Prioritizing Trail Gaps Along the Susquehanna Greenway: *Analysis and Study for the Susquehanna Greenway Partnership*

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Contents

Glossary of Acronyms

SGP - Susquehanna Greenway Partnership
DCNR - Pennsylvania Department of Conservation and Natural Resources
SEDA-COG - Susquehanna Economic Development Association Council of Governments
WATS - Williamsport Area Transportation Study

Defining terms

Definitions for the following terms have been adapted from the Susquehanna Greenway Partnership Strategic Plan:

Trail gap refers to areas between two or more different land trails or water trails (navigable streams). Such areas where a trail does not yet exist is considered a *gap*. Pennsylvania's Department of Conservation and Natural Resources (DCNR) defines a trail gap as "An existing land-based trail which is recognized as a major or regionally significant greenway that has a missing segment(s) … and is identified in an official planning document". Trail gaps in this study must also make possible the connection of another trail or trail network, connect trails or sections of trails, to help extend existing trails into nearby local or regional parks, river accesses, or population centers.

The image below illustrates a trail gap that exists in Lewisburg, Pennsylvania - the Buffalo Valley Rail Trail connection to downtown parks and the riverfront (Figure 1). The red oval indicates a trail gap that exists in Lewisburg, Pennsylvania. The gap is a missing formal link between two separate trail networks.

Figure 1

Greenway is a conglomeration of two words, "greenspace" and "parkway". It is referred to as a, "corridor of open space"…"Greenways vary greatly in scale, from narrow ribbons of green that run through urban, suburban, and rural areas to wider corridors that incorporate diverse natural, cultural, and scenic features. They can incorporate both public and private property, and can be land or water-based" (Susquehanna Greenway Strategic Action Plan, 2006, p. 3).

Susquehanna Greenway Corridor is the greenway that has been designated and mapped along the Susquehanna River. It lies between 1 to 3 miles on either side of the River like a green ribbon that splits the commonwealth. The map below illustrates where the Susquehanna Greenway Corridor exists within Pennsylvania (Figure 2).

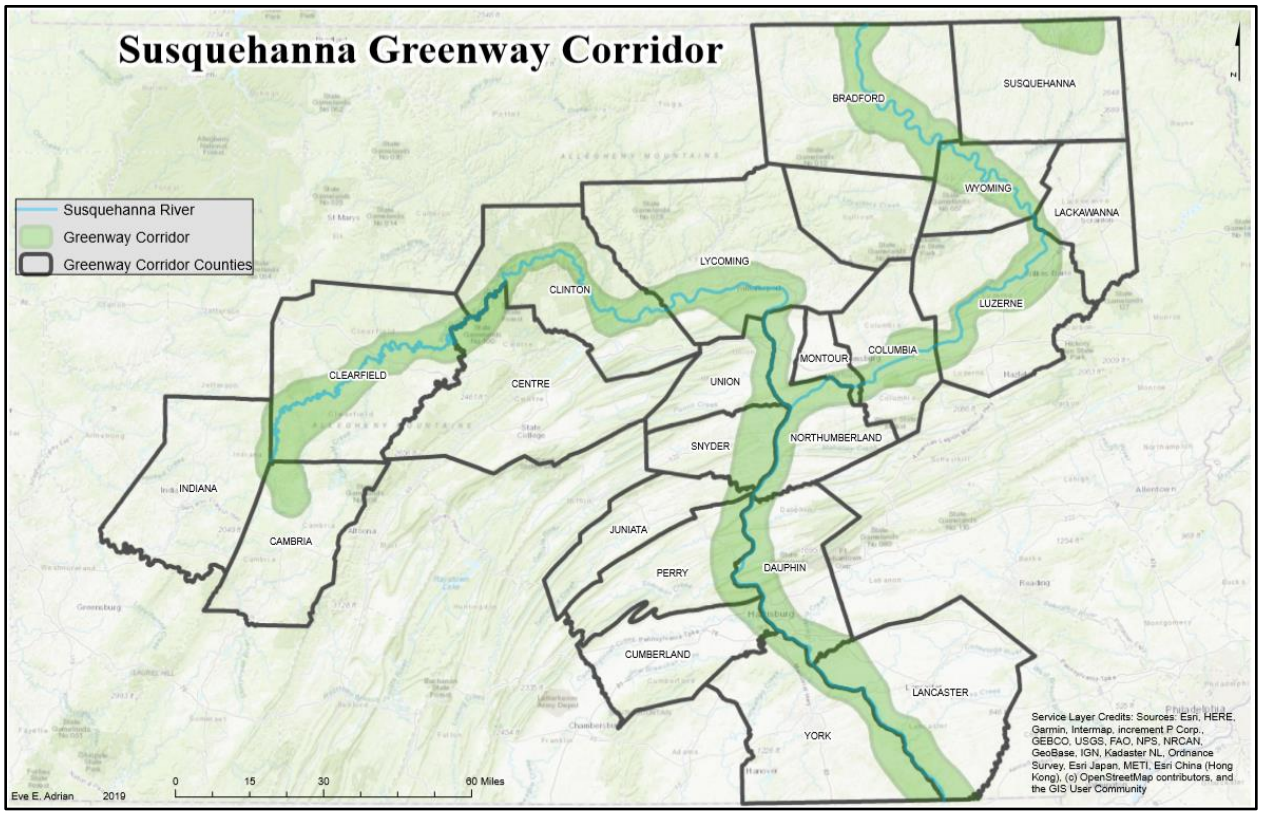

Figure 2

Abstract

What are the priority trail gaps along the Middle Susquehanna Greenway Corridor? A study and analysis of greenway network connectivity

The objective of this project was to help communities that are situated along the Susquehanna River make streategic multi-modal trail connections by identifying and prioritizing the trail gaps that exist along the seven-county Middle Susquehanna Greenway Corridor. Four unique prioritization methods were developed after reviewing case studies, articles, and planning documents; conducting a GIS coding and analysis, and engaging in interviews with planning staff and partners. This research found that there are over 40 trail gaps that exist in the Middle Susquehanna Region. The trail gaps in the study area were analyzed according to criteria such as number and type of landowners, miles to connect, plan continuity, obstacles, and the presence of cultural or historical sites along the route. Top trail gaps were identified from this system, though many of these gaps were challenging to prioritize due to a lack of information about their physical features. Further planning should be conducted to more thoroughly understand the route options and feasibility of the trail gaps identified in this research. Inventorying and prioritizing trail gaps benefits communities and planning bodies in several ways: by helping these entities make more-informed planning decisions, by being able to prioritize projects according to what funders find favorable, and by gaining a better understanding of where gaps in multi-modal services are located. The hope of this research is that it will be used and adapted in future greenway planning along the Susquehanna and beyond.

"Greenways and trails are one of the Commonwealth's most powerful tools to achieve sustainable growth and livable communities"

-Pennsylvania Department of Conservation and Natural Resources

Introduction

Greenways are ecological and recreational buffers that border rivers. They connect animals and humans to, and along, these river systems; encouraging tourism is another element of well-established greenways. The Susquehanna Greenway is one such greenway that supplies the Middle Susquehanna Region with recreational assets, multi-modal transportation corridors, and tourism opportunities. By expanding the network of trails along the greenway by identifying and prioritizing trail gaps, the Middle Susquehanna Region would be equipped to attain competitive funding and plan more strategically for the future.

Background

The Susquehanna River is an ancient waterway that stretches from western New York to the Chesapeake Bay. It has been sculpting and shaping the iconic ridge and valley system and pastoral lands of the eastern United States for a millennium. The river has served many purposes throughout its history; as a transportation route and source of food, a canal system for logging during the timber boom, and a recreation hub for outdoor enthusiasts. Most importantly, it continues to serve as a critical connection to our shared histories and to our visions for the communities that thrive along this river. As these communities plan, their proximity to the river becomes a central theme to their futures, and an integral component of their collective identities. Better connecting residents to the river can help establish a stewardship mentality, and connecting communities along the river to one another can help build local economies. Vibrant futures stem from integrating our natural features into our planning efforts.

Purpose

The overarching purpose of this study is to identify priority trail gaps along the middle Susquehanna Greenway Corridor; such an analysis does not currently exist. The intention is to help the communities situated along the Susquehanna, known as “river towns”, make strategic connections along the river, and to serve as a case study for future trail research in this region and beyond. It was also intended to benefit the Susquehanna Greenway Partnership by determining how many miles of trail that have been built during their existence as a non-profit, as this organization provides technical assistance to towns along the Susquehanna and was the primary research partner. Additionally, this study was intended to provide the PA Department of Conservation and Natural Resources (DCNR) with more data for their statewide trail and trail gap inventory.

This project provides a substantial body of research and a framework tool for planners to use when they consider the future of their communities. The methods, criteria, classifications, resources, and case studies catalogued in this report are designed to be transferable for urban metro agencies who are working towards regional trail systems, for small towns who desire increased connectivity, or for academics who are researching effective trail planning techniques. This report is a guide for lead

agencies at any level in their trail planning process. It is designed to provide a measurable procedure for prioritizing the trail gaps that exist within the snaking Susquehanna Greenway Corridor and beyond.

The focus area for this study included 7 of the 22 counties that are situated along the Susquehanna River - Clinton, Columbia, Lycoming, Montour, Northumberland, Snyder, and Union (outlined in black in Figure 3). These counties, excluding Lycoming County, as it has its own Metropolitan Planning Organization (MPO), make up the SEDA Council of Governments (COG). Operating as a Regional Advisory Committee, these counties have been engaged in a multi-modal planning effort to expand the trail systems in this region; to connect them to build a robust network that spans the entire greenway.

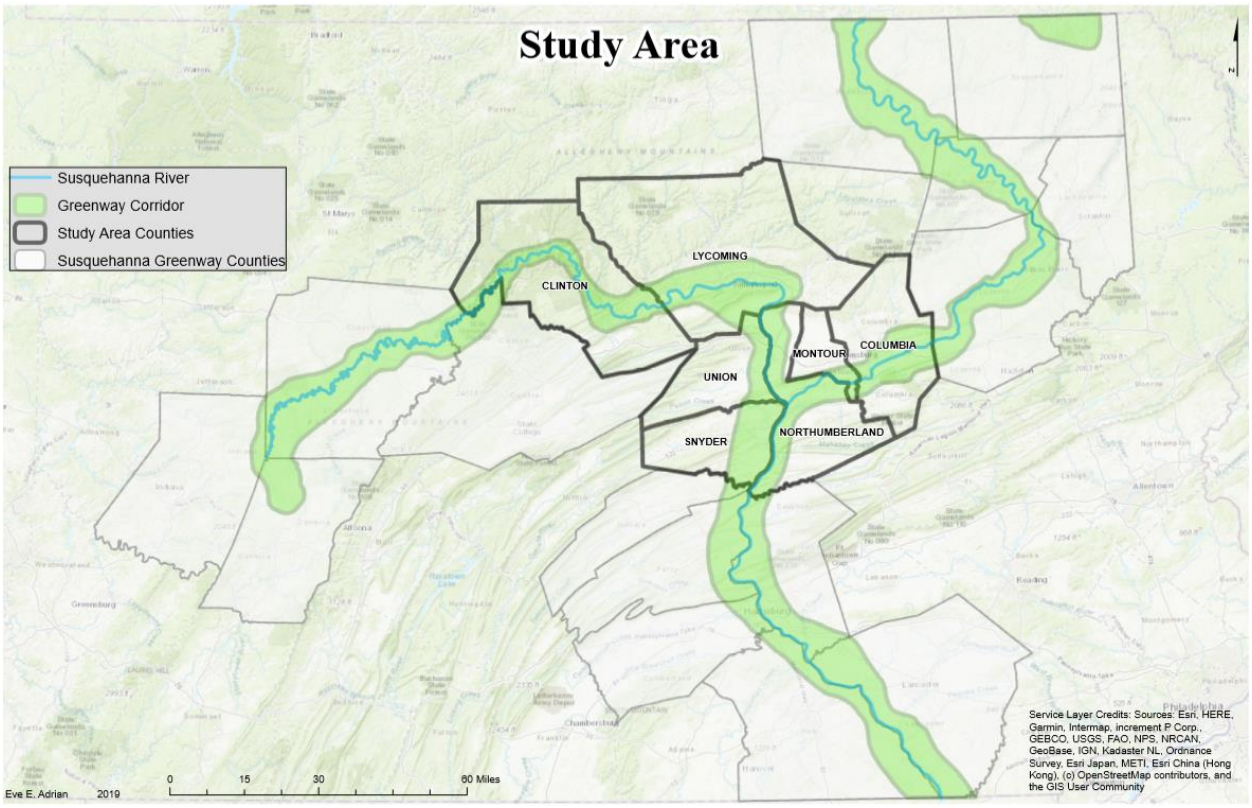

Figure 3

Literature Review

This section provides a brief literature review regarding trail development methods, economic return on investment, health benefits, sense of place, and equity issues regarding trail placement.

The formally published and edited literature on trail gaps is nearly non-existent. However, there is a large body of research on the effects of having trails in communities. Of all of the research and case studies that have been reviewed in this report, none have reported negative aspects of trails. It is telling that such an overwhelming account of the effects of trails are positive. While dissenting information

related to trail development does exist in blogs and editorials, none were identified in reports and articles during the research exploration performed for this study.

Economic return on investment (ROI)

Having a trail or open space within ½ mile a property increases the value of the property and boosts local spending (Pennsylvania Land Trust Association, p.2, 2011; ELGP, Econsult Corporation, and Keystone Conservation Trust (KCT), p A.7, 2011; Outdoor Industry Foundation, p. 6, 2006).

An Economy League of Greater Philadelphia (ELGP), Econsult Corporation, and Keystone Conservation Trust (KCT) developed for Delaware Valley Regional Planning Commission (DVRP) and the Green Space Alliance a report on return on environment (ROE) from protected open space. While trails and protected open space may seem to be separate topics, trails, in the study area of this research, are often located along protected open space. The researchers found that home sales within the mostly-upper-class Township of Radnor (nearly 18 miles north of Philadelphia) that were located within a quarter mile of the Radnor Trail saw an estimated $69,139 of additional value, and that home sales within a quarter mile of the Perkiomen Trail saw $4,766 of additional value. Homes immediately adjacent to protected open space in Bucks, Chester, Delaware, and Montgomery counties also claimed an average of $10,000 in additional value over comparable homes farther than one mile from open space. Homes that are located a half mile from open space in these counties enjoy an average increase of $5,000. All homes in southeastern Pennsylvania are, in fact, worth $10,000 more because of access to open space. This amount compounds to a gain of more than $16.3 billion for the region's economy (2011). These four counties surround the City of Philadelphia, and are some of the densest in the entire Commonwealth. This is an important detail, as these benefits in home values are primarily seen in urban and suburban areas. As the housing density decreases, the less likely a person can expect an increase in property values. This is due to increased rural proximity to open space even if it is not public, and the potential opportunities to connect trails to resources such as local shopping centers and schools.

City homes that are immediately adjacent to open space and parks see their value increase on average of $35,000 relative to comparable homes that are greater than 1 mile from open space. For suburban homes, the value of immediate adjacency is $10,000, declining to $5,000 within ½ mile (ELGP, et. al., p. A.7, 2011). The researchers found that a likely reason for the higher value to city homeowners is that, where an amenity is relatively scarce, it has a greater value. Since dense urban environments have less open space in general, the value of proximity to it is higher than in more rural areas where open space exists in greater abundance. This is further supported by the fact that house values in Philadelphia are, on average, less than those in the suburbs. So, the fact that open space not only has a higher percent value but also a higher dollar value in the city is consistent with the notion that its relative scarcity is what is driving this result (ELGP, et. al., p. A.7, 2011).

Economic trends such as these are not unique. Maryland's Northern Central Rail Trail profited the state $111,000 annually (The Business Council of New York State, Inc, p. 4, n.d.), and Dunedin, Florida, saw a 35% reduction in storefront vacancy after transforming an abandoned railroad into the Pinellas Trail. There was even a waiting list for available downtown space. Visitors in Stowe, Vermont, stay about one

day longer than other resort areas because of the Stowe Recreation Path (Pennsylvania Land Trust Association, p.3, 2011).

In terms of job growth, trail construction projects are found to create twice the number of jobs per mile as road construction projects because, while road construction projects tend to be dependent on materials and construction equipment, trail construction projects are more labor dependent. This creates more jobs at a lower cost (Broat et. al., 2015, p. 43). Broat et. al. also found that the most profound economic benefit are "spillover effects" after construction, which are the various indirect ways trails and multi-modal travel can contribute to some economies (2015).

Health

Proximity to trails has been found to increase rates of exercise and improve residents' health, which is important in the work of prioritization if a planning authority has a goal to reduce obesity or weight-related diseases in a community (Headwaters Economics, 2016; Abildso, C., S. Zizzi, S. Selin, and P. Gordon, 2012; Deenihan, G. and B. Caulfield, 2014; Wang, G., C.A. Macera, B. Scudder-Soucie, T. Schmid, M. Pratt, and D. Buchner, 2005; Grabow, M., M. Hahn, and M. Whited, 2010; BBC Research & Consulting, 2014).

The ROE Report ELGP, Econsult Corporation, and KCT found that outdoor exercise (not just on trails) improves health and wellbeing, and reduces the risks of cardiovascular disease, diabetes, certain cancers, and obesity. It reported that 41% of moderate or strenuous physical exercise was performed in a park or on a trail, and that this improved health prevents nearly $800 million in medical care costs annually in Pennsylvania's southeast region. This economic value increased to nearly $1.3 billion in savings when you add avoided workers' compensation costs, and costs related to lost productivity in addition to direct use benefits and avoided medical care costs (2011). Residents who live in communities that are located along trails can enjoy reduced medical costs because of their proximity to these low-to-no-cost recreational assets (Pennsylvania Land Trust Association, p.3, 2011).

An investigation by the National Park Service on the overall health benefits of outdoor recreation found that regular outdoor exercisers filed 14% fewer claims for insurance than people with sedentary lifestyles. The study also found that healthy people filed 41% fewer claims that were over $5,000 and spent 30% fewer days in the hospital. Therefore, people who recreate outdoors were found to pay less for their health insurance (Greenways Incorporated, 1992).

In Morgantown, West Virginia, 60% of trail users report they exercise more regularly since they began using trails, and 47% of trail users report getting their recommended physical activity through trail use alone. Twenty-three percent of respondents did not exercise regularly before using the trails (Abildso, C., S. Zizzi, S. Selin, and P. Gordon, 2012).

Sense of place

The presence of trails in a community influence residents' choice to stay in an area (Headwaters Economics, 2016; Whatcom Mountain Bike Coalition, 2014; RRC Associates, 2015; Resource Dimensions, 2005; Bowker, J., Bergstrom, J., Gill, J., and Lemanski, U, 2004; Greer, D.L, 2001).

In a survey from Whatcom County, Washington, 95% of long-time residents stated that trails were important to their decision to stay in the area (Whatcom Mountain Bike Coalition, p. 19, 2014), and ⅓ of residents or Methow Valley, Washington, ranked recreational opportunities as the top reason they moved to the area (Resource Dimensions, p. vii, 2005). Similarly, Bloomington, Indiana property owners adjacent to trails found that social connection and connection to the natural environment as benefits of living near trails (Corning, S. E., Mowatt, R. A., and Chancellor, H. C., 2012). Sixty-eight percent of respondents in a report for Nebraska and Iowa felt that having trails nearby had a positive impact on their communities (Greer, Donald L., 2001).

Because trails make communities more attractive places to live, they can revitalize depressed areas and create a demand for space in what were once vacant buildings (Pennsylvania Land Trust Association, p.2, 2011). Trails and open space are destinations that attract visitors who spend millions of dollars in southeastern Pennsylvania's regional economy, according to the ROE Report from ELGP, Econsult Corporation, and KCT. Each year open space accounts for $566 million in expenditures and almost $299 million in salaries in Pennsylvania's southeast region, which translates to increased local tax revenues (Pennsylvania Land Trust Association, p.3, 2011). This economic activity generates $30 million per year in state and local tax revenue. This helps the local economies in the region, and it helps to create and sustain jobs in both the public and private sectors. In Pennsylvania's southeast region, preserved open space accounts for roughly 6,900 jobs annually in industries including agriculture, tourism, hospitality, recreation, and open space management and preservation (2011).

Equity

Transportation options designed with motor vehicles in mind are vast and often well-funded by states and the federal government. Transportation funding for trails, on the other hand, is limited and sometimes difficult to acquire. One important problem with designing transportation corridors for vehicles alone is equity. Millions of Americans, urban and rural, live below the poverty line, and do not have access to personal vehicles. This makes multi-modal transportation alternatives necessary for individuals to move from point A to point B without the need for a motor vehicle (especially for trails that link to areas of employment). Trails are more than just recreational assets. They are transportation, and federal government recognized this since the early 1990's, as most federal transportation grants required the construction of multi-modal trails or paths.

In a study done by Dilys Bowman regarding greenway trail placement in North Carolina towns, African Americans (who make up almost 22% of the state's population) accounted for 41% of the North Carolina bicycle crashes and almost 45% of pedestrian crashes from 1997 to 2006 (UNC Highway Safety Research

Center, 2006). The study found that this trend was similar in many cities throughout the state. Bowman found that this disproportionate rate of crashes was likely due to the fact that African Americans were less likely to own a motor vehicle, and were more likely to use other forms of transportation such as walking or taking the bus, and Broat et. al. identified that people making less than $25,000 per year were the largest population of bike commuters (Bowman, D., p. 153, 2009; Broat et. al, p. 47, 2015)).

Landowner concerns often circulate when a potential trail project is considered. One such popular objection to these projects regard a fear of increased crime and vandalism in their community or on their property (if the trail is expected to go through their property). As Bowman points out, "greenways often connect different neighborhoods or communities, and this is seen as a potential conduit for undesirable strangers - often black undesirable strangers. However, greenways are no more likely to be havens for crime than are the surrounding neighborhoods; they are less efficient as conduits for criminal activity than roads" (Bowman, D., p. 155, 2009). These concerns are born from persistent stereotypes and a spirit of racisim, and can inhibit the development of a trail project.

Greenways and trails, like any other public works project, are a form of community development, as is demonstrated by the vast economic reporting regarding trail and open space valuation. However, in lower-income and minority neighborhoods, what greenways offer may be secondary to other needed improvements. This does not mean that there is no value to a greenway in the neighborhood, but it does speak to the urgency for close attention to the needs of the people in that neighborhood (Bowman, D., p. 156, 2009).

At a societal level we still do not place as much value on bike and/or pedestrian infrastructure (Bowman, D., p.156, 2009). This is slowly changing, but, as municipalities and cities build these corridors, special attention must be made to ensure that these facilities are easily available to everyone, as access to multi-modal trails is critical to the professional and social life of diverse users (Bowman, D., 2009; Keith, S. J., Larson, L. R., Shafer, C. S., Hallo, J. C., Fernandez, M. (2018).

The scope of this paper did not include identifying trail access to low income or minority populations, but is identified as a recommendation for future research in the Middle Susquehanna Region.

Prioritization methods

Drawing from other researchers' trail gap prioritization techniques was challenging, as it is not commonly viewed as an academic venture. Because of this, few journal articles could be identified from which to extract methodologies. Instead, most of the exploration spent on identifying methodologies was done by finding planning feasibility studies by searching through county or city planning documents, or looking through case studies.

Broat et. al. (2015) suggested exploring trail networks along abandoned railroads, those that would connect population centers, those with safe street design, as well as identifying regional trail gaps to create trail networks that would be "low hanging fruit". Their gap analysis looked at the distance between existing trails and selected locations to highlight where connections could be made. From

there, they created a hierarchy of gaps by using a matrix that quantified specific variables to prioritize which gaps could be closed first. Highest priority were those gaps that connected "needy populations to job opportunities" as well as those that help to build a multi-modal regional transportation system (p. 57).

This trail gap matrix included station names, trail names, a comprehensive gap score showing distance from a train station (weighted and unweighted), a gap class score, struggling score, total score, and the location of the gap (Figure 4). In this research, a gap score reflected the distance between the train station and the trail (½ mile - 2 miles), and had the most weight out of all of the categories. The Struggling Score references a variable reflecting the percentage of the local population that is living at or close to the poverty line. Overall, the lower the Total Score, the higher the trail gap priority (p. 58).

Trail Gap Scores

Station		Trail	Gap Score	Gap Score Weighted (x 1.5)	Gap Class Score	Struggling Score	Total Score	Census Place
Inwood		Nassau Expressway Shared Use Path	1	1.5	1	1	3.5	Inwood
Massapequa Park		Bethpage Bikeway	1	1.5	1	3	5.5	Massapequa Park
Valley Stream		Valley Stream State Park	1	1.5	3	2	6.5	Valley Stream
Wantagh		Wantagh Parkway Bikepath	1	1.5	3	3	7.5	Wantagh
West Hempstead		Hempstead Lake State Park	2	3	3	2	8	West Hempstead
Hempstead Gardens		Hempstead Lake State Park	2	3	3	2	8	West Hempstead
Lakeview		Hempstead Lake State Park	2	3	3	2	8	Lakeview
Hempstead		Hempstead Turnpike Shared Use Path	3	4.5	3	1	8.5	Hempstead
Seaford		Bethpage Bikeway	3	4.5	1	3	8.5	Seaford
Westbury		Hempstead Turnpike Shared Use Path	3	4.5	2	2	8.5	Westbury

Figure 4 - Gap Analysis Matrix, Broat et. al., 2015, p. 58.

The City of Lebanon, Oregon developed a trail prioritization categorization tool that organized trails by their ownership and ROW status. Ownership options included city-owned, public ROW or easement; some private ownership, some city ownership, and public ROW or easements; sidewalks; private ownership with no public ROW; and water trails (City of Lebanon, p. 88).

After the trails are separated into their respective categories, a series of questions is asked of trail section to further prioritize the trails within each category. The following is an example of the list of

yes/no questions developed by a community trails advocacy group. These were used as the criteria for trail evaluation, as they describe favorable conditions or features to potential funders. Each question has a value of 1 point for a “yes” answer and 0 points for a “no” answer. Total scores of the trail is determined by adding up the number of points for each trail out of a possible 26 (see Appendix for full list).

1. Does the trail complete a connection within the city?
2. Is the proposed trail located off of, or set back from roads?
3. Does the trail provide a connection to existing neighborhoods?
4. Is the trail partially developed?
5. Is the trail a loop?
6. Is the trail close to schools or other services (grocery, library, etc.)?

After answering each question and adding up the points, the City of Lebanon uses a scoring matrix to list trails in order of their overall favorability (Figure 5). Trails that score high with this scoring method posess qualities that are attractive to trail users and trail project funders. The top trails listed in Figure 5 likely scored high because they connect to public facilities (schools, grocery stores, library, etc.), connect to a water body, are located along areas of the city that are aesthetically pleasing, and have few private landowners along the proposed routes.

City of Lebanon Trail Project Scores

Trail	Score	Description/Location
Marks Slough Phase 2	16	Across Tennessee Rd from Marks Slough Trail.
*Trail 21	15	Near Justice Center, Library, Pioneer Cemetery.
Trail 13 Section 2	14	Trail along Weirich Dr (Cheadle Lake entrance).
Trail 1 Section 4	14	Along Santiam Hwy, across from Hospital.
Cheadle Lake Island Trail	13	On Cheadle Lake Island, traverses entire Island.
Oak Street Pedway Section 1	13	Beside Oak Street, near western UGB.
*Trail 18	13	Off of Cascade Dr - south side of Wal-Mart.
Trail 23	13	Mostly existing trail on Crowfoot Rd.
Trail 5	12	Bridge from Mark Slough Phase 2 to P. Walden.
BCT Section 2	12	Between 15th and 16th St. North of Sherman St.
Trail 8 Section 1	12	Travels from of 4th and Oak to Wynn Mill Park.
*Trail 16	11	On 5th St near Pioneer Elem. Spur to skate park.
Trail 12	11	Roadside trail from View Ln to Weldwood Dr.
*Trail 17 Alt. A	10	Alongside Russell Dr and Mtn. River Dr.
*Trail 8 Section 2	10	On F St north of L.H.S., to Wynn Mill Park.
Trail 13 Section 1	9	On View Ln and Crowfoot Rd, to Santiam Hwy.
*Trail 1 Section 1	9	Connects from Burkhart Creek to Hansard Ave.
Trail 20 Alt. B	9	On Williams St., connecting to Industrial Way.
Trail 17 Alt. B	9	On River Rd, from Mt. River Dr to Cheadle L.

Figure 5 Entirely City-Owned, Public ROW, or Easements Trail Scoring Matrix, City of Lebanon, p. 91.

The Pennsylvania Department of Conservation and Natural Resources has been studying trail gaps throughout the Commonwealth since 2008. The agency's methods of collecting these gaps involve sending out communications among all PA counties sending DCNR datasets of their identified trail gaps. Originally, gaps were collected from organizations managing major greenways as well as a few statewide trail partners. DCNR then requested each organization's 10 priority gaps, but few parameters were placed on what was considered a gap. In the 2009 trail gap study, the definition of a trail gap was, "A missing link or connection between existing trails". In 2018, the definition of a gap narrowed to, "An existing land-based trail which is recognized as a major or regionally significant greenway trail system that has a missing segment(s) of no more than five miles and is identified in an official planning document". This restrictive distinction of what constitutes a recognized trail gap was unique among the methodology research done for this study, and DCNR was the only entity to provide such a definition.

DCNR's most recent trail gap criteria are as follows (quoted here verbatim):
1. The Gap would make possible the connection of a major or regionally significant greenway trail system; connects two or more trails; sections of trail; extending existing trails into state parks, state forests, public parks, or key communities.

2. To fill the Gap requires significant planning, construction, acquisition of right of way, development, infrastructure (drainage, bridge, tunnel), cultural & environmental considerations
3. The Gap itself is no more than 5 miles long
4. The trail has been formalized in an official planning document Trail Gap Criteria – Top 10 Trail Gap: (In addition to meeting criteria above):
5. The cost for filling the Gap is at least $1.0 million or more.
6. It would be possible to fill this Gap within the next 5 years.
7. Preference will be given to the Gaps that have resolved all right-of-way issues.
8. Preference will be given to the Gaps that have strong municipal support (ex. Willing to serve as primary sponsor/applicant and/or part of a multi-municipal agreement).
9. Preference will be given to those with multi-use accessibility for all users.

Summary of Prioritization Methods

The studies by Broat et. al. (2015), The City of Lebanon (2006), and DCNR (2014) all informed the methods used in this research in the Middle Susquehanna Region. The prioritization methods in Broat et. al. (2015) were outside the scope of this study; however, the format of the matrix that was used by Broat was a design that was able to be modified to the needs of this study (2015). The City of Lebanon (2006) had a series of criteria that they used to prioritize trail projects; however, only 9 of the questions were able to be used for this study. Many of the questions in Lebanon's analysis were too location-specific to be relevant in the Middle Susquehanna Region, but those that were able to be generalized were included in one of the prioritization methods in this study. Unique to the DCNR study was its use in defining what constituted a trail gap in this research (2014). A trail gap definition was not included in the Broat or The City of Lebanon studies (2015, 2006).

Methods

To answer the research question, "What trail gaps exist in the Middle Susquehanna Region, and how can they be prioritized?", a systematic approach was needed. The diagram below illustrates the methods used in this research (Figure 20).

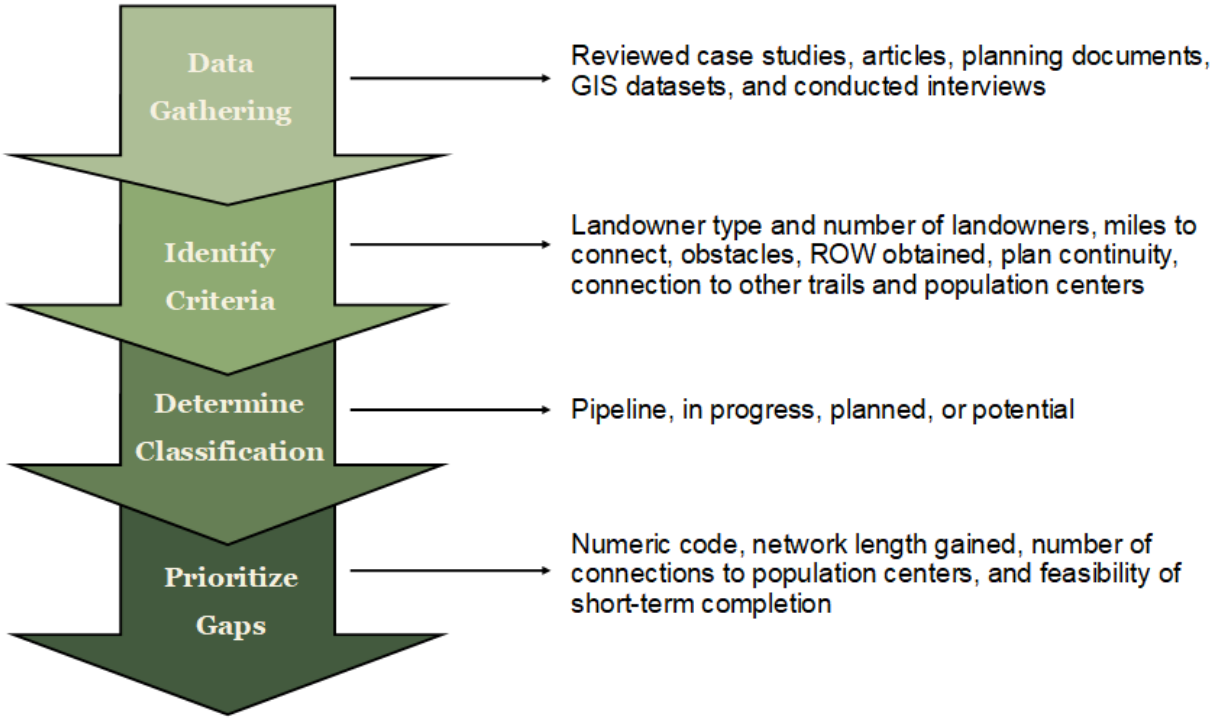

Figure 20

To understand what previous research and projects have been completed, I reviewed journal articles and various case studies throughout the country, but specifically along the East Coast. I contacted state agencies, county planners, and planning partners to gain a better understanding of the planning efforts that were done in the past and of those that are being done currently. I also compiled planning documents and GIS data from each county to ensure that this analysis was consistent with the counties' previous planning efforts.

From these plans, datasets, and interviews, I was able to identify 9 criteria that would provide detailed information about the trail. Once these criteria were determined, a classification could be assigned regarding how feasibly the gap could be completed within 5 years. Prioritization methods and further analysis could be done after the trail gaps' classifications were determined. This process is detailed in the Findings section of this report.

Data gathering

The data gathering step involved a review of case studies, articles, planning documents, GIS datasets, and by conducting over 15 interviews, comprehensive trail gap data was collected.

Review of case studies, articles, and planning documents

State, county, and municipal planning documents and feasibility studies were reviewed to determine where planned and proposed trails existed. Case studies from other locations were examined to determine how they evaluated trail gaps for priority and implementation.

The table below lists the 33 regional plans that were reviewed to gather necessary trail gap information for a categorical analysis. The goal of this analysis was to find trails that met the definition of "trail gap" as described in the Defining Terms section of this paper. Each identified proposed trail within the planning document was examined for the following, which relate to the 9 criteria listed in the second step of my methods, "Identify Criteria":

- Did the trail connect two existing trail segments?
- Would the trail expand a larger greenway system?
- Would the gap extend into existing parks?
- Would the gap connect two or more river accesses?
- Would the gap connect population centers?
- Would the gap make neighborhood connections within a community?

If any of the above criteria were met, the trail gap was included in this study as a trail gap (Figure 6).

Relevant Plans
Clinton County
Clinton County Comprehensive Plan, 2014
Clinton County Greenway and Open Space Plan, 2010
City of Lock Haven Comprehensive Plan, 2005
Columbia County
Berwick Town Trails, 2010
Columbia County Comprehensive Recreation, Parks, Greenways, and Open Space Plan, 2007
Lycoming
Jersey Shore Active Transportation Plan, 2018
Lycoming County Comprehensive Plan, 2018
Lycoming County Long Range Transportation Plan, 2018
Montoursville to Muncy Feasibility Study, 2009
Williamsport Comprehensive Plan, 2017
Susquehanna River Trail Feasibility Study: The City of Williamsport to Jersey Shore Borough, 2009
220/I/99 Planning Area Comprehensive Plan, 2018
Montoursville-Muncy Comprehensive Plan, 2018

Route 15 South Planning Area Comprehensive Plan, 2018
Lower Lycoming Creek Planning Area Comprehensive Plan, 2018
Muncy Heritage Park and Nature Trail Master Plan, 2008
Muncy Creek Planning Area Comprehensive Plan Comprehensive Plan, 2018
Montour
Danville Riverfront: A Plan for Creating an Active and Connected Community, 2012
Montour County Comprehensive Plan, 2009
Northumberland
Northumberland County Comprehensive Plan, 2005
Warrior Run Pathways Partnership, 2006
Snyder
Selinsgrove Borough Comprehensive Plan, 2016
Snyder County Comprehensive Plan, 2001
Union
Union County Comprehensive Plan, 2009
Union County Greenway and Open Space Plan, 2017
Multiple
North Branch Canal Trail Feasibility Study, 2009
Susquehanna River Water Trail - West Branch Stewardship and Conservation Plan, 2009
Middle Susquehanna Bicycle and Pedestrian Plan, 2019
SEDA-COG Long Range Transportation Plan, 2016
Statewide
DCNR Pennsylvania Trail Gap Study, 2014
Pennsylvania Statewide Comprehensive Outdoor Recreation Plan, 2014
Pennsylvania Land and Water Trail Network Strategic Plan, 2014

Figure 6

GIS analysis

To analyze the trail gaps that were identified in the Findings section of this report, county and state GIS layers were collected show where existing trails and proposed trails along the Greenway Corridor were located. Only those gaps that were located within the Corridor were analyzed.

After acquiring the necessary datasets, only those trails that were classified in the metadata as known bike and/or pedestrian trails were selected. Trail types that were not included in this study were

equestrian, all-terrain vehicle, off-road vehicle, snowmobile, and mountain bike trails. The reason for these exclusions is due to the nature of the trail use and multi-modal intentions and the scope of this research. Bike and/or pedestrian trails along the Greenway are used for transportation networks *and* recreation. Such multi-modal trails are usually ADA (Americans with Disabilities Act of 1990) accessible, paved, and maintained with the intention of capturing as many users as possible. The way trails along greenway corridors are used is very different from winding, rugged motorized trails, which are used primarily for recreation, not necessarily for transportation. This distinction was made for this study because of the mission of the SGP; the purpose of a greenway corridor is not simply for recreation, but also an important transportation corridor. Multi-modal transportation networks, or trails that serve a transportation and recreation function, are the focus of this study.

Interviews

Relevant state agencies, county planners, and planning partners were interviewed to develop a grasp of the current status of identified trail gaps and their feasibility because some trail gap information was not available within planning documents. Jurisdictional trail priorities or trail project status can change from year to year, and most of the documents I was referencing were done prior to 2015 and did not reflect the current conditions of the projects I was interested in researching.

To gain a better understanding of how other planners develop trail gaps, interviews with practitioners from around the country were conducted. These individuals were associated with organizations such as Rails-to-Trails, urban and state governing authorities, universities, and law firms. Representatives from state agencies within Pennsylvania were contacted, as well, such as DCNR and the PA Game Commission. Ultimately, over 15 different interviews were conducted between July 2018 and May 2019.

The format of these interviews was informal, and each one lasted between 15 minutes and 60 minutes. The purpose of these interviews differed according to the individual, but the goals were to gather data, to understand more about how to prioritize trail gaps, and to learn more about the gaps I examined for readiness. The following list contains the entities I contacted and why:

- Rails-to-Trails – understanding rail-trail development and working with landowners
- Akerman LLP – understanding trail development
- Montour Area Rec Commission – gathering trail gap information
- SEDA-COG – gathering trail gap information and methodology
- PA Game Commission – gathering trail gap information
- DCNR – gathering trail gap information
- Union County – gathering trail gap information
- Lycoming County – gathering trail gap information
- Wyoming County – gathering trail gap information
- Luzerne County – gathering trail gap information
- Columbia County – gathering trail gap information
- Northumberland County – gathering trail gap information
- Clinton County – gathering trail gap information

- Portland Metro – understanding how regional authorities collaborate and work with landowners
- Previous SGP Executive Director – gathering trail gap information

Identify criteria

Once the trail gaps were identified from the planning documents previously discussed, they were analyzed against 9 criteria. Comparing trail gaps against the criteria was intended to help planners make decisions about how and when to construct current and future gaps as it is a tool to organize and objectively categorize trails. Having a metric to categorize trails in this way is invaluable for regional multi-modal trail commissions, as planners can become susceptible to undue emotional attachment to a trail from within their own jurisdiction. This tool provides the organization or governing body a way to strategize trail completion priorities in common interest within coordinated timelines while avoiding otherwise likely contention among its members.

From the data that was gathered, the trail gaps were catalogued within a matrix and examined against 9 criteria and are described in the Findings section of this report.

- Landowner type
- Number of landowners
- Miles to connect
- Physical obstacles that will require new crossing construction
- Right of Way obtained
- Plan continuity
- Connection to other regional trails
- Connection to population centers
- Existence of cultural or historical sites

These criteria were selected after determining what physical qualities were favorable among trail users and trail funders. The City of Lebanon and the Broat et. al. study's trail scoring methods, and DCNR's project scoring system helped inform the criteria selection process that was used in this research.

Determine Classification

In this step of the trail gap prioritization process, I developed a classification system that categorized trail gaps according to their feasibility of being completed within the next 5 years (short-term completion). This system was adapted from the Pennsylvania Environmental Council (PEC) and, in collaboration with SGP, was modified to fit the needs of this study. These classifications primarily identify whether ROW and funding has been acquired (or is actively being acquired), how much detailed planning has been done, and the overall momentum to complete the trail gap.

Prioritize Gaps

With each previous step completed, I was able to finally prioritize the identified trail gaps. I developed 4 different methods for this objective: feasibility of short-term completion, a comprehensive numeric code, network length gained, and number of connections to population centers.

- Feasibility of short-term completion – prioritizes trail gaps according to their classification (Pipeline, In Progress, Planned, or Potential)
- Numeric code – prioritizes trail gaps according to a score that was determined from 9 criteria that was adapted from the City of Lebanon to meet the needs of this study
- Network length gained – prioritizes trail gaps by how many additional land miles they could potentially link
- Number of connections to population centers – prioritizes trail gaps by how many additional population centers they could potentially link

Study Limitations

This project produced one of the most comprehensive collections of bike and/or pedestrian trail data for the Susquehanna Greenway Corridor. Planning entities simply lack a complete list of existing and proposed trails, let alone trail *gaps*. Data gaps and issues with the data provided was also problematic for this research. Duplicate information within a trail layer was found, inaccurate data, incomplete data, or non-existing data was a challenge, as was the problem of identical trails being called different names within different counties' (or the same county's) metadata. Because of these data discrepencies, gathering a correct list of trail gaps and analyzing those gaps required so much time that I needed to limit my scope. My original intent was to analyze trail gaps along the entire Greenway Corridor within Pennsylvania, but this scope would not have been compatable with this study's timeline.

Findings

This study produced 4 primary outcomes from a comprehensive analysis:

1. Criteria and classifications were developed for the purposes of this study
2. There are 48 trail gaps in the Middle Susquehanna Region
3. Four prioritization methods were developed
4. Two top trail gaps were identified as high priority among all four of the prioritization methods

Trail Gaps

This section describes the top gaps that were identified in this study with a detailed description of the purpose of this ranking along with overall findings from this study.

A list of top trail gaps was difficult to develop, as there are many ways to prioritize trail gaps. Is the gap a priority based on its phase of completion? In other words, is it a higher priority because it is a pipeline trail instead of a planned trail? If this is the case, what is the utility in listing them as a priority? Because they are so developed in their planning and are near construction, does the planning agency need yet

another plan that identifies them? The funding is already in place, as is the community support necessary to build the trail. Is the gap a priority based on its potential to add length to the Greenway Corridor? Its ability to connect very dense municipalities? Its overall feasibility?

A numeric coding system was initially considered to rectify any suspicion of bias in the process of prioritizing. However, this method was considered for the Middle Susquehanna Regional Bicycle and Pedestrian Advisory Committee when they were developing a prioritization method for their counties' recreation projects and it presented challenges, as discussed with the SGP Executive Director. When committee members saw a numeric ranking of a project they felt passionate about, that was lower than projects other committee members felt equally passionate about, it bred contention. This ranking system can also exacerbate unequal power dynamics within a committee. It also was considered to not be entirely useful, as too many projects would have identical codes, and many of the proposed trail gaps are simply not developed enough to determine a "yes" or "no" answer to whether the route possessed certain qualities or elements. How could a numeric system be considered fair and unbiased if a third of the gaps are unable to be quantified in areas other gaps *can* be simply because they are in their planning infancy?

Because of these issues, a numeric coding system used to exclusively discern which trails were the highest priority was abandoned in favor of a categorical ranking system that was successfully invented and used by the PEC. Much like the Body Mass Index, assigning a numeric value *in this particular study* was considered to be too crude, static, and potentially controversial. Ranking a trail gap according to its "shovel readiness" in a qualify-able manner is much more psychologically palatable than ranking them with numbers. However, this method does not serve as a remedy to the issue of power imbalances within a collaborative planning authority. Users of this study must choose which prioritization method to apply for the purposes of their organization.

There are times when ranking numerically is useful and necessary, however. When enough trail gaps that have been identified in this report have been classified as "pipeline" or "in progress" projects (or at least be developed enough to allow each qualifier to be answered), a numeric code would be appropriate, as planning efforts will have allowed these projects to develop enough to require a system to triage the search for funding or requests for proposals (RFPs).

Prioritization methods

The following prioritization methods are listed according to their complexity. Numeric code and feasibility of short-term completion used multiple criterion to accomplish results, while network length gained and connection to population centers used single criterion.

Numeric code

This method was modified from the ranking systems used in Broat et. al. (2015) and The City of Lebanon. For the purposes of demonstrating what a numeric code would look like, a table was

developed to categorize the identified trail gaps according to their relative favorability and feasibility (Figure 15). This ranking is only meant to provide an example of what a coding table could look like, and it is not intended to suggest official ranking for these gaps.

With this coding system, trail gaps with values of 5 or 6 would be prioritized over those with lower ranking values. The trail gaps with these values are highlighted in green (Figure 15).

To develop this table, the trail gaps were grouped by category (pipeline/in progress, planned, and potential), and a list of questions was used to assign a numeric value to certain criteria, as these questions are important qualities to many funders. The questions that were asked are as follows, and were adapted for the purposes of this study by the City of Lebanon, Oregon:

1. Does the trail gap have fewer than 5 private landowners?
2. Is Right of Way obtained or being actively acquired?
3. Will the trail gap complete a loop?
4. Does the trail gap avoid obstacles (road or railroad crossings, streams, etc.)?
5. Does the trail gap have its own feasibility study?
6. Is the trail gap partially developed?
7. Does the trail gap connect separate communities?
8. Does the trail gap make a connection to other neighborhoods within the same community?
9. Does the trail gap link to an historic artifact/cultural site?

If one could answer, "yes" to any of these questions, a value of 1 was assigned to the gap. After completing the sequence of questions and adding up the 1 values, a gap would be left with its numeric rank. The highest rank (in terms of feasibility or ease) would be values of 9, and the lowest would be values of 0. Trail gaps that were categorized as "pipeline" or "in progress" were ranked 5 or 6; "planned" were between 2 and 6; "potential" were between 1 and 6.

This method is best used for planners who are exploring which trails would be most attractive to state or federal funders, as it assesses qualities that these government agencies would consider to be important in a multi-modal network.

Feasibility of short-term completion (Classification)

This method was adapted from a trail categorization system used by the Pennsylvania Environmental Council, and was modified for this research. Prioritizing trail gaps according to their feasibility of short-term completion would produce a table ranking "pipeline" trails as the highest priority, second to "in progress" trails, then "planned" trails, and "potential" trails. This method was discussed as the most palatable method of prioritization, as there is no numeric ranking.

If this method were used, then trail gaps with darker shades of green would be the highest priority (Figure 14). This method is best used for planning authorities who are exploring which trail gaps have been planned most thoroughly or have the most feasibility.

Network length gained

This method was uniquely developed for this study, as added trail length is often important to funders. To identify trail gaps that would be considered "top trail gaps" according to different methods of prioritization, a similar numeric code was used. Here, trails with the highest number of miles that could be connected by completing the trail gap are coded with higher values indicating increased favorability with this coding method. This method does not take into account cost per mile or complexity of connecting the trail gaps.

With this coding system, trails gaps with values over 20 would be more favorable and are highlighted in green. Trail gaps that connect to water trail accesses have the potential to gain over 400 miles of navigable river, however, this is an extreme outlier for the purposes of this study, and many of the trails listed here have the potential to access the Susquehanna River. Therefore, those gaps that connect river trail accesses were only assessed according to their land trail length gained for this coding system (Figure 16).

This method is important for certain funders or planning objectives. If a funder or planning authority is interested in constructing a long-distance trail network, this method would help them identify trail gaps that would help meet that objective.

Number of connections to population centers

This method was uniquely developed for this study, as trail access to areas of high density can be important to funders and planning bodies. The ability to link multiple population centers is prioritized in this coding system with values of 3 or 4 ranking highest. These gaps are highlighted in green. Several trail gaps in this analysis are valued at 0, which simply implies that the gap is intended to connect to another area within the same community. The idea that these trails have lesser value than those that connect to communities outside of the trail's origin jurisdiction is inherently incorrect, however. This coding system, alone, would be considered ineffective for trail gap prioritization at the regional level because it would exclude trails that make important connections to neighborhoods within the same community. Trail gaps that do not extend beyond one community border should be ranked in their own category in future research (Figure 17).

Interestingly, nearly all of the trail gaps in this study were located within or along population centers. The reason for this trend is due to trail type. Because this research looks at bike and or pedestrian trails, which are transportation corridors as well as recreational assets, they would logically lead to areas of economic development. Therefore, counties with higher population densities overall have more trail gaps. This is not to say that counties with fewer people have fewer trail gaps. Most of the trail gaps that existing these counties are motorized trail gaps or equestrian trail gaps, which lend themselves well to large swaths of unbroken forest to allow for extensive circuit networks (Figure 11).

This method would be ideal for planners who are interested in connecting as many people as possible with a multi-modal network.

Top trail gaps

There were gaps that were determined to be high priority in all of the coding methods, which suggests that these trails would be most attractive to funders and would be the most feasible to complete within the next 5 years. Those trails include the Pine Creek Trail Connector which will connect Lock Haven (Clinton County) to Jersey Shore (Lycoming County) and the Pine Creek Rail Trail and the connection between Pine Creek trailhead to the Susquehanna River Walk in Williamsport (Figure 19). Because these two trail gaps (and most of their phased segments) connect to densely populated areas and expand a 62-mile rail trail, they add miles of length to a larger trail corridor that will service over 50,000 residents.

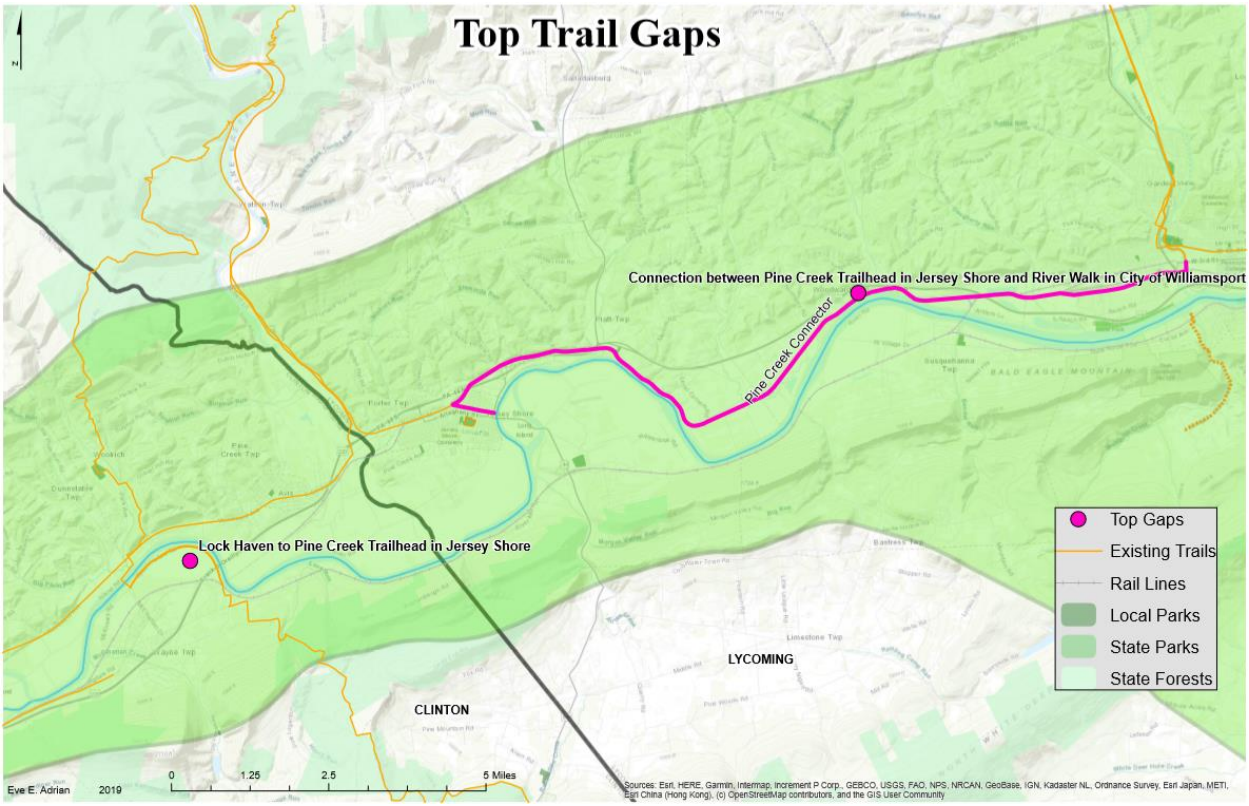

Figure 19: Top Trail Gaps

What is most interesting about the results of the four methods is the inconsistencies in their results. Trails, like the North Branch Canal Trail (NBCT) – Catawissa to Bloomsburg connection, scored highly against the feasibility of short-term completion (classification) and the numeric ranking method because it has been planned extensively. It is also an extension of a longer trail network that links other communities. However, it did not score as highly against other trail gaps that connected to *longer* trail networks and, in these instances, more population centers. The NBCT is a critical link to several population centers along the Susquehanna, but it has some issues regarding ROW acquisition. Trail gaps that connect with the North Branch Canal Trail are promising, but can be challenging. Other trails, like the Susquehanna River Walk in Williamsport, link several neighborhoods within a densely populated

city. Some gaps that are proposed to link to this trail network (which also happens to be a loop) scored highly on the numeric ranking method and the population center method, but not highly on the feasibility of short-term completion because constructing trail connections in densely populated areas is more complicated because there are more landowners with which to negotiate ROW and more obstacles to cross. With population comes more railroad and street crossings. These gaps also do not score highly on the population center method because they only access neighborhoods within the same community from which it originates. Trail gaps, like those in the Warrior Run Pathways project, have the potential to connect multiple population centers, but struggle in the same way other trail projects in densely populated areas struggle. Attaining ROW and crossing obstacles can add several years to an already-lengthy average project lifespan.

Discussion

Closing trail gaps is not a new initiative for Pennsylvania. In 2009, and again in 2014, DCNR collected and catalogued and mapped trail gaps along the major greenway corridors that exist within the Commonwealth. However, what made this project different was its scope and methods. To develop the most comprehensive list of trail gaps possible, information was collected at the county and municipal level by exploring planning documents and conducting interviews. When DCNR performs its trail gap studies, the agency sends out an invitation to counties to provide DCNR with their top trail gaps and DCNR takes that data and enters it into a GIS layer. This is a reasonable method considering the size of the study area (an entire Commonwealth), but it has inherent flaws, just like any study, of course. One of the challenges of this method is that there is no guarantee that all of the data will be collected, or that it will be correct. People may forget to submit their trails, there could be errors from the person submitting the trails, or the people submitting the trails could have a personal interest in one trail over another. Unfortunately, perfectly viable gaps could be omitted this way. The amount of gaps that the agency collected increased between 2009 (107 reported) and 2014 (208 reported), and 6 gaps that were identified in 2009 were reported to be filled in 2014. It is unknown how many gaps are not represented in these numbers. This is a challenge for which nobody can be blamed, as state agencies and local governments alike are strained for resources. Employees at every level are stretched thin, but there are several ways that this issue can be remedied which are discussed in Reflections and Recommendations.

The scope of this study was much smaller, which afforded a more in-depth investigation of the trail gaps that exist in the 7-county area of the Susquehanna Greenway Corridor. More trail information was collected, more proposed trails were explored, and more time was committed to the data to ensure accuracy of the names of the trail gaps, the degree to which they have been planned, their intended use (bike and/or pedestrian trails were analyzed only, instead of equestrian or all-terrain vehicle, for example), or their completion status. This level of deep exploration into the trail gaps in the study area is critical because nothing like it exists anywhere else. One of the reasons this does not exist elsewhere is because of a lack of communication among counties and state agencies. Counties do not often share cartographic information, and trail data is no exception. Many times during this study, discrepancies,

duplicate trails, and incorrect data was found. Some existing trails, primarily within local parks, do not even have a GIS layer.

Another implication of this research reaches a more political element of trail planning. Identifying critera and categories for the intention of prioritizing projects suggests an assumption of values. These values may vary according to what funding mechanisms are used, what residents prefer, and can even subjected to administrative priorities at the state and federal level. Ultimately, systems of prioritization may not resolve underlying diputes within planning bodies; criteria and methods simply quantify a preference or bias that individuals in postitions of power have about what they find important.

Recommendations

There are many ways that local governments and state agencies can prioritize trail gap projects, develop trails, improve their datasets, and optimize future planning efforts. This section provides a list of recommendations intended for local and county governments, state agencies, and for future research.

Local and county governments

- Prioritize identified trail gaps according to appropriate methods.
- Use the trail gap matrix developed in this study to catalogue important trail information for easy sharing and collaboration.
- Add sufficient signage and wayfinding to existing and future trails.
- Clean and update trail data to eliminate duplicate trails, incorrect data, or incomplete metadata.
- Ground truth available trail data.
- Develop a strategy for coding trail data so as to avoid calling identical trails different names.
- Improve communication with other local and county governments.
- A comprehensive inventory of the cultural and/or historical landmarks along existing trails and proposed trail gaps should be gathered.

State agencies

- Collect a comprehensive list of all existing trails within the Commonwealth.
- Collect a comprehensive list of all existing trail gaps within the Commonwealth.
- Increase trail funding.
- Increase funding for trail signage.
- Ground truth state agency trails.
- Clean and update trail data to eliminate duplicate trails, incorrect data, or incomplete metadata.
- Improve communication with other state agencies.

Future research

- A catalogue of trail research should be compiled.

- Further analysis and prioritization should be conducted according to potential access to impoverished communities.
- Further exploration into trail access and equity should be conducted.
- Efforts around ground truthing the conditions and needs of trail signage should be considered.
- Analysis of the value of cultural and/or historical features along the identified trail gaps should be conducted.
- Analysis of the value of scenic viewsheds along the identified trail gaps should be conducted.

Reflections

This study evolved significantly as it progressed. Gaps in knowledge, personal capacity, and philosophical questions of values became a guiding factor in the final product of this research. The original scope of this project was much larger and spanned the entire length of the Susquehanna Greenway. Gaps throughout the 400-mile stretch of the River Corridor were intended to be identified and prioritized according to categorical numeric codes. Signage was also intended to be ground-truthed by an AmeriCorps member assigned to SGP, as was current land use mapping of the locations of the trail gaps. When considering the task of prioritizing the trail gaps identified in this study, a question of values and philosophy was what circulated around the objective. Prioritization was intended to be numeric and objective, but this was challenging, as new realizations about how humans interact with numeric rankings emerged. “Prioritize according to what?” was the final and resounding question that this study could not definitively answer, which is why several prioritization methods were explored. When planners prioritize projects (trails, roads, bridges, buildings, crosswalks, etc.) they make value judgements that are static by necessity. Prioritization usually involves ranking projects with the highest need (“this bridge should have collapsed 3 years ago, and it needs to be fixed *now* because ambulances cannot traverse it safely”), or by lowest cost, or by public demand for the project. The rationale for the methods for prioritization proposed in this study are similar, but imperfect. Coding projects in tandem with other categories is necessary to arrive at a more holistic understanding of rank to maximize the benefit of the trail project. This choice is ultimately up to the planning body to decide.

Future research

Future researchers who intend to study the topic of trail or project prioritization should consider addressing the following recommendations before beginning their research:

- Understand the political environment of the intended study area to avoid addressing/be sensitive to certain topics such as power imbalances within, or among other, planning bodies.
- Ensure all necessary data is available, and if it is not, ensure there is consistent access to individuals who can fill in gaps in knowledge.
- Identify what criteria is important to the potential users of the project. Some users may prioritize connectivity to community assets (schools, grocery stores, libraries, etc.) over having a

long distance trail; some users may feel that having access to historical/cultural sites is more desirable than having a connection to other population centers.

- Evaluate what criteria is important to the current and potential funders of the project. State agencies, like DCNR or departments of transportation, often fund multi-modal projects that add significant length to a trail network or connect to many population centers. Other funders, like foundations or grants from corporations, might prioritize projects that connect underrepresented communities to employment sites or community assets.

Conclusion

The Susquehanna Greenway Corridor is a vast ribbon of opportunity for multi-modal transportation, connection, and identity for the communities along it. This fact is what led to this study and its findings. The methods, analysis, and recommendations outlined here is designed to be replicated and adapted for future use on any scale. It is a tool designed to provide a measurable procedure for prioritizing the trail gaps that exist within the study area and beyond. From this research, 48 trail gaps were identified in the seven-county region within the Middle Susquehanna Greenway Corridor, most of which were categorized as “planned”, which indicates that they are referenced in a plan, may have had some public input, but they have insufficient funding and little to no momentum to be completed within the next five years. This is likely due to a previous lack of capacity and funding. Recent organization has helped generate a bike and pedestrian advisory committee, which will increase the momentum to complete trail projects, and will add project legitimacy in the eyes of funders.

A total of 32 planning documents and 40 articles were reviewed, nearly 20 different interviews and datasets were conducted and assessed, and multiple case studies were explored to complete the analysis done in this research. By defining and identifying nine different trail gap criteria, classifying them according to four different classifications, and applying four prioritization methods, 48 different trail gaps in the study area were prioritized. Two trail gaps ranked highly among all of the methods, as both of their proposed routes have few private landowners and obstacles, they connect to population centers and other trail networks, and they both have been extensively planned and/or are already partially built.

Inventorying and prioritizing trail gaps benefits communities and planning bodies in several ways: by helping these entities make more-informed planning decisions, by being able to prioritize projects according to what funders find favorable, and by gaining a better understanding of where gaps in multi-modal services are located. The hope of this research is that it will be used and adapted in future greenway planning along the Susquehanna and beyond.

Appendix

Maps

The following maps show where most trail gaps exist within the study area. Some trail gaps and their segments do not appear on these maps because they lack the GIS data necessary to be cartographically represented. Trail gaps are symbolized with red dots. Some identified trail gaps also have a determined route associated with them. In these cases, the trail gap shows a red dot *and* a dashed red line that shows the proposed route.

Clinton County Trail Gaps

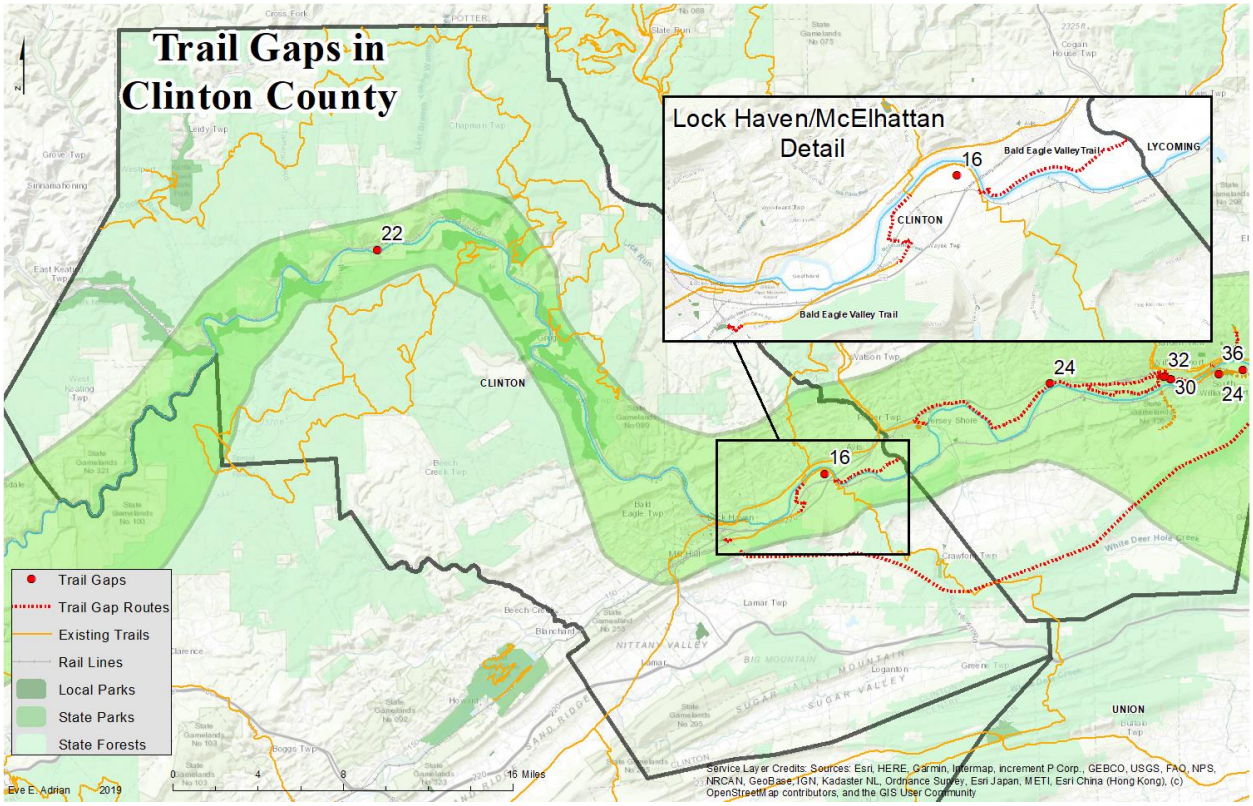

Figure 7

Columbia and Montour County Trail Gaps

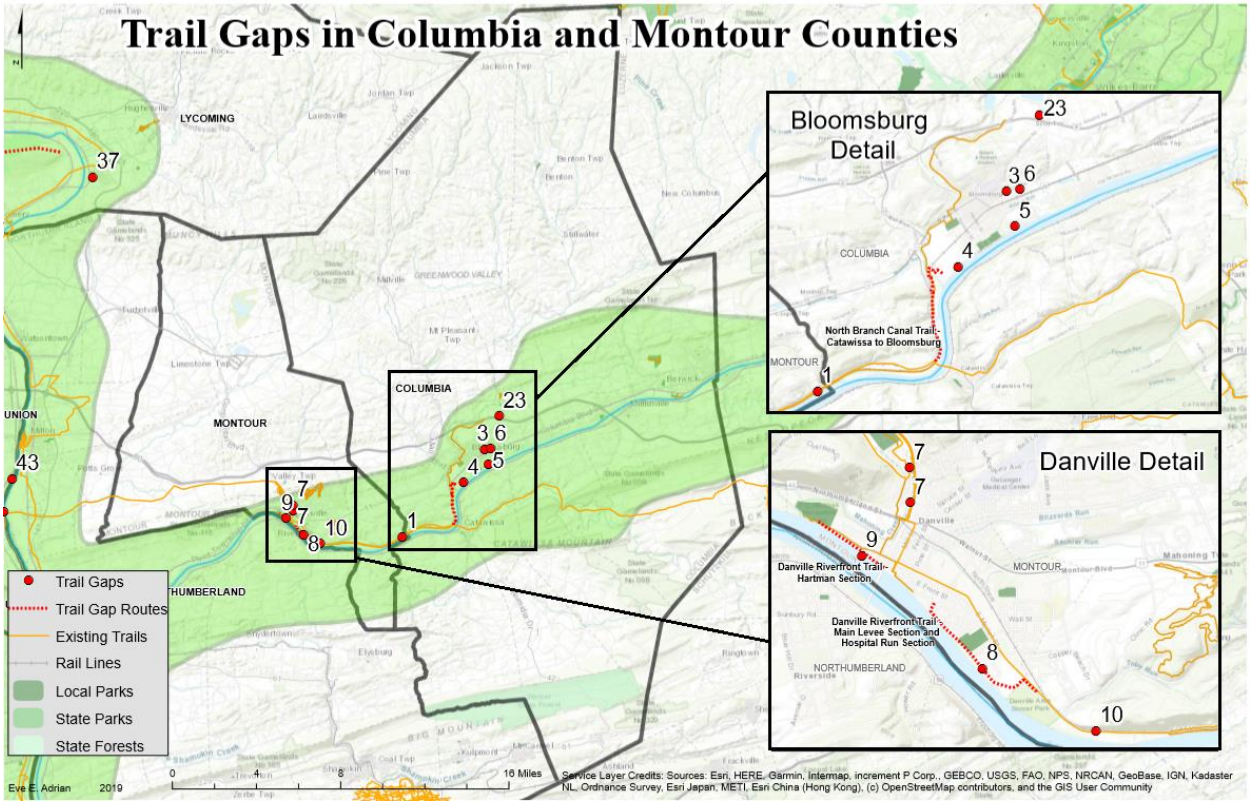

Figure 8

Lycoming County Trail Gaps

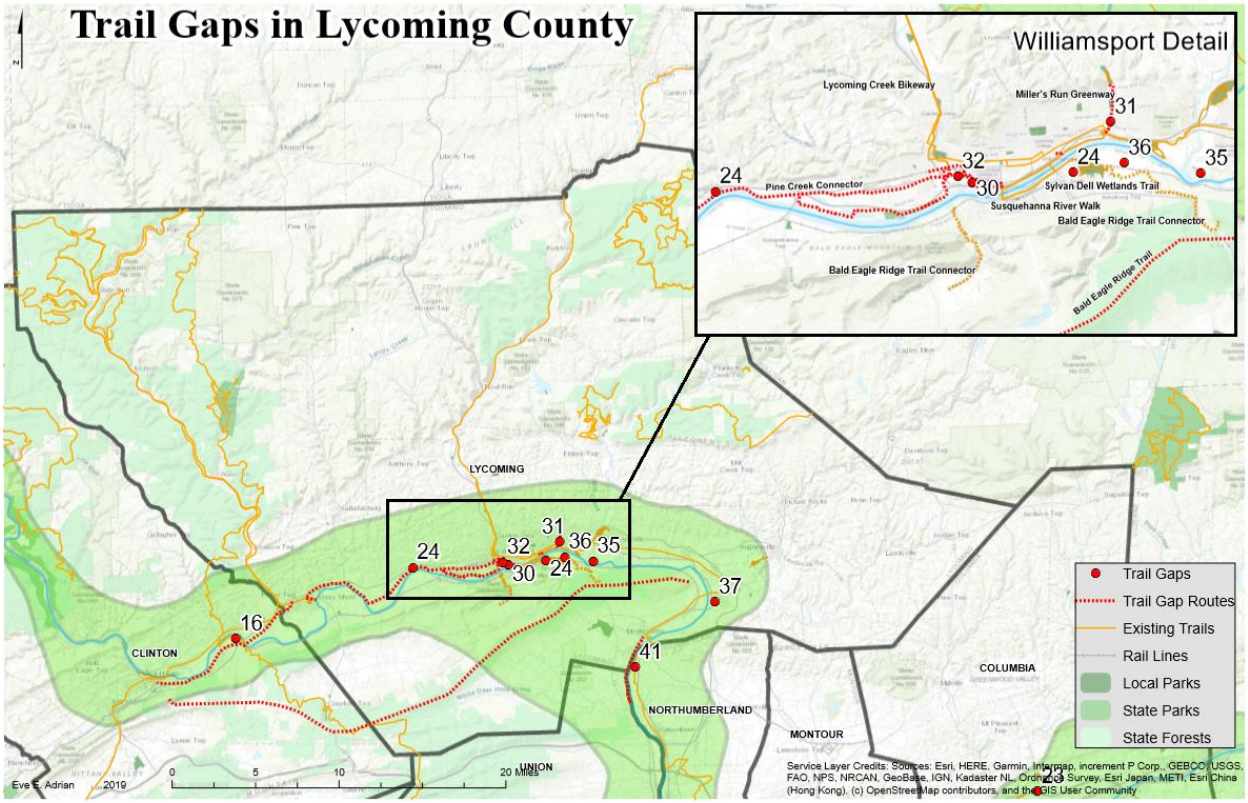

Figure 9

Northumberland, Union, and Snyder County Trail Gaps

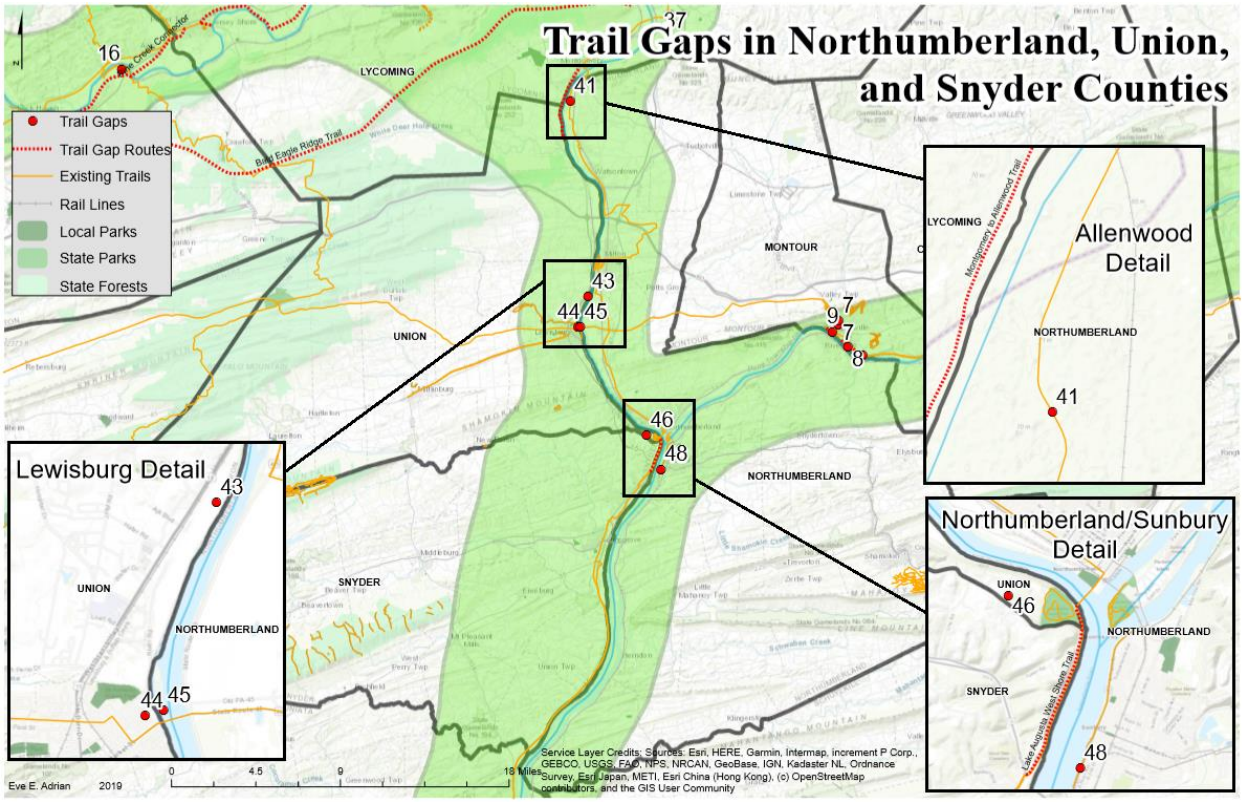

Figure 10

Population Density

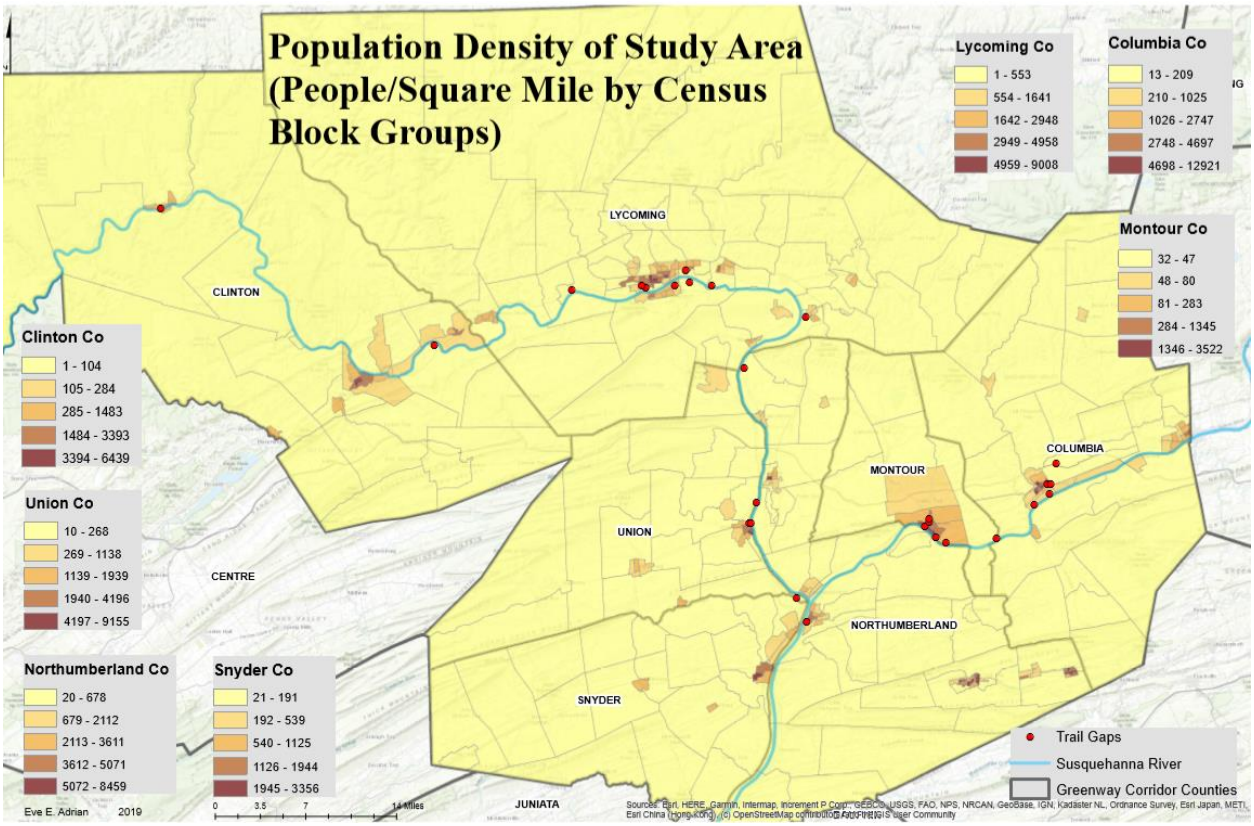

Figure 11

Trail Gap Classification Summary Table

This table was developed to provide a summary of the identified trail gap classifications - pipeline, in progress, planned, or potential, and are color coded for visual ease. It was developed to be used in conjunction with the maps that are located in this Appendix.

These classifications were adapted and modified for the purposes of this study from previous trail classification projects from the Pennsylvania Environmental Council, and the modified definitions are as follows:

Pipeline - The most shovel-ready trail gaps were classified as “pipeline”. Planners for these trails have already acquired a Right of Way (ROW) and full funding, or are actively working towards acquiring ROW and funding. These trails are referenced in several plans with detailed descriptions of the corridor’s feasibility.

In Progress - Second in the readiness classifications, these trail gaps are actively being planned. Lead organizations or agencies are progressing toward securing ROW and funding, they have engaged the public to some capacity, and are on track to be completed within the next 5 years.

Planned - These trail gaps are referenced in a plan, may have had some public input, but they have insufficient funding and little to no momentum to be completed within the next 5 years.

Potential - This is considered to be an honorable mention category. These trail gaps are either not eligible to be considered a trail gap as defined in this report (see the Defining Terms section), or are significantly underdeveloped in their planning. These trail gaps may be developed within the next 20 years.

Key
Pipeline
In Progress
Planned
Potential

SGP Number ID	Classification (Pipeline, In Progress, Planned, Potential
North Branch	
1	Pipeline
2	Potential
3	Potential
4	Potential
5	Potential
6	Potential
7	Potential
8	Potential
9	Potential
10	Planned
West Branch	
11	Potential
12	In Progress
13	In Progress

14	In Progress
15	In Progress
16	Pipeline
17	Pipeline
18	Pipeline
19	Pipeline
20	Pipeline
21	Pipeline
22	Potential
23	In Progress
24	Planned
25	Planned
26	Planned
27	Planned
28	Planned
29	Planned
30	Potential
31	Planned
32	Planned
33	Planned
34	Planned
35	Planned
36	Potential
37	Planned
38	Planned
39	Planned
40	Planned
41	Potential
42	Planned
43	Planned
44	Planned
45	Potential
46	Potential
Lower Branch	
48	Planned

Figure 12

Methods for closing trail gaps

Planning effectively

Ensuring that trail gap planning efforts are comprehensive so as to collect as much useful information as possible is key to successful project completion. It is advised that lead agencies and planners consult this research and other relevant planning tools to conduct thorough planning efforts. It is important to avoid vague language and goals with weak strategies or objectives. Planners should provide straightforward and direct implementation goals with detailed descriptions of identified trail projects.

Several national organizations provide helpful trail planning toolboxes for regional initiatives such as The Pennsylvania Environmental Council, The Pennsylvania Land Trust Association, The Rails-to-Trails Conservancy, and The Susquehanna Greenway Partnership.

Engaging the public and addressing concerns

Landowners often express concerns about trail projects. Often, these landowners simply have a lack of information or inaccurate information bred from unaddressed misconceptions and criticisms of the project. Common landowner concerns relate to perceptions of a loss of property rights, liability issues, decreased property values, and increases in crime and vandalism.

Some techniques planners can use to work with concerned landowners are described below (Figure 13).

LANDOWNER CONCERNS	
Concern	Addressing the Concern
Land will be "taken"	Express support of "willing seller, willing buyer" policy; choose minimum width necessary for easement; point out individuals who are donating easements.
Loss of privacy	Include privacy screens in development plans.
Security fears	Create security plans (patrols, limited hours); design for security (gates, lights, sight-lines); provide positive examples from existing trails.
Interruption of customary use	Provide right-of-way or existing customary use.
Reduced property values	Provide statistics and case studies; plan for clean-ups, maintenance, pruning; design for attractive amenities.
Higher taxes	Provide statistics and case studies; point out reduced public costs; point out increased tax base due to business development.

Figure 13 Creating Connections: The Pennsylvania Greenways and Trails How-To Manual, p. 24 (1998)

Working with partners and fostering a culture of collaboration

Trails have a habit of transcending jurisdictional boundaries, and planning for them cannot be done without collaborating among various governing bodies, stakeholder groups, and interest groups. This is easier said than done, but applying effective frameworks can make the process more successful. Closing the trail gaps discussed in this report will require the full participation of a broad range of stakeholders that span from the grassroots level to the state governing bodies.

Collaborating with partner organizations requires an understanding of what causes barriers to participation. These barriers are often attributed to a lack of shared information across agencies/organizations, a piecemeal planning approach, weak inter-party agreements, and poor overall group management (consistently letting meetings run long, not having an agenda, a spirit of disrespect, etc.).

To ensure that these barriers are not materialized, collaborative committees should consider employing techniques to encourage an hospitable work culture:

1. Involve all stakeholders
2. Craft realistic strategies
3. Establish a shared vision
4. Determine how decisions will be made (consensus, majority vote, etc.)
5. Develop and enforce group procedures and expectations

Securing funding

Having a diverse pool of funding resources is key to the success of a trail project, and there are thousands of grant options from which to select. One tool that can help planners when searching for funding is the Susquehanna Greenway Partnership's Project Funding page which has a list of regularly-updated organizations and agencies who fund trail initiatives.

Attaining ROW

Acquiring an easement is often necessary for trail projects, and, unfortunately, this can take the longest amount of time in the life of a typical trail project development process (a total of 14-16 years on average). There are strategies to attain ROW, and while the process may be slow and arduous, is often successful.

Reviewing documents and guides like those found in The Pennsylvania Land Trust Association's Conservation Tools website or in The Pennsylvania Environmental Council's "Creating Connections" document can help planners make informed strategic decisions regarding the best method of obtaining ROW along a proposed trail corridor.

Prioritization Methods Results

Feasibility of Short-Term Completion			
Pipeline	**In Progress**	**Planned**	**Potential**
1	12	10	2
16	13	23	3
17	14	24	4
18	15	25	5
19		26	6
20		27	7
21		28	8
		29	9
		31	11
		32	22
		33	30
		34	36

		35	41
		37	45
		38	46
		39	
		40	
		42	
		43	
		44	
		48	

Figure 14

Trail Gap Numeric Ranking (higher the number means higher rank)					
Pipeline/In Progress (SGP ID)	**Coding**	**Planned (SGP ID)**	**Coding**	**Potential (SGP ID)**	**Coding**
1	6	10	5	2	3
12	2	22	3	3	2
13	3	23	2	4	2
14	4	24	4	5	2
15	3	25	5	6	2
16	5	26	4	7	6
17	5	27	4	8	6
18	5	28	4	9	6
19	5	29	5	30	4
20	5	31	3	36	3
21	5	33	3	41	3
32	5	34	2	45	2
		35	6	46	1
		37	5		
		38	5		
		39	5		
		40	4		
		42	3		
		43	2		
		44	4		
		48	2		

*Figure 15 ** Unsure at this time*

Trail Gap Length Gained (higher the number means higher rank)					
Pipeline/In Progress (SGP ID)	**Coding**	**Planned (SGP ID)**	**Coding**	**Potential (SGP ID)**	**Coding**
1	6.2	10	7	2	12.3
12	1.3	22	400 (water miles)	3	20

13	1.3	23	0.5	4	1
14	1.3	24	71.4	5	1
15	1.3	25	71.4	6	1
16	62	26	71.4	7	**
17	62	27	71.4	8	**
18	62	28	71.4	9	**
19	62	29	71.4	30	9.7
20	62	31	6.5	36	**
21	62	33	4.2	41	**
32	4.2	34	4.2	45	9
		35	4.2	46	**
		37	.5, 400 (water miles)		
		38	**		
		39	**		
		40	**		
		42	10		
		43	1		
		44	9		
		48	**		

*Figure 16 **Unsure at this time*

Trail Gap Links to Population Centers (higher the number means higher rank)					
Pipeline/In Progress (SGP ID)	**Coding**	**Planned (SGP ID)**	**Coding**	**Potential (SGP ID)**	**Coding**
1	1	10	1	2	1
12	2	22	0	3	0
13	2	23	1	4	0
14	2	24	3	5	0
15	2	25	3	6	0
16	2	26	3	7	0
17	3	27	3	8	0
18	3	28	3	9	0
19	3	29	3	30	2
20	3	31	1	36	0
21	3	33	1	41	2
32	0	34	0	45	2
		35	3	46	**
		37	0		
		38	**		
		39	**		

		40	**		
		42	4		
		43	2		
		44	2		
		48	**		

*Figure 17 **Unsure at this time*

City of Lebanon trail prioritization categories

Higher point totals indicate higher priority trail sections.

1. Does it complete a connection within the city?
• The trail must create a significant connection within the community.

2. Is the proposed trail located off of, or set back from roads?
• These proposed trails are considered alternative transportation routes.

3. Does the trail provide connection to existing neighborhoods?
• The trail must provide access to/from/through/ an existing neighborhood.

4. Does the trail contain an existing section (partially developed trail)?
• Must contain a partially completed section of paved trail.

5. Is the trail a loop trail?
• The trail must be a loop in itself, or in combination with another trail.

6. Is it close in proximity (500 feet) to other services (grocery, library, etc.)?
• The trail must be within 500 feet of a service.

7. Is the trail close to schools (1⁄4 mile)?
• The trail must be within 1⁄4 mile of a school.

8. Does it have historic or sentimental value to the city?

9. Is it in an impact location (high visibility)?
• Trails located in impact locations are important because they are highly visible, and will help increase awareness and use of the trails. Trails located off of Highway
34/Tangent Street, Oak Street, Grant Street, or the Santiam Highway, are considered to be in impact locations.

10. Are there any viewsheds located along the trail?
• Trails located on Ridgeway Butte, or alongside water, are considered possible viewshed locations.

11. Is 50% or more of the trail located in the woods?

12. Is it alongside the Santiam River or Cheadle Lake?
• Trails located alongside the river or lake for a significant distance (at least 100 feet).

13. Could it be an ADA accessible multi-use trail (biking, walking, etc)?

14. Does the trail have other unique values (specify)?
• Special reason(s) why the trail section may take priority over another.

15. Is 50% or more of the trail already a public right of way or city owned?
• Includes trail sections proposed along road right of ways, sidewalks, trails on city property, public access easements, etc.

16. Does the trail have willing property owners?
• As of July 2009, information to answer this question for all trail sections has yet to be gathered. Trails proposed on City owned taxlots receive an automatic "yes" response.

17. Is the trail located on an easement or right of way?
• Considers easements on private taxlots. Proposed trails located on City owned taxlots, or public right of ways, receive an automatic "yes" response.

18. Would the trail provide opportunities for future funding?
• Trails with potential for funding sources not available to all other trails. Unique funding sources include trails qualifying for the "Rails to/with Trails" program.

19. Is the trail included in the planning for new projects or development (piggybacking)?

20. Is it easy to build (once land is acquired)?
• Only includes trails requiring very little site preparation.

21. Is the trail free from serious safety concerns?
• Safety concerns include unmarked crossings of major roads, or crossings of water.

22. Does the trail have 3 or less property owners?

23. Is the proposed route free of width restrictions?
• The trail must not have structures or other features encroaching upon a 15 foot wide trail corridor.

24. Does the trail appear to avoid wetlands?

• The trail must not pass through areas delineated as wetland by the Lebanon GIS database. Any uncertainty may require site visits and the wetland permitting process before site development can begin. Trail corridors containing wetlands that have had all issues resolved will receive a “yes” response.

25. Have all wetland issues been addressed (delineation, permitting, if necessary)?
• For those trails containing wetlands, all issues need to be resolved. Trails with no wetlands receive an automatic “yes” response.

26. Does the trail avoid road and railroad crossings?
• The trail section must not begin or end at a road/railroad crossing, or intersect with a road/railroad at any point (City of Lebanon, p. 89).

Matrix

SGP Number ID	County	Trail gap name/ID	Classification (Pipeline, In Progress, Planned, Potential	Connection points	Landowner type (public, private, municipal, utility, etc)	Number of landowners	Miles to connect	Physical obstacles that will require new crossing construction (active railroad, water body, road)?	Right of Way Obtained (for entire length of trail)	Plan continuity (in how many plans does the trail appear?)	Plans	Number of connections to other trail systems	Additional miles gained	Number of population centers trail will connect (0 if trail does not extend outside of single municipality)	Cultural/historical sites	Stakeholders
North Branch																
1	Columbia	North Branch Canal Trail Catawissa to Bloomsburg Connection	Pipeline	Catawissa to Bloomsburg	MARC ROW	1	~3	No	Yes	1	North Branch Canal Trail Feasibility Study	1	6.2	1	**	MARC, SGP
2	Columbia	North Branch Canal Trail Bloomsburg to Berwick/Susquehanna Warrior Trail Connection	Potential	Bloomsburg to Berwick and Susquehanna Warrior Run Trail	Private	**	**	Railroad, river	No	1	North Branch Canal Trail Feasibility Study	1	12.3	1	**	MARC, SGP
3	Columbia	Bloomsburg Trail Connections	Potential	Various neighborhood destinations in Bloomsburg (downtown, university, park, etc.) and to surrounding areas.	Public, private, municipal	**	**	**	No	1	Bloomsburg Comprehensive Plan/Blueprint for Bloomsburg	~2	~20	0	**	Town of Bloomsburg
4	Columbia	Bloomsburg Riverfront trail to Streater Park and Town Park (AKA Fort McClure Boulevard Riverfront Trail)	Potential	Streater Park in Bloomsburg to Town Park	Public, private, municipal	**	**	**	No	1	Bloomsburg Town Park Master Site Plan	1	~1	0	Fort McClure	Town of Bloomsburg
5	Columbia	Fort McClure Boulevard Riverfront Trail connections	Potential	Bloomsburg walk/bike path along Fort McClure Blvd, airport, to Rupert Bridge and Fairgrounds	Public, private, municipal	**	**	**	No	1	Bloomsburg Comprehensive Plan/Blueprint for Bloomsburg	1	~1	0	Fort McClure	Town of Bloomsburg
6	Columbia	Bloomsburg walk/bike path to Zeisloft development and AAA office	Potential	Bloomsburg walk/bike path to Zeisloft development and AAA office	Public, private, municipal	**	**	**	No	1	Bloomsburg Comprehensive Plan/Blueprint for Bloomsburg	1	~1	0	**	Town of Bloomsburg

7	Montour	Monkey Drift Trail to Hess Loop Connector	Potential	Monkey Drift Trail to Hess Loop Connector	Municipal	1	~.5	No	Yes	1	Danville Riverfront Plan	1	**	0	**	MARC, SGP
8	Montour	Danville Riverfront Trail - Levee to Soccer Park	Potential	Danville Riverfront Trail to Soccer Park	**	**	~.5	**	**	1	Danville Riverfront Plan	1	**	0	**	MARC, SGP
9	Montour	Danville Riverfront Trail - Main Levee Segment	Potential	Danville Levee connection	**	**	~.5	**	**	1	Danville Riverfront Plan	1	**	0	**	MARC, SGP
10	Montour	River Road to North Branch Canal Trail Connector	Planned	River Road segment connection to NBCT	Municipal	2	~1.5	No	Yes	2	North Branch Canal Trail Feasibility Study, Danville Riverfront Plan	1	7	1	**	MARC, SGP
West Branch																
12	Clinton/Centre	Bald Eagle Valley Trail (previously "Bald Eagle and Spring Creek Canal Trail")	In Progress	Bellefonte to Lock Haven	Private, municipal, public	5-16	33	Creek, railroad	No	3	Clinton County Greenway and Open Space Plan, Clinton County Comprehensive Plan, Brick Town Trail Feasibility Study	1	1.3	2	**	
13	Centre	***Bald Eagle Valley Trail (previously "Bald Eagle and Spring Creek Canal Trail" (Phase 1))	In Progress	Bellefonte to Curtin Village	Private	3-14	6.3	Creek, railroad	No	2	Clinton County Greenway and Open Space Plan, Clinton County Comprehensive Plan	1	1.3	2	Historic canal artifacts	
14	Clinton/Centre	***Bald Eagle Valley Trail (previously "Bald Eagle and Spring Creek Canal Trail" (Phase 2)) (AKA "Brick Town Trail")	In Progress	Curtin Village and Beech Creek	Municipal	0	14	No	Yes	3	Clinton County Greenway and Open Space Plan, Clinton County Comprehensive Plan, Brick Town Trail Feasibility Study	1	1.3	2	**	

15	Clinton	***Bald Eagle Valley Trail (previously "Bald Eagle and Spring Creek Canal Trail" (Phase 3))	In Progress	Beech Creek to Lock Haven	Public, municipal	2	12.7	No	No	2	Clinton County Greenway and Open Space Plan, Clinton County Comprehensive Plan	1	1.3	2	**	
16	Clinton	Pine Creek Trail Connector	Pipeline	Jersey Shore to Lock Haven and Pine Creek trailhead	Private, public, municipal, utility	5	11.48	Road, railroad	No	2	Clinton County Greenway and Open Space Plan, Clinton County Comprehensive Plan	1	62	2	**	
17	Clinton	Pine Creek Trail Connector (Phase 3)	Pipeline	McKinney Road to McElhattan Road Overpass	Public, utility	**	1.6	**	Yes	2	Clinton County Greenway and Open Space Plan, Clinton County Comprehensive Plan	1	62	3	**	
18	Clinton	Pine Creek Trail Connector (Phase 4)	Pipeline	McElhattan Road Overpass to Landfill Entrance	Public, utility	**	2.1	Road	Yes	2	Clinton County Greenway and Open Space Plan, Clinton County Comprehensive Plan	1	62	3	**	
19	Clinton	Pine Creek Trail Connector (Phase 5)	Pipeline	Railroad Bridge Crossing, including approaches on both sides	Public, utility	**	0.5	Railroad	Yes	2	Clinton County Greenway and Open Space Plan, Clinton County Comprehensive Plan	1	62	3	Fort Horn site	
20	Clinton	Pine Creek Trail Connector (Phase 6)	Pipeline	Railroad Bridge to River Road	Private, public, utility	1	1.3	**	No?	2	Clinton County Greenway and Open Space Plan, Clinton County Comprehensive Plan	1	62	3	**	

21	Clinton/Lycoming	Pine Creek Trail Connector (Phase 7)	Pipeline	River Road to DCNR Tiadaghton Elm Site	Public, utility	**	2	**	Yes	3	Clinton County Greenway and Open Space Plan, Clinton County Comprehensive Plan, Jersey Shore Borough Community Bicycle and Pedestrian Audit	1	62	3	Tiadaghton Elm	
22	Clinton	East/West Renovo Walking Connector ("Renovo Riverwalk")	Planned	Proposed 5th Street River Access site with the existing PA Flaming Foliage River Access	Municipal/private	5	0.45	No	No	1	Clinton County Greenway and Open Space Plan	Connects 2 water trail access points	>400 water trail miles	0	**	Renovo Borough and Pennsylvania Railroad (PRR) group, SGP
23	Columbia	Extend Columbia County Susquehanna Trail, Iron St to Kocher Park	Planned	Village of Rupert to the area north of Bloomsburg, Berwick, and Sullivan Railroad intersects Iron Street	Private, public	**	~4	**	No	1	Columbia Co Comp Rec, Park, Greenways, and Open Space Plan	1	~.5	1	**	Town of Bloomsburg, Scott Township
24	Lycoming	Connection between Pine Creek trailhead in Jersey Shore to the Susquehanna River Walk	Planned	Pine Creek trailhead in Jersey Shore to Susquehanna River Walk	Private, public, municipal	39-*58	15.7-*18.3	Creek	No	4	Williamsport to Jersey Shore Feasibility Study, Lycoming County Long Range Transportation Plan, Lycoming County Comprehensive Plan	2	71.4	3	Hiawatha Paddlewheel Riverboat, The Old Granary	Jersey Shore Borough, City of Williamsport, Woodward Township, Piatt Township, Porter Township
25	Lycoming	Connection between Pine Creek trailhead in Jersey Shore to the Susquehanna River Walk (Segment 1, *Alternative 1.1)	Planned	Maynard Street to Susquehanna State Park via Maynard St, railroad, Rose St, abandoned railroad, and levee	Private, public, municipal	2	2.2	**	No	4	Williamsport to Jersey Shore Feasibility Study, Lycoming County Long Range Transportation Plan, Lycoming County	2	71.4	3	Hiawatha Paddlewheel Riverboat	Jersey Shore Borough, City of Williamsport, Woodward Township, Piatt Township, Porter Township

											Comprehensive Plan					
26	Lycoming	Connection between Pine Creek trailhead in Jersey Shore to the Susquehanna River Walk (Segment 2, *Alternative 2.1)	Planned	Susquehanna State Park to Pennsylvania Fish & Boat Commission (PFBC) Linden Access via levee, South Reach Rd, and Antlers Lane	Private, public, municipal	5	3.2	Creek	No	4	Williamsport to Jersey Shore Feasibility Study, Lycoming County Long Range Transportation Plan, Lycoming County Comprehensive Plan	2	71.4	3	Hiawatha Paddlewheel Riverboat, The Old Granary	Jersey Shore Borough, City of Williamsport, Woodward Township, Piatt Township, Porter Township
27	Lycoming	Connection between Pine Creek trailhead in Jersey Shore to the Susquehanna River Walk (Segment 3, *Alternative 3.1)	Planned	PFBC Linden Access to Woodward Township School via Antlers Lane and Railroad	Private, public, municipal	24	2.4	Creek	No	4	Williamsport to Jersey Shore Feasibility Study, Lycoming County Long Range Transportation Plan, Lycoming County Comprehensive Plan	2	71.4	3	**	Jersey Shore Borough, City of Williamsport, Woodward Township, Piatt Township, Porter Township
28	Lycoming	Connection between Pine Creek trailhead in Jersey Shore to the Susquehanna River Walk (Segment 4, *Alternative 4.1)	Planned	Woodward Township School to Level Corners via railroad, Windswept Drive, Level Corners Road, and Schoolhouse Road	Private, public, municipal	12	3.4	Creek	No	4	Williamsport to Jersey Shore Feasibility Study, Lycoming County Long Range Transportation Plan, Lycoming County Comprehensive Plan	2	71.4	3	**	Jersey Shore Borough, City of Williamsport, Woodward Township, Piatt Township, Porter Township
29	Lycoming	Connection between Pine Creek trailhead in Jersey Shore to the Susquehanna River Walk (Segment 5, *Alternative 5.1)	Planned	Level Corners to Jersey Shore via railroad, NB SR 220 slope, and North Main Street	Private, public, municipal	2	3.7	**	No	4	Williamsport to Jersey Shore Feasibility Study, Lycoming County Long Range Transportation Plan, Lycoming County	2	71.4	3	**	Jersey Shore Borough, City of Williamsport, Woodward Township, Piatt Township, Porter Township

											Comprehensive Plan					
30	Lycoming	Lycoming Creek Bikeway to Susquehanna River Walk	Potential	Lycoming Creek Bikeway to Susquehanna River Walk	Private, municipal, state	~5	~8	**	**	3	Williamsport to Jersey Shore Feasibility Study, Lycoming County Long Range Transportation Plan, Lycoming County Comprehensive Plan	2	9.7	2	**	Lycoming County, Hepburn Township, Lycoming Township, Lewis Township, Old Lycoming Township, Loyalsock Township, SGP
31	Lycoming	Miller's Run Greenway	Planned	(Four phases) Susquehanna River Walk to Bruce Henry Park, the Loyalsock Community Center, James Short Park, and the community swimming pool in Loyalsock Township	Municipal, private	~15	~1.3	Road	No	2	Lycoming County Long Range Transportation Plan, Lycoming County Comprehensive Recreation, Parks, and Open Space/Greenway Plan	2	6.5	1	Bruce Henry and James Short Parks	Loyalsock Township, Loyalsock Township School District, Diamond Pointe Apartments, USACE, PennDOT, PADEP, Susquehanna Greenway Partnership, Lycoming County PCD
32	Lycoming	Basin Street Access to Riverwalk	Pipeline	Susquehanna River Walk to an access improvement at Basin Street	State, municipal, SEDA-COG Joint Rail Authority	3	~.2	Road (underpass must be built)	Yes	2	Lycoming County Long Range Transportation Plan, Williamsport Comprehensive Plan	1	4.2	0	Access to many cultural features in downtown Williamsport (ex. Community Theatre League, art galleries, etc.)	Lycoming County PCD and Susquehanna Greenway Partnership/Other Partners- City of Williamsport, Pennsylvania College of Technology, Lycoming College, Susquehanna Economic Development Association, SEDA-COG Joint Rail Authority, Williamsport Sanitary

																Authority, USACE, PennDOT, DCNR, DCED
33	Lycoming	Newberry River Walk Connection	Planned	Susquehanna River Walk to Newberry and Susquehanna State Park	Municipal, private	~5	~.4	Road	**	2	Lycoming County Long Range Transportation Plan, Williamsport Comprehensive Plan	1	4.2	1	Historic Bowman Field, Original Little League Field	Newberry Township, City of Williamsport, Lycoming County
34	Lycoming	South Reach Road River Walk Connection	Planned	Susquehanna River Walk to South Reach Road	**	**	**	**	**	2	Lycoming County Long Range Transportation Plan, Williamsport Comprehensive Plan	1	4.2	0	**	City of Williamsport
35	Lycoming	Susquehanna River Walk to Muncy	Planned	Susquehanna River Walk to Muncy	Private, municipal	0-30	3.9-13.8	Railroad, road	No	3	Susquehanna River Trail Feasibility Study, Lycoming County Comprehensive Plan, Lycoming County Comprehensive Recreation, Parks, and Open Space/Greenway Plan	1	4.2	3	Historic canal structures	Montoursville, Muncy Township, Muncy Creek Township, Muncy Borough, Fairfield Township
36	Lycoming	South Williamsport-Sylvan Dell Nature Park and Bald Eagle Ridge Trail Connector	Potential	Sylvan Dell Nature Park and Bald Eagle Ridge Trail connector	**	**	**	**	**	1	Lycoming County Comprehensive Plan	1	**	0	**	South Williamsport Borough, South Williamsport Area School District, Armstrong

																Township, Lycoming County
37	Lycoming	Downtown Muncy to Muncy Heritage Park and West Branch Susquehanna River	Planned	Downtown Muncy to Muncy Heritage Park and Susquehanna River access	Private, utility, municipal	**	~2	Road, canal, stream (break in towpath)	No	2	Muncy Heritage Park and Nature Trail Master Plan, Lycoming County Comprehensive Recreation, Parks, and Open Space/Greenway Plan	2	~400 water trail miles, ~.5 land miles	0	Historic canal-era structures, Last Raft crash site at RR bridge	Muncy Borough, Muncy Creek Township
38	Lycoming	Downtown Muncy to Muncy Heritage Park and West Branch Susquehanna River (Segment 1, *Alternative 1.1)	Planned	Mill Street to Sydney Street via River Corridor	Private, utility, municipal	**	5.7	**	No	2	Muncy Heritage Park and Nature Trail Master Plan, Lycoming County Comprehensive Recreation, Parks, and Open Space/Greenway Plan	2	**	**	**	Muncy Borough, Muncy Creek Township
39	Lycoming	Downtown Muncy to Muncy Heritage Park and West Branch Susquehanna River (Segment 2, *Alternative 2.2)	Planned	Sydney Street to Lycoming Mall via Railroad Corridor	Private, utility, municipal	**	2.7	**	No	2	Muncy Heritage Park and Nature Trail Master Plan, Lycoming County Comprehensive Recreation, Parks, and Open Space/Greenway Plan	2	**	**	**	Muncy Borough, Muncy Creek Township
40	Lycoming	Downtown Muncy to Muncy Heritage Park and West Branch Susquehanna River (Segment 3, *Alternative 3.3)	Planned	Lycoming Mall to Future Park Site	Private, utility, municipal	18	4	**	No	2	Muncy Heritage Park and Nature Trail Master Plan, Lycoming County Comprehensive Recreation, Parks, and Open	2	**	**	**	Muncy Borough, Muncy Creek Township

											Space/Greenway Plan					
41	Lycoming/Union	Montgomery to Allenwood	Potential	Montgomery to Allenwood	Public	3?	~4	Railroad	No	1	Union County Greenway and Open Space Plan	**	**	2	Montgomery RR Bridge, Allenwood Park Old Ordnance Dam, canal remnants	Montgomery Borough, Gregg Township
42	Northumberland	Warrior Run Pathways project	Planned	Dewart Village through Watsontown Borough and Allenwood Township to White Deer Township	Private, state, municipal, public	38	8.75	Bridge underpass, road, railroad	No	2	Warrior Run Pathways Partnership, Northumberland County Greenway and Open Space Plan	Several	~10	4	Restored White Deer Depot	SGP, Dewart Village, Watsontown Borough, Allentown Township, White Deer Township
43	Union	West Branch RiverWalk	Planned	Lewisburg to Milton State Park	Private, public	~6-10	**	**	No	1	Union County Greenway and Open Space Plan	1	1	2	**	Lewisburg Borough, Union County
44	Union	Buffalo Valley Rail Trail Lewisburg Gap	Planned	Buffalo Valley Rail Trail and Lewisburg trail systems and parks	State	1	~0.5	Road	No	2	Union County Greenway and Open Space Plan, US 15 Smart Transportation Corridor Improvement Plan	1	9	2	**	Lewisburg Borough, Union County
45	Union	Buffalo Valley Rail Trail railroad bridge over Susquehanna	Potential	Buffalo Valley Rail Trail to proposed greenway and trail in Northumberland	**	**	**	**	No	**	**	1	9	2	**	Lewisburg Borough, Union County
46	Union	Lewisburg to Selinsgrove Trail	Potential	Lewisburg to Selinsgrove	**	2	**	**	No	**	**	**	**	**	**	Lewisburg Borough, East Buffalo Township, Union County
Lower Branch																
48	Northumberland	Sunbury Riverfront Trail extension	Planned	Sunbury connections	Private	2?	5	1	**	2	Lake Augusta Gateway Corridor Plan, Northumberland County	**	**	**	**	City of Sunbury, Northumberland County

										Greenway and Open Space Plan					
* Apply to alternative routes																
** Unknown at this time																
***An updated route has been determined for this trail and is as follows:																
Montour Area Recreation Commission (MARC); Susquehanna Greenway Partnership (SGP)																

Figure 18

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