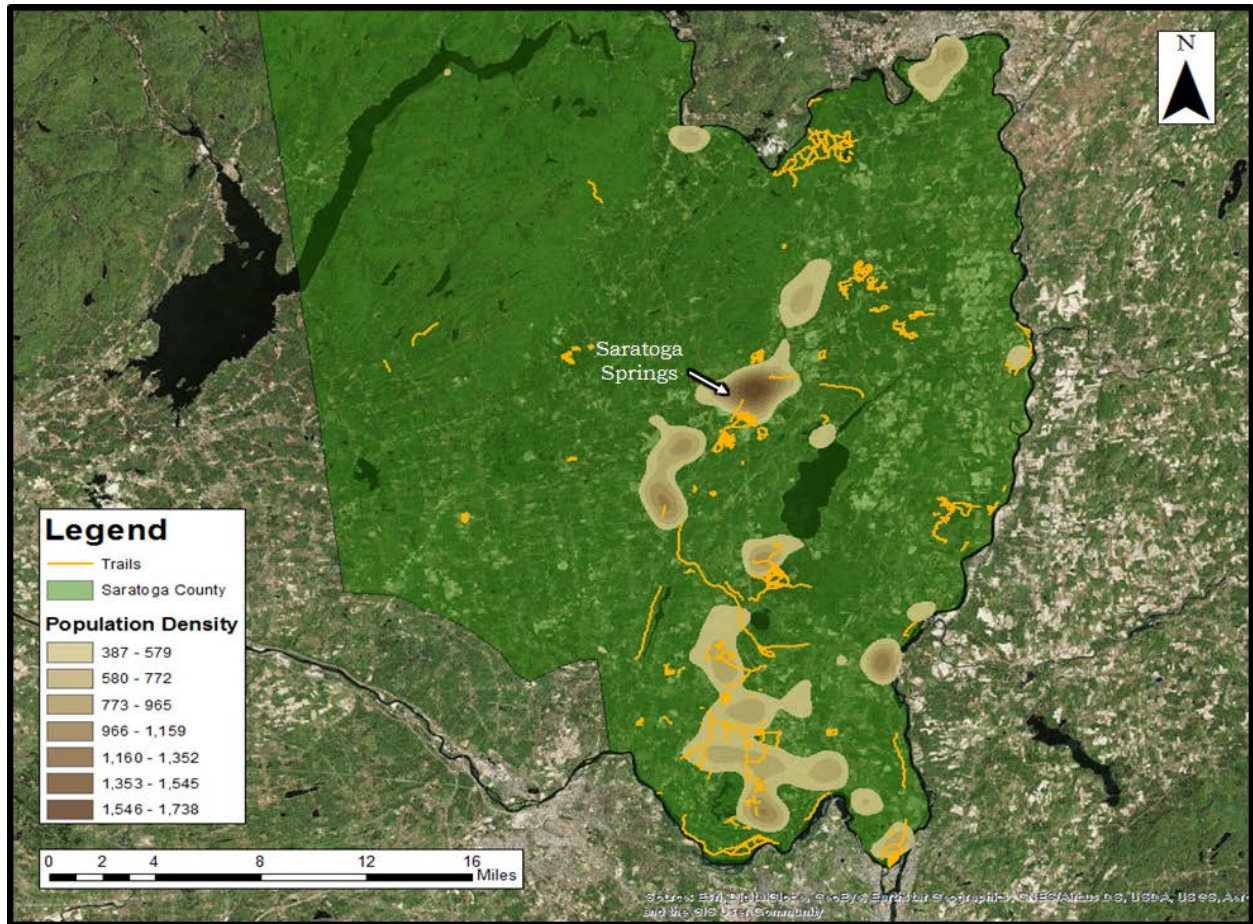


Figure 8. Map showing trails in relation to population centers in Saratoga County

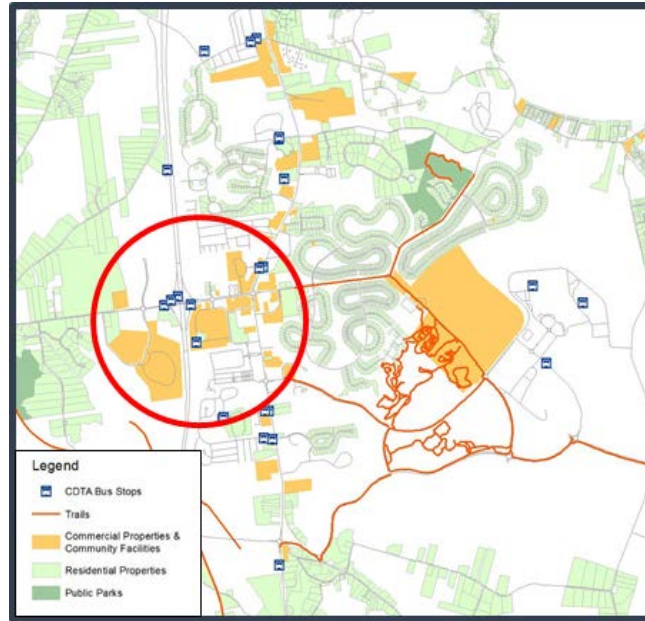


Figure 9. GIS connectivity analysis for Malta

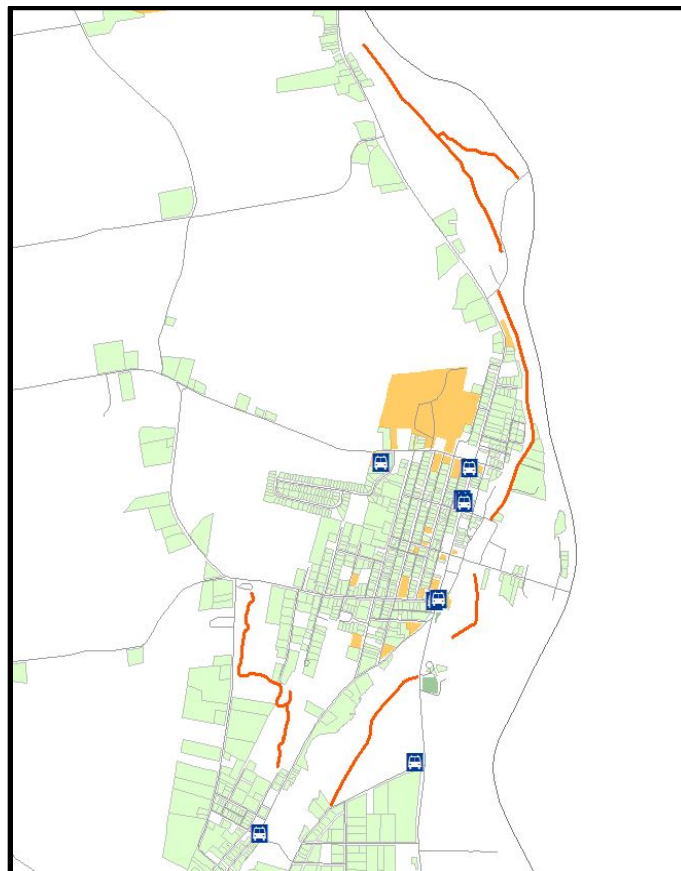


Figure 10. GIS connectivity analysis for Schuylerville

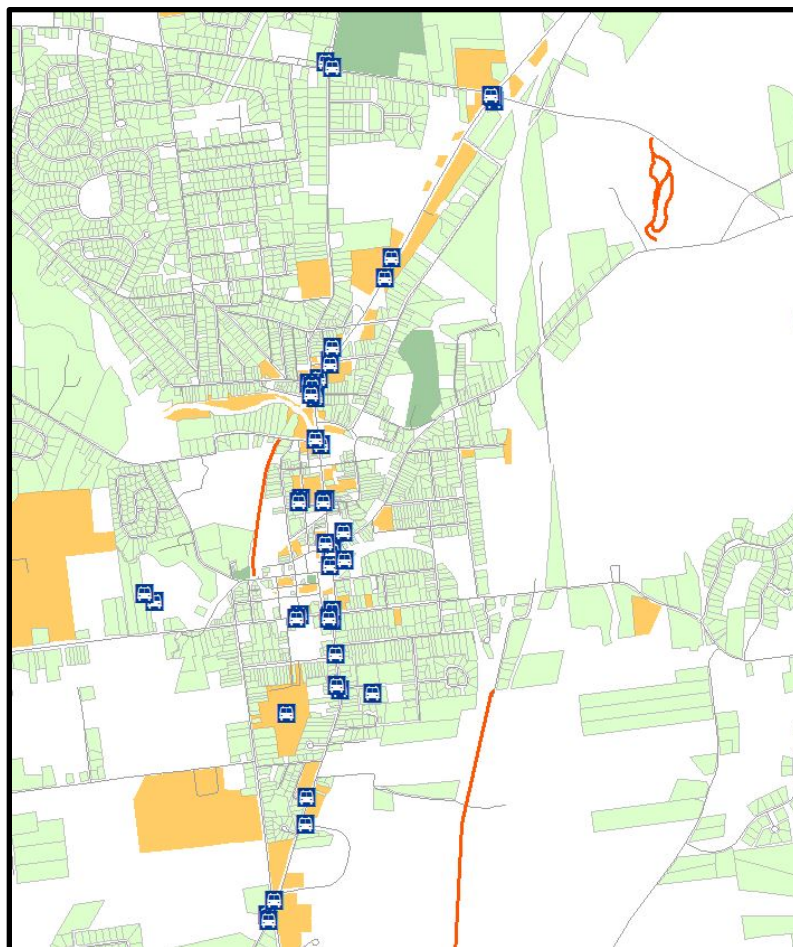


Figure 11. GIS connectivity analysis for Ballston Spa

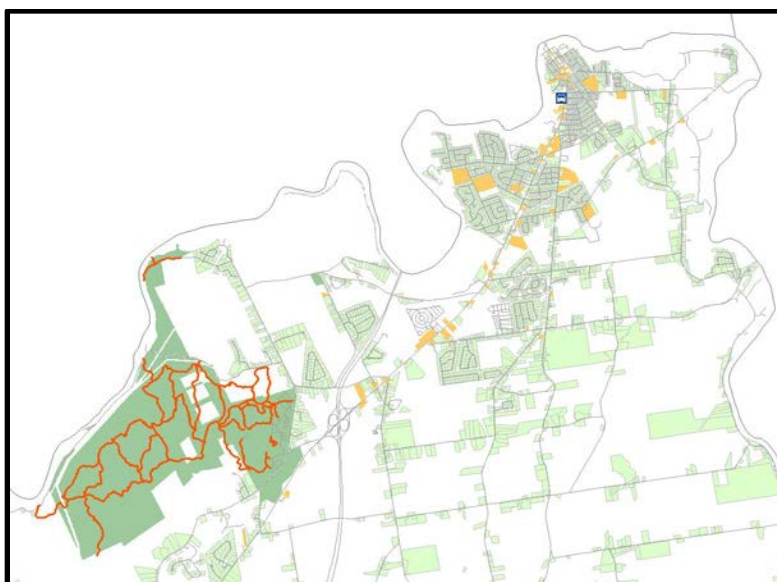


Figure 12. GIS connectivity analysis for Moreau and South Glens Falls

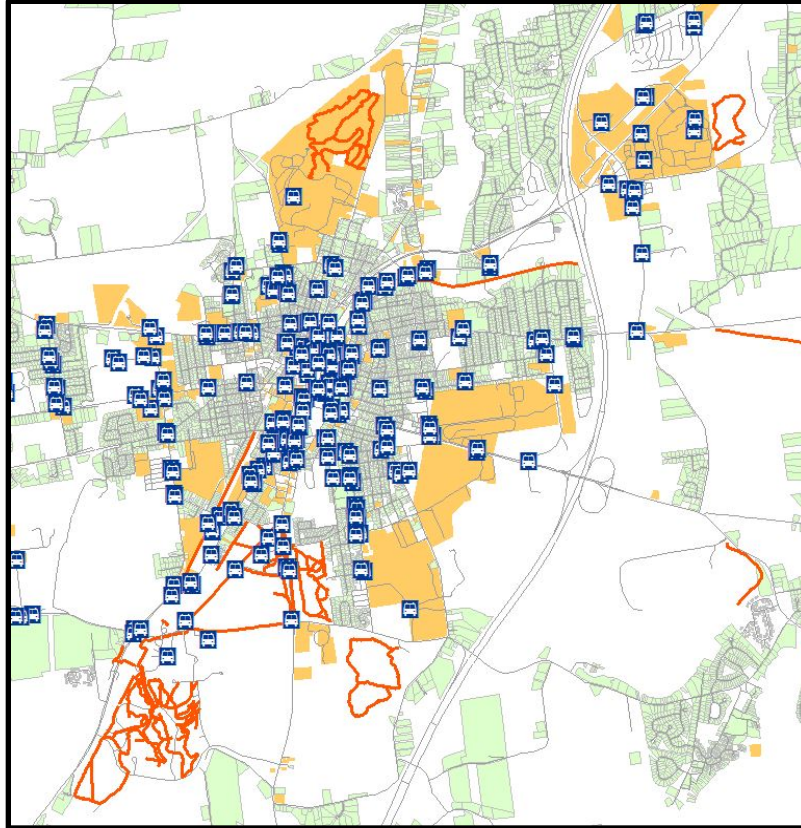


Figure 13. GIS connectivity analysis for Saratoga Springs

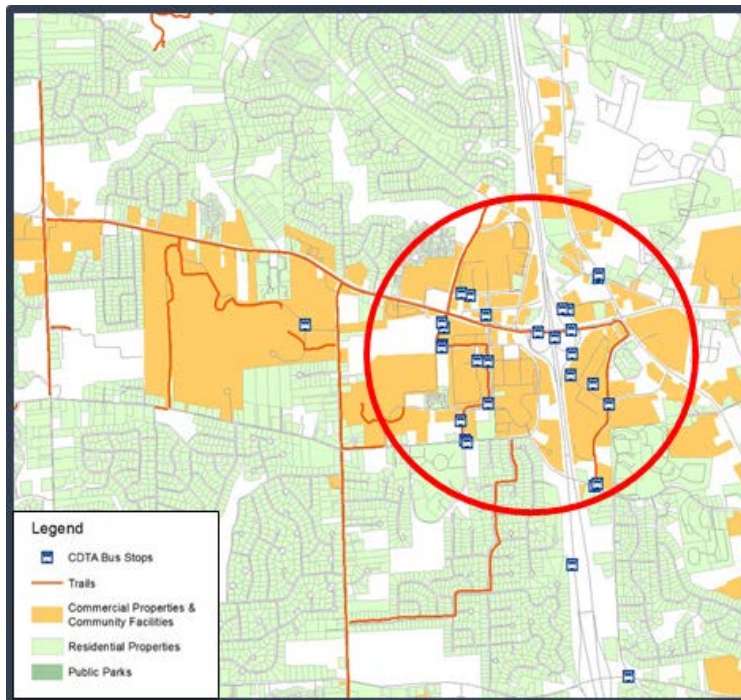


Figure 14. GIS connectivity analysis for Clifton Park

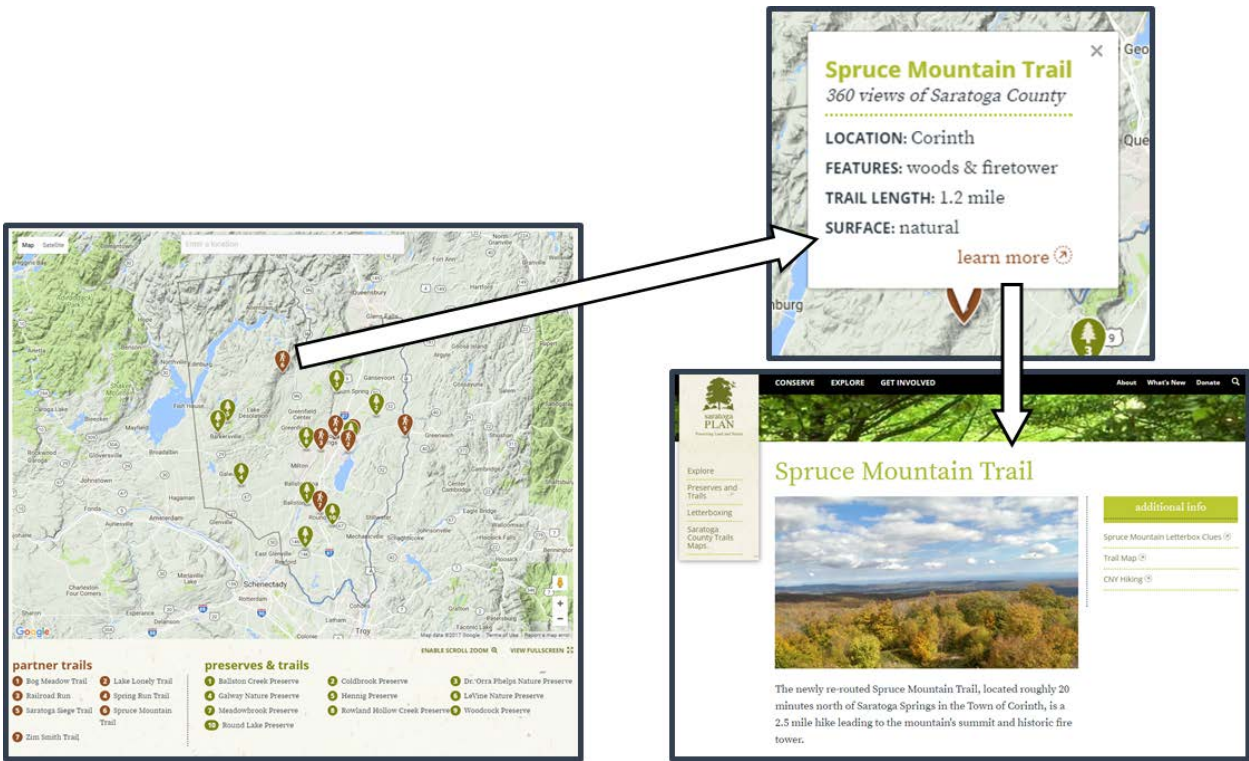


Figure 15. Saratoga PLAN online trail map (Saratoga PLAN, 2017)

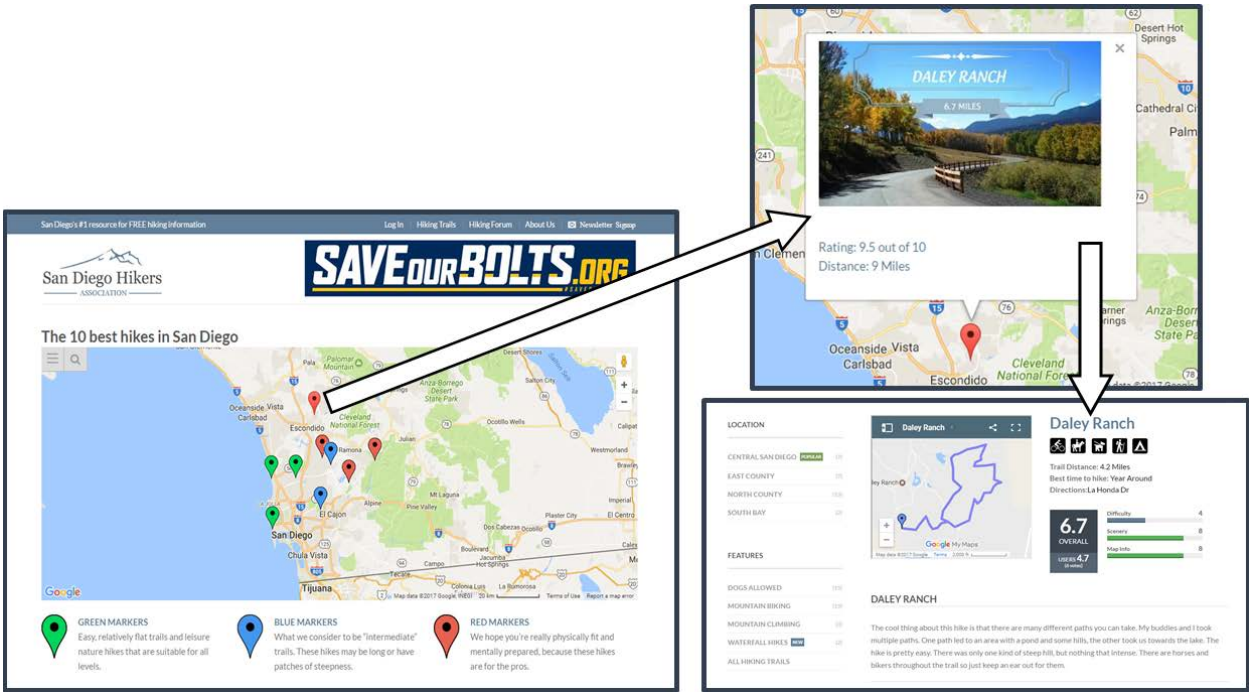


Figure 16. San Diego Hikers Association Online Trail Map (San Diego Hikers Association, 2017)