Marsh Creek Greenway
Tioga County, PA

Impact Analysis of a Regional Recreation Hub

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BACKGROUND

The Marsh Creek Greenway (MCG) project is an economic development initiative that will connect users of the Pine Creek Rail Trail (PCRT) to the shopping, dining and lodging establishments in the Borough of Wellsboro. This critical connection will enable uninterrupted foot and bicycle travel from Jersey Shore (Lycoming County) to Wellsboro (Tioga County). The journey is approximately 65 miles.

Other regional trail connections and bike routes include:

- Mid-State Trail (which runs the entire North-South length of Pennsylvania)
- Scenic West Rim Trail (provides views of the PA Grand Canyon)
- Bicycle Route G (running from Corning, New York to the north and Jersey Shore/Lock Haven to the south)
- Bicycle Route Y (running from Potter County to the west, and Mansfield to the east)

PROJECT COMPONENTS

The Marsh Green Greenway project includes the following components:

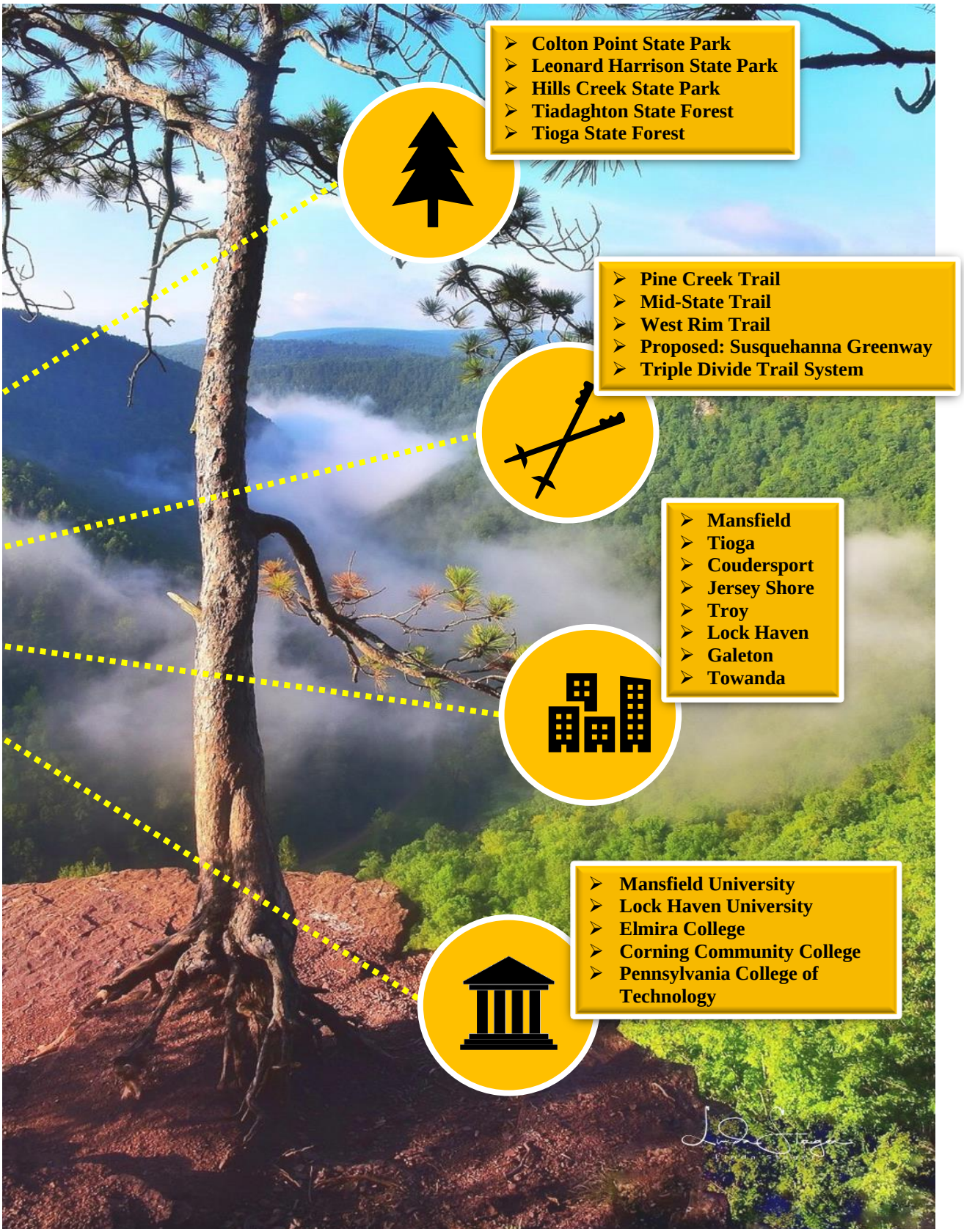
- Trailhead to include parking, kiosks and pavilions, along with a 5,000-square-foot building to offer public restrooms, conservation/outdoor shop, café, small museum, and retail space
- Construction of over 17,800 lineal feet of ADA accessible trail with amenities
- Railroad siding to accommodate an alternative passenger pick-up for Tioga Central Railroad to expand tourism
- Safety and railroad separation fencing
- Stormwater management/controls
- Bridge repair/replacements

This study seeks to quantify these factors and understand the extent of their impact on the region. With the completion of the Marsh Creek Greenway trail, Tioga County is poised to be at the geographic hub of a multi-modal trail corridor extending through the Pine Creek Valley and PA Grand Canyon.

A HUB OF REGIONAL CONNECTIVITY

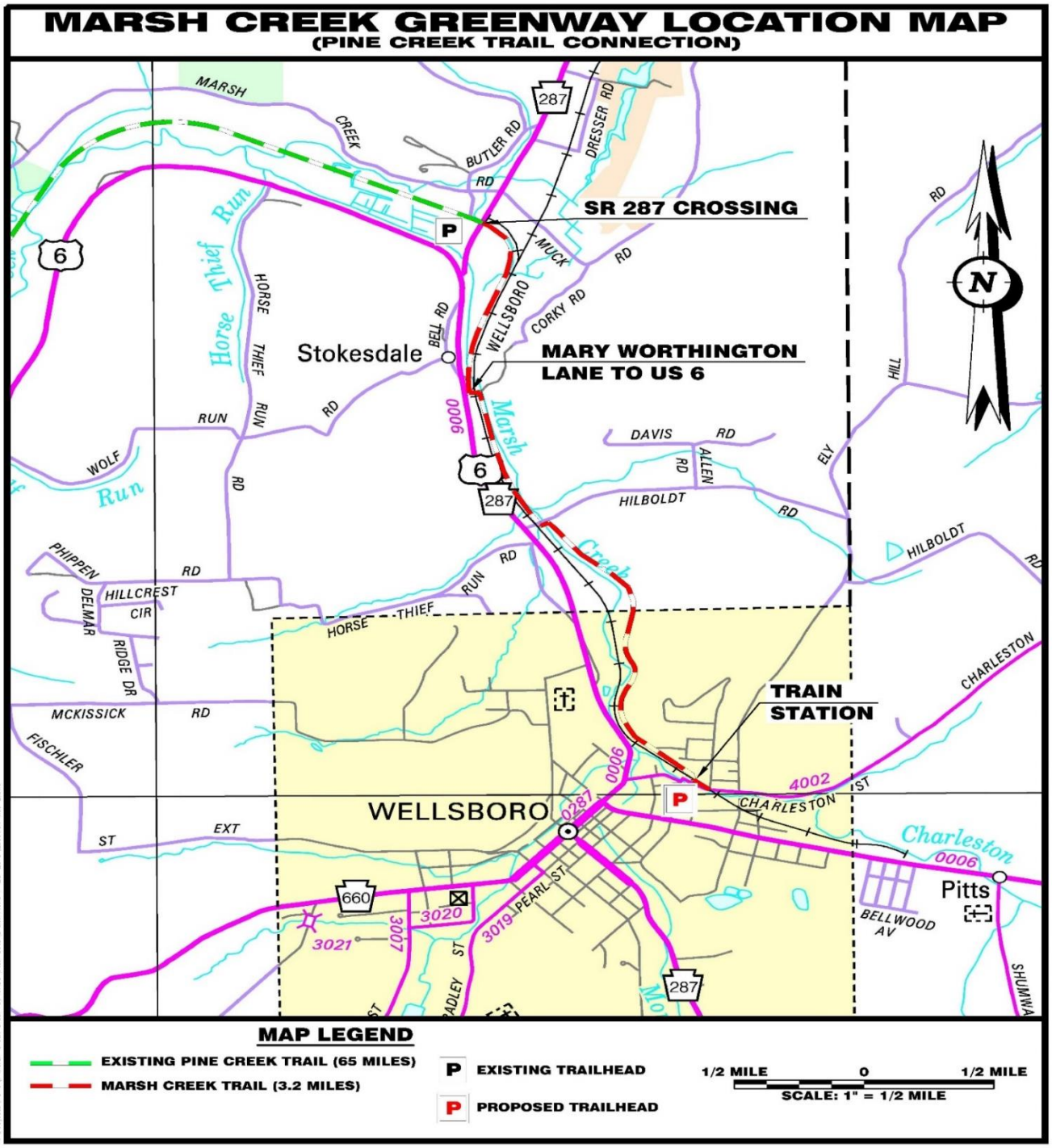
FIGURE 1

FIGURE 2


Colton Point State Park
Leonard Harrison State Park
Hills Creek State Park
Tiadaghton State Forest
Tioga State Forest
Pine Creek Trail
Mid-State Trail
West Rim Trail
Proposed: Susquehanna Greenway
Triple Divide Trail System
Mansfield
Tioga
Coudersport
Jersey Shore
Troy
Lock Haven
Galeton
Towanda
Mansfield University
Lock Haven University
Elmira College
Corning Community College
Pennsylvania College of Technology

MARSH CREEK GREENWAY MAP

FIGURE 3



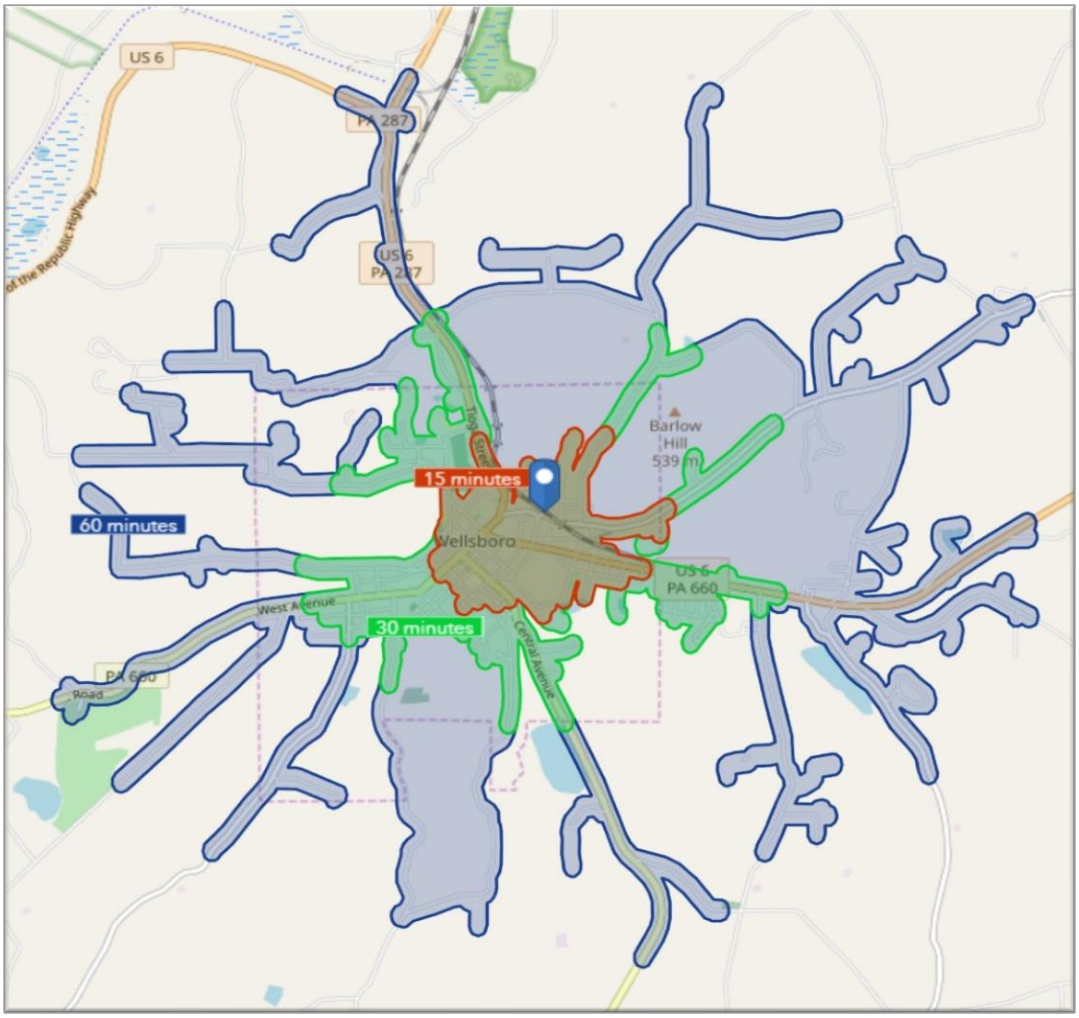
LOCAL BENEFIT

WHO LIVES AROUND THE TRAIL?

For the purposes of this analysis, a walk-time map was generated using ESRI Business Analyst to study the demographic makeup of those living within a specified walk-time (15, 30, and 60 minutes) of the proposed trailhead.

This analysis gives insight into the residents that will become regular trail users. In addition to easy access to recreational opportunities, nearby residents and business owners near the Marsh Creek Greenway stand to benefit economically. For reference, a 2008 study [6] by the University of Cincinnati School of Planning found that residential properties near Ohio's Little Miami Trail sold for an additional $7.05 per square foot every foot closer to the trail. So, a 2,640 square-foot. home located adjacent to the Marsh Creek Greenway would sell, on average, for $18,612 more than a home located a half mile away from the Greenway.

FIGURE 4 – ADDED VALUE TO A HOME ADJACENT TO THE TRAIL (AS COMPARED TO AN IDENTICAL PROPERTY A HALF MILE AWAY): $18,612



DEMOGRAPHICS

In 2018, there were over 700 households that lived within a fifteen-minute walking distance of the trailhead. Over 3,600 are employed within this same walking distance. Over 82% of the population are over the age of eighteen.

TABLE 1- POPULATION AND INCOME

Walk Time Demographics			
	15 Minutes	30 Minutes	60 Minutes
2010 Population	1,539	2,483	3,419
2018 Population	1,496	2,460	3,409
2023 Population	1,473	2,432	3,375
2018 Total Daytime Population	4,492	5,389	6,508
Workers	3,628	3,964	4,533
Residents	864	1,425	1,975
2018 Households	752	1,200	1,581
2023 Households	741	1,187	1,566
2018 Families	378	653	881
2023 Families	369	641	866
2018 Median Household Income	$43,232	$47,644	$48,680
2023 Median Household Income	$47,493	$51,583	$52,347
2018 Median Age	48	48.6	48.5
2023 Median Age	48.4	49.2	49.1

Source: ESRI Business Analyst

TABLE 2 – POPULATION BY AGE

WALK TIME AGE DEMOGRAPHICS (2018)			
	15 Minutes	30 Minutes	60 Minutes
TOTAL:	**1,495**	**2,460**	**3,409**
0 to 4	4.5%	4.5%	4.4%
5 to 9	4.5%	4.6%	4.7%
10 to 14	4.7%	4.9%	5.0%
15 to 24	10.0%	10.1%	10.2%
25 to 34	12.0%	11.2%	11.1%
35 to 44	10.5%	10.4%	10.5%
45 to 54	12.5%	12.3%	12.3%
55 to 64	13.2%	13.8%	14.1%
65 to 74	13.1%	13.7%	13.7%
75 to 84	8.6%	8.7%	8.6%
85 +	6.1%	5.8%	5.5%
18 +	82.9%	82.5%	82.4%

Source: ESRI Business Analyst

TAPESTRY SEGMENTATION

ESRI Business Analyst Tapestry Segments [3] classifies neighborhoods into 67 segments based on demographic and socioeconomic characteristics. These accurate, detailed descriptions of America's neighborhoods give planners, local officials, and business owners a better idea of the people who reside in the community. The top two tapestry segments for the 15- to 60-minute walk time area is Small Town Simplicity and Midlife Constants. The Small Town Simplicity segment enjoys outdoor recreation such as hunting and fishing, while the Midlife Constants enjoy fishing and golf.

TABLE 3

DOMINANT TAPESTRY SEGMENTATIONS					
15 MINUTES		30 MINUTES		60 MINUTES	
SEGMENT	%	SEGMENT	%	SEGMENT	%
Small Town Simplicity (12C)	92.0%	Small Town Simplicity (12C)	63.8%	Small Town Simplicity (12C)	57.9%
Midlife Constants (5E)	8.0%	Midlife Constants (5E)	35.8%	Midlife Constants (5E)	37.0%
		The Great Outdoors (6C)	0.5%	The Great Outdoors (6C)	3.7%
				Comfortable Empty Nesters (5A)	1.2%
				Prairie Living (6D)	0.2%

Source: ESRI Business Analyst

FIGURE 5

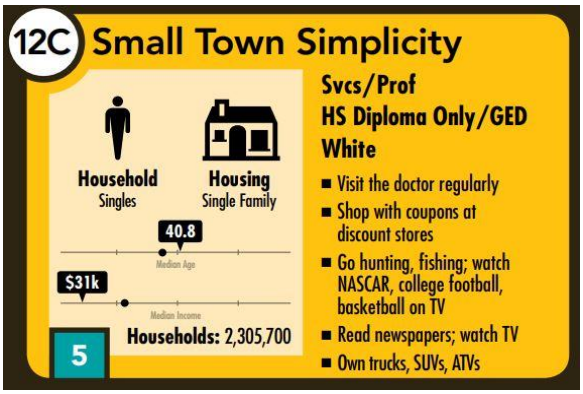
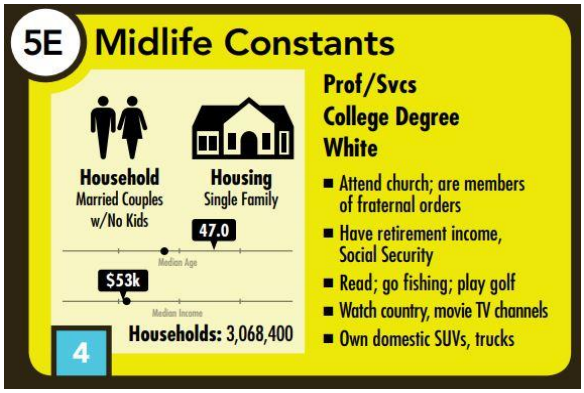


FIGURE 6



CURRENT USERS OF PINE CREEK RAIL TRAIL

The Pine Creek Rail Trail extends through the Tioga and Tiadaughton State Parks. The counters installed to track users for the PCRT are managed by the Recreation Foresters at each park. The data obtained from the Tioga County Recreation Foresters is provided in Table 4 below. It should be noted that the counter for Darling Run stopped working in June of 2018, therefore the correct data was not obtained. Information was not available for the Tiadaughton State Park.

TABLE 4

TIOGA COUNTY STATE PARK – PINE CREEK RAIL TRAIL COUNTERS						
COUNTER LOCATION	2013	2014	2015	2016	2017	2018
Darling Run	15,604	20,671	10,521	11,899	11,477	3,518
Rattlesnake Rock	695	23,467	6,612	4,785	20,191	14,415
Butler Road	12,603	6,325	6,676	8,688	12,553	7,964

Source: Tioga State Park Recreation Foresters

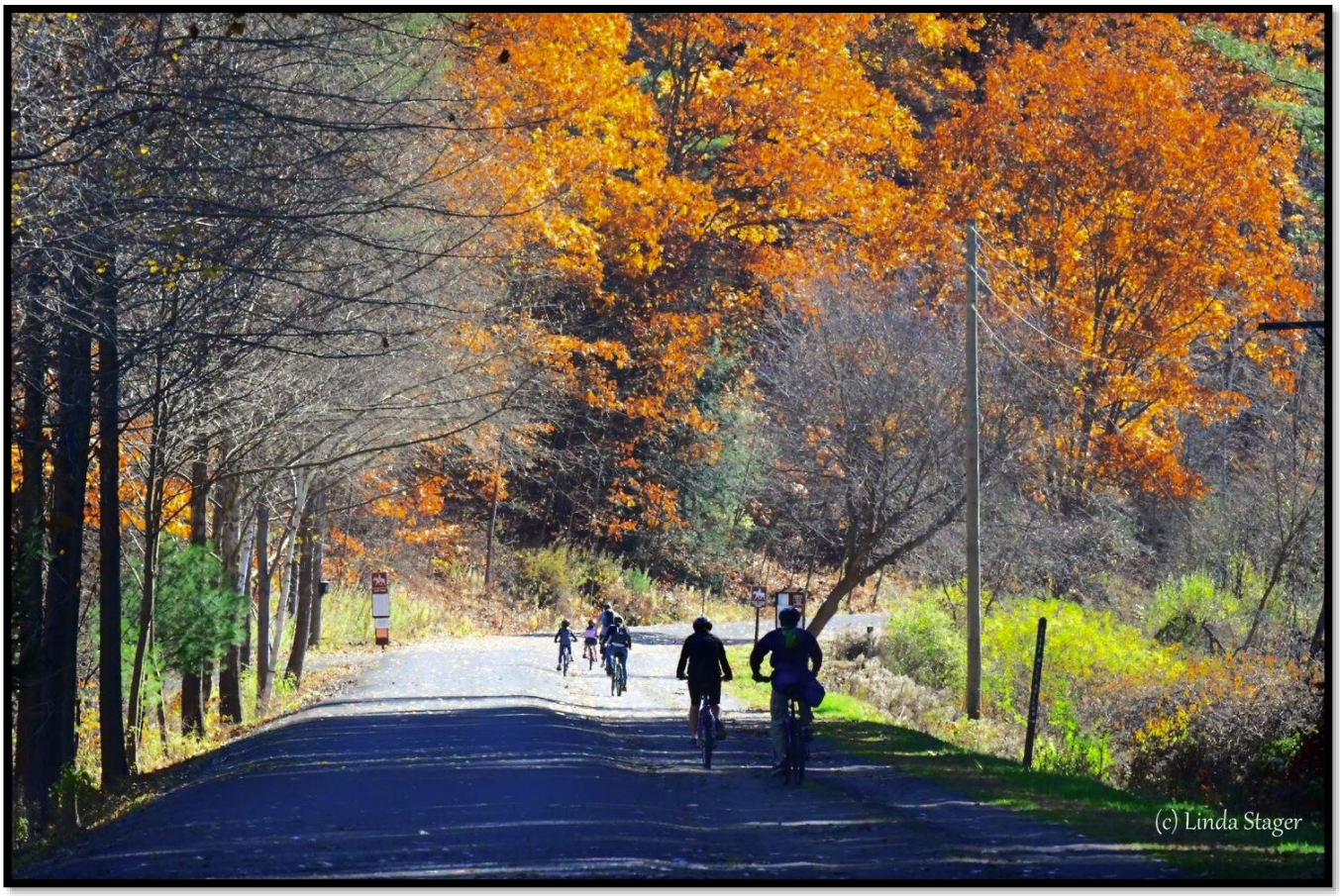
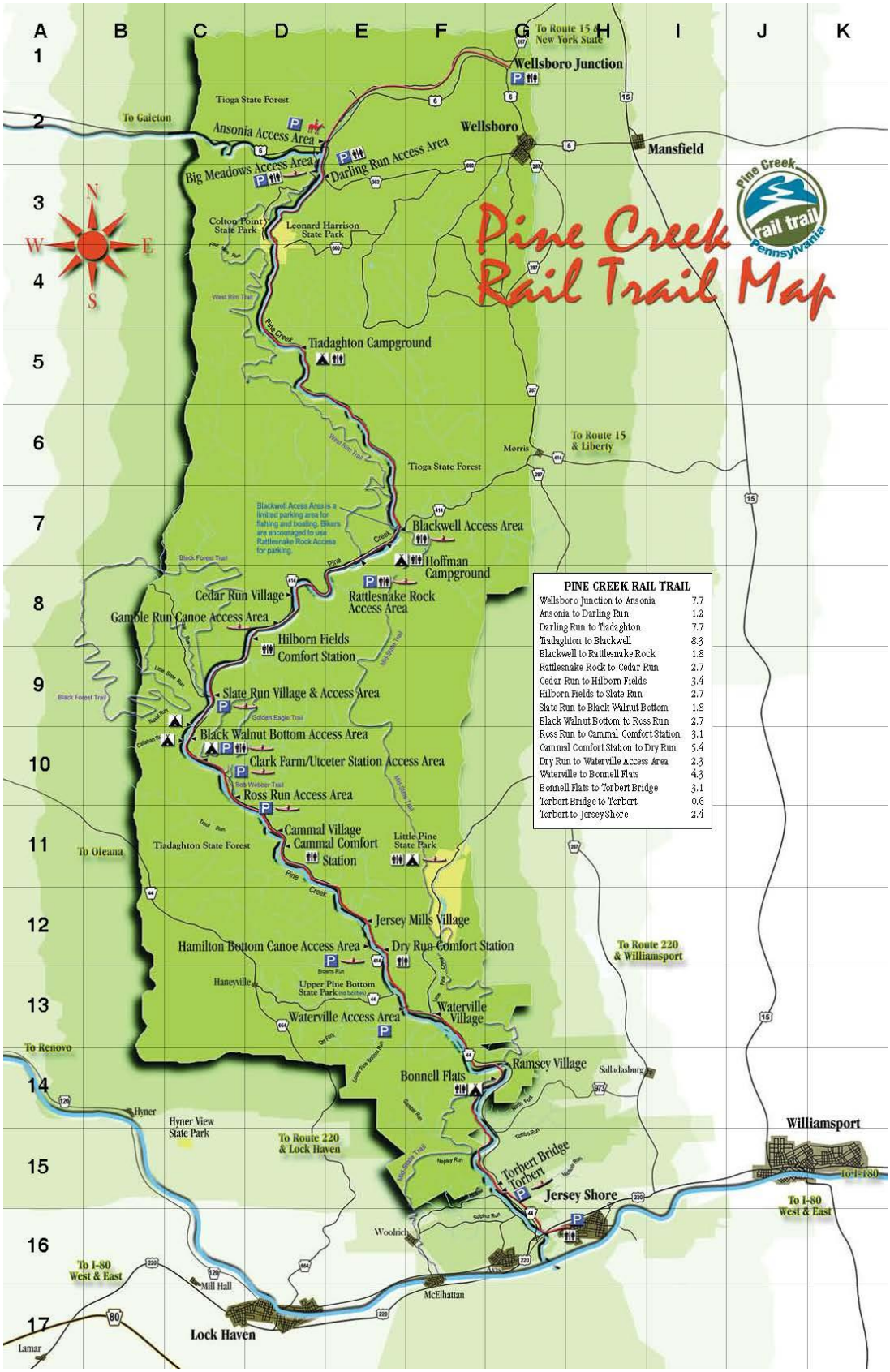


FIGURE 7


Pine Creek Rail Trail Map
Pine Creek rail trail Pennsylvania
PINE CREEK RAIL TRAIL
Wellsboro Junction 7.7
Ansonia to Darling Run 1.2
Darling Run to Tiadaghton 7.7
Tiadaghton to Blackwell 8.3
Blackwell to Rattlesnake Rock 1.8
Rattlesnake Rock to Cedar Run 2.7
Cedar Run to Hilborn Fields 3.4
Hilborn Fields to Slate Run 2.7
Slate Run to Black Walnut Bottom 1.8
Black Walnut Bottom to Ross Run 2.7
Ross Run to Cammal Comfort Station 3.1
Cammal Comfort Station to Dry Run 5.4
Dry Run to Waterville Access Area 2.3
Waterville to Bonnell Flats 4.3
Bonnell Flats to Torbert Bridge 3.1
Torbert Bridge to Torbert 0.6
Torbert to Jersey Shore 2.4
Wellsboro Junction
Wellsboro
Mansfield
Tioga State Forest
Ansonia Access Area
Darling Run Access Area
Big Meadows Access Area
Colton Point State Park
Leonard Harrison State Park
Tiadaghton Campground
Blackwell Access Area
Hoffman Campground
Rattlesnake Rock Access Area
Cedar Run Village
Gamble Run Canoe Access Area
Hilborn Fields Comfort Station
Slate Run Village & Access Area
Black Walnut Bottom Access Area
Clark Farm/Utceter Station Access Area
Ross Run Access Area
Cammal Village
Cammal Comfort Station
Little Pine State Park
Tiadaghton State Forest
Jersey Mills Village
Hamilton Bottom Canoe Access Area
Dry Run Comfort Station
Upper Pine Bottom State Park
Waterville Access Area
Waterville Village
Ramsey Village
Bonnell Flats
Torbert Bridge
Torbert
Jersey Shore
Williamsport
Lock Haven
Mill Hall
McElhattan
Woolrich
Salladasburg
Haneyville
Hyner
Hyner View State Park
Morris
To Galeton
To Oleana
To Renovo
To Route 15 & Liberty
To Route 220 & Williamsport
To Route 220 & Lock Haven
To I-80 West & East
Lamar

POTENTIAL UNIQUE USERS

ESTIMATED MARSH CREEK GREENWAY USERS

The Pine Creek Rail Trail is a world-renowned trail that attracts tourists and recreationists throughout the entire year. The connection of this Trail to the town of Wellsboro will create a hub of new activity, which will result in new spending in the areas of retail, dining and lodging.

Previous plans and studies that quantified both recreational activity and consumer spending were relied on to calculate the number of unique users. The first study, the *2017 Outdoor Participation Report*, published by the Outdoor Foundation, was based on 24,134 online surveys conducted by the Physical Activity Council, a partnership of leading organizations in the US sports, fitness and leisure industries. The goal of the survey was to determine the levels of activity and trends in sports, fitness and recreation participation. The most popular outdoor activities by participation rate included:

- Running, Jogging and Trail Running: 18% of Americans / 52.3 million participants
- Freshwater, Saltwater and Fly Fishing: 16 % of Americans / 47.2 million participants
- Road Biking, Mountain Biking and BMX: 15% of Americans / 45.8 million participants
- Hiking: 14% of Americans / 42.1 million participants
- Car, Backyard, Backpacking and RV Camping: 14% of Americans / 40.5 million participants

On average participants in the study traveled 16 miles for outdoor recreation. The commitment to traveling for outdoor recreation breaks down as follows:

- Less than a mile – 11%
- 1-10 miles – 36%
- 11-25 miles – 16%
- 26-50 miles – 9%
- Over 51 miles – 10%

Population data from ESRI Business Analyst was collected at specified intervals around the proposed Marsh Creek Greenway trailhead in Wellsboro. To estimate the number of potential unique visitors, the distance data, shown above, was multiplied by the population data, and then weighted by the likelihood of the population choosing to use the Marsh Creek Greenway. Using this method, it is estimated that the Marsh Creek Greenway could attract approximately 64,387 unique visitors per year, with over 74% traveling 50 miles or more.

TABLE 5

MARSH CREEK GREENWAY TRAIL USER ESTIMATE					
TRAVEL DISTANCE FOR USERS	TRAVEL DISTANCE PERCENTAGE	TRAVEL DISTANCE PERCENTAGE	ESRI BUSINESS ANALYST 2018 POPULATION	WEIGHT (*LIKELIHOOD OF USE*)	UNIQUE USERS
Less Than 1 Mile	11%	0.11	2,465	3	814
1-10 Miles	36%	0.36	10,576	1.2	4,569
11-25 Miles	16%	0.16	47,552	0.48	3,652
26-50 Miles	9%	0.09	431,081	0.192	7,449
51-100 Miles	10%	0.10	3,172,163	0.0768	24,362
101-150 Miles	8%	0.08	8,485,310	0.019	12,898
151-200 Miles	4%	0.04	34,408,244	0.006	8,258
201-250 Miles	1%	0.01	14,907,824	0.016	2,385
				TOTAL:	64,387

**Weights for the 0-100-mile rings decline 2.5 times per subsequent population ring; weights for the 101-250-mile rings are calculated based upon the percentage of people falling within ESRI Business Analyst's "The Great Outdoors" Tapestry group.*

CONSUMER SPENDING

Information contained in the annual publication, *Economic Impact of Travel in Pennsylvania* was relied on to calculate the potential economic impact derived through consumer spending. This publication is commissioned by the Pennsylvania Department of Community and Economic Development.

The study found that in Pennsylvania tourists spend an average of $129 on hard and soft goods during their trip. Table 6 illustrates how the $129 is spent.

TABLE 6

AVERAGE DAY-TRIP-SPENDING (2017)		
EXPENDITURE	%	AMOUNT
Food and Beverage	19%	$25
Retail	25%	$32
Transportation	32%	$41
Recreation	24%	$31
		$129

Source: The Economic Impact of Travel in Pennsylvania

Overnight leisure spending was calculated separately. Those staying overnight spend an average of $302. Table 7 illustrates how this money is spent.

TABLE 7

OVERNIGHT LEISURE SPENDING (2017)		
EXPENDITURE	%	AMOUNT
Food and Beverage	17%	$51.07
Lodging	20%	$59.28
Retail	16%	$49.25
Transportation	35%	$105.18
Recreation	12%	$37.70
		$302.48

Source: The Economic Impact of Travel in Pennsylvania

Tourism spending data, and the estimate of unique annual trail users, were used to estimate the total annual economic impact for Tioga County. It was assumed that because of the Greenway's proximity to their homes, local users will spend less in the local economy, while users further from the Greenway will spend more. It can also be assumed that approximately 36.6% of unique visitors would be overnight guests. Based on these assumptions, and the spending patterns noted by Pennsylvania's tourism study, the Marsh Creek Greenway could generate an additional $11.6 million in consumer spending.

TABLE 8

ANNUAL TOURISM SPENDING (2017)								
DISTANCE (MILES)	FOOD & BEVERAGE	RETAIL	TRANSPORTATION	RECREATION	LODGING	TOTAL SPENDING	UNIQUE USERS	TOTAL ANNUAL SPENDING
DAY-TRIP LEISURE SPENDING								
Less than 1 Mile	$0	$0	$0	$0	$0	$0	814	$0
1-10 Miles	$6.25	$8	$10.25	$7.75	$0	$32.25	4,569	$147,350
11-25 Miles	$12.5	$16	$20.5	$15.5	$0	$64.50	3,652	$235,554
26-50 Miles	$25	$32	$41	$31	$0	$129	7,449	$960,921
51-100 Miles	$25	$32	$41	$31	$0	$129	24,362	$3,142,698
OVERNIGHT LEISURE TRAVELER SPENDING								
101-150 Miles	$51.07	$49.25	$105.18	$37.70	$59.28	$304	12,898	$3,920,992
151-200 Miles	$51.07	$49.25	$105.18	$37.70	$59.28	$304	8,258	$2,510,432
201-250 Miles	$51.07	$49.25	$105.18	$37.70	$59.28	$304	2,385	$725,040
						TOTAL:	**64,387**	**$11,642,987**

Source: The Economic Impact of Travel in Pennsylvania and Delta Projections

POTENTIAL INDUSTRY GROWTH

Tioga's entrepreneurial ecosystem is partially fueled by visitor spending. Building and expanding natural assets within the County will continue to strengthen this system. Visitors attracted to Wellsboro because of the Marsh Creek Greenway will have the potential to add over $11 million to the local economy. The $11 million is broken down by industry as follows:

- Transportation industry: $3,907,817
- Retail: $2,279,342
- Food and Beverage: $2,077,762
- Recreation: $1,978,095.31
- Lodging: $1,399,970

TABLE 9

ANNUAL INDUSTRY INCOME (2017)							
	FOOD & BEVERAGE	RETAIL	TRANSPORTATION	RECREATION	LODGING	UNIQUE USERS	TOTAL ANNUAL SPENDING
DAY-TRIP LEISURE SPENDING							
Less than 1 Mile	$0	$0	$0	$0	$0.0	814	$0
1-10 Miles	$28,556.25	$36,552.00	$46,832.25	$35,409.75	$0.0	4,569	$147,350
11-25 Miles	$45,650.0	$58,432.0	$74,866.0	$56,606.0	$0.0	3,652	$235,554
26-50 Miles	$186,225	$238,368	$305,409	$230,919	$0.0	7,449	$960,921
51-100 Miles	$609,050	$779,584	$998,842	$755,222	$0.0	24,362	$3,142,698
OVERNIGHT LEISURE TRAVELER SPENDING							
101-150 Miles	$662,011.04	$639,068.68	$1,359,803.60	$493,072.00	$767,036.67	12,898	$3,920,992
151-200 Miles	$423,855.42	$409,166.47	$870,620.11	$315,691.47	$491,098.53	8,258	$2,510,432
201-250 Miles	$122,414.03	$118,171.70	$251,444.52	$91,175.09	$141,834.57	2,385	$725,040
TOTAL:	**$2,077,761.74**	**$2,279,342.85**	**$3,907,817.48**	**$1,978,095.31**	**$1,399,969.77**	**64,387**	**$11,642,987**

Source: *Delta Projections*

SPACE REQUIRED TO ACCOMMODATE INDUSTRY GROWTH

The infusion of new visitor spending will strengthen the existing businesses and provide an opportunity for new commercial growth. Two sources, the *Urban Land Institute's Dollars & Cents of Shopping Centers (2008)* and information obtained from Hilton's SEC third quarter filings, were referenced to better understand the new square footage requirements. The 2008 figures obtained in the *Dollars & Cents of Shopping Centers* have been inflation-adjusted to reflect current dollar values.

For the food and beverage industry, the median sales per square foot of gross leasing area is $238.83. Because the new visitor spending will create over $2 million in new sales, the space needed to support this growth is 8,700 square feet.

The retail spending will support 13,887 square feet of new space, while recreation spending will support 7,480 square feet of new space.

TABLE 10

IMPACT BY INDUSTRY (2017)			
LOCAL INDUSTRY	TOTAL	MEDIAN SALES PER SF GROSS LEASING AREA (GLA), OR PER ROOM	TOTAL SF, OR ROOMS, SUPPORTED
Food and Beverage	$2,077,761.74	$238.83	8,700
Lodging	$1,399,969.77	$142.50	9,824
Retail	$2,279,342.85	$164.14	13,887
Transportation	$3,907,817.48	$1,582.03	2,470
Recreation	$1,978,095.31	$264.45	7,480

The overnight guests will spend $1,399,970 on lodging. Using information from Hilton's SEC filing for the third quarter of 2018, it is approximated that the benchmark for revenue per room is $2,520 or $10,079 annually. Therefore, the $1,399,970 generated through this project would support an additional 138 rooms.

TABLE 11

LODGING EXPANSION		
Gross Revenue – Hilton 10K	$2,253,000,000	$9,012,000,000
Total Rooms	894,158	894,158
Revenue Per Room Benchmark	$2,520	$10,079
TIOGA COUNTY EXPANSION		
Tioga Projected Lodging Gross Sales		$1,399,970
Revenue Per Room Benchmark		$10,079
Potential Supported Rooms		139

Source: Hilton 10K September 30, 2018 for the Quarter; Delta Projections

JOB GROWTH – TRAILHEAD BUILDING AND NEW INDUSTRY GROWTH

Delta utilized IMPLAN to determine the number of jobs that could be created through the construction of the new Trailhead Building, and the industry growth due to additional consumer spending. IMPLAN is a robust economic modeling software used to model development and operational impacts on local economies. This software uses inputs, such as construction costs, employment, or building square footage, to calculate potential employment, tax income, and value added within the community. IMPLAN modeling is typically conducted using two scenarios: Construction and Operations.

TABLE 12

JOB GROWTH									
	CONSUMER SPENDING- NEW INDUSTRY GROWTH			CONSTRUCTION – TRAILHEAD BUILDING			OPERATIONS – TRAILHEAD BUILDING		
IMPACT TYPE	EMPLOYMENT	LABOR INCOME	VALUE ADDED ($)	EMPLOYMENT	LABOR INCOME	VALUE ADDED ($)	EMPLOYMENT	LABOR INCOME	VALUE ADDED ($)
DIRECT EFFECT	97.48	$1.579 million	$2.214 million	93	$4.311 million	$5.212 million	4	$71,241	$137,230
INDIRECT EFFECT	8.79	$322,126	$540,619	14	$604,625	$1.002 million	.72	$23,877	$39,887
INDUCED EFFECT	8.58	$281,284	$519,126	22	$724,891	$1.344 million	.43	$14,081	$25,958
TOTAL EFFECT	114.84	$2.183 million	$3.274 million	129	$5.640 million	$7.558 million	5.15	$109,199	$203,074
Annual State and Local Tax Impact – New Industry Growth		$547,511		Annual State and Local Tax Impact – Construction of Trailhead Building		$485,823	Annual State and Local Tax Impact – Operations of Trailhead Building		$71,252

***Source**: IMPLAN and Delta Projections*
***Direct Effect**: Number of jobs created directly from activity*
***Indirect Effect**: Number of jobs or amount of $ spent by businesses benefitting from direct spending (business to business)*
***Induced Affect**: Spending by households receiving revenue from the Direct or Indirect spending (household to business)*
***Value Added**: The total sum of employee compensation, proprietor income, or other property income, and taxes on productions and imports of a net subsidy.*

STRENGTH OF EXISTING RECREATION INDUSTRY

LOCATION QUOTIENT

The Location Quotient (LQ) is a measure used to quantify how concentrated a particular industry is within a study area. A LQ that is higher than 1.0 indicates that the industry employs a proportionally higher number of people in Tioga County than the Commonwealth of Pennsylvania. A LQ lower than 1.0 indicates that the industry employs a lower proportion of people in Tioga County than in the Commonwealth.

Analysis shows growing Location Quotients for NAICS Codes 71 (Arts, Entertainment, and Recreation) and 72 (Accommodation and Food Services). The Marsh Creek Greenway will further strengthen and expand these industries.

TABLE 13

HISTORIC CHANGE IN EMPLOYMENT BY 2-DIGIT NAICS, 2012-2017, TIOGA COUNTY

NAICS	INDUSTRY	3RD Q 2012	3RD Q 2017	2012-2017 CHANGE	2012 Q3 LOCATION QUOTIENT	2017 Q3 LOCATION QUOTIENT
11	Agriculture, Forestry, Fishing and Hunting	111	111	0	2.1	2.1
21	Mining	613	452	-161	7.6	8.0
22	Utilities	171	204	33	2.3	2.6
23	Construction	555	1109	554	1.0	1.9
31	Manufacturing	2219	1853	-366	1.6	1.5
42	Wholesale Trade	660	439	-221	1.2	0.9
44	Retail Trade	1570	1492	-78	1.1	1.1
48	Transportation and Warehousing	655	418	-237	1.3	0.7
51	Information	170	143	-27	0.8	0.7
52	Finance and Insurance	431	435	4	0.7	0.8
53	Real Estate and Rental and Leasing	74	76	2	0.5	0.5
54	Professional, Scientific, and Technical Services	355	326	-29	0.5	0.4
55	Management of Companies and Enterprises	44	49	5	0.1	0.2
56	Administration & Support, Waste Management and Remediation	222	254	32	0.3	0.4
61	Educational Services	672	803	131	0.7	0.9
62	Health Care and Social Assistance	2022	1646	-376	0.9	0.7
71	Arts, Entertainment, and Recreation	126	369	243	0.5	1.4
72	Accommodation and Food Services	1066	1115	49	1.0	1.1
81	Other Services (excluding Public Administration)	378	355	-23	0.8	0.8
90	Public Administration	749	711	-38	2.0	1.7
	TOTAL	**12,863**	**12,360**	**-503**		

Source: U.S. Census Bureau Quarterly Workforce Indicators

CURRENT HEALTH RANKINGS AND ROADMAPS

County Health Rankings & Roadmaps [2] is a collaborative effort between the Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute. Using these statistical rankings, a county gains a baseline for proposed health improvement projects. Currently, Tioga County residents' access to exercise opportunities (29%) falls significantly short as compared to the entire Commonwealth of Pennsylvania (68%).

Construction of the Marsh Creek Greenway will provide a new recreation asset that will provide a tremendous health benefit, greatly enhancing the well-being of Tioga County residents.

TABLE 14

TIOGA	FACTOR	PENNSYLVANIA
33%	Adult Obesity	30%
12%	Diabetes Prevalence	11%
26%	Physical Inactivity	24%
29%	Access to Exercise Opportunities	68%
14%	Population in Poor or Fair Health	15%

HEALTH AND WELLNESS

DISTANCE OF MEDICAL FACILITIES FROM TRAILHEAD

Once operation of the Marsh Creek Greenway commences, Tioga County residents will have a conveniently located venue for outdoor recreation. The proposed trailhead's proximity to local healthcare facilities ensures ease of access for all Tioga County residents seeking to live a healthier lifestyle.

FIGURE 8

BENEFITS OF THE TRAIL

The MCG project is expected to increase recreational and mobility benefits to pedestrians and cyclists, safety benefits, environmental benefits, and health benefits. This Analysis utilizes data from the *National Cooperative Highway Research Program Report 552: Guidelines for Analysis of Investments in Bicycling Facilities (NCHRP 552)* [1]. The NCHRP (Report) was developed to assist planners in evaluating the potential value and benefit of integrating bicycle facilities into their transportation plans. The methodologies and tools provided in the Report have been used to value the annual benefit due to the construction of the Marsh Creek Greenway.

Table 15

ANNUAL BENEFIT	
FACTOR	**ANNUAL AMOUNT**
Cycling (Recreation and Mobility)	$442,380
Walking (Recreation and Mobility	$992,175
Safety	$324,758
Environment	$127.80
Health	$133,744

RECREATIONAL VALUE

The findings in the Report were based on research detailing the relationship between an individual's likelihood to bike and the proximity of that individual's residence to a bike facility. Research found that residents living within 400 meters from a bike facility had significantly increased odds of bike use compared with residents living more than 1,600 meters from a bike facility. As expected, those that lived within 400 to 799 meters from a facility also had significantly increased odds of bike use compared with subjects living more than 1,600 meters from the facility. For the purpose of this analysis, Delta used the following parameters provided in the Report, and ESRI Business Analyst:

- Residents within 0 to 399 meters of the Marsh Creek Greenway – 2,577
- Residents within 400 to 799 meters of the Marsh Creek Greenway – 1,764
- Residents within 800 to 1600 meters of the Marsh Creek Greenway - 398
- National average of adults in a community – 80%
- National average of percent of likely commuters – 50%
- Tioga bike commute share (ESRI) – 1.5%

[1] Krizek, K. J. (2006). *Guidelines for Analysis of Investments In Bicycle Facilities* (Vol. 552). Transportation Research Board.

- Likelihood of residents within 400 to 799 meters to use bike facility – 2.11
- Annual Growth Rate of Cyclists – 1%
- Recreation Value Per Day - $12

Using these values, and additional formulas provided in the Report, Delta determined that there would be 101 new cyclists' trips due to the construction of the Marsh Creek Greenway. With a $12 per day value, the annual recreation value would equate to $442,380.

PEDESTRIAN BENEFITS

The pedestrian benefits were determined similarly to that for the cyclist benefits. Existing data regarding the commuter share of individuals who walk for each parameter could be obtained and were consequently implemented for each population parameter as opposed to an overall commuter share. *ESRI Business Analyst* found 9.1 percent of individuals within the 400-meter parameter, 7.6 percent of individuals within the 800-meter parameter, and 5.9 percent of the individuals within the 1,600-meter parameter were pedestrian commuters. *Northern Tier Regional Planning and Development Commission* found a total pedestrian share for Tioga County of 4.9 percent, which was multiplied by each population parameter times each likelihood multiplier and found that the MCG project could result in 139 new commuter trips and 365 new pedestrian trips. Based on a daily recreational value of $12, this equates to an annual recreational benefit of $992,175.

SAFETY BENEFITS

The MCG project will result in a physically separated route for pedestrians and bicyclists to access the Borough of Wellsboro from the Pine Creek Trail. The proposed trail connector will reduce the number of potential conflicts between motorists and pedestrians/bicyclists to two locations; 1) crossing PA Route 287 on DCNR property in Delmar Township that straddles PA Route 287 and Butler Road; and 2) accessing downtown Wellsboro from the proposed southern terminus at the intersection of Fellows Avenue and Charleston Street.

Heavily trafficked, with less than ideal pedestrian and cycling lanes, the current route poses many adverse safety concerns. From February 2007 to January 2017, the latest data set available from PennDOT, there were 38 crashes from the U.S. Route 6/PA Route 287 intersection in Delmar Township to the southern terminus of the proposed trail connector. In 2013, a pedestrian was hit by a motorist on U.S. Route 6, north of Hilboldt Road, resulting in a serious injury. Two years later, a pedestrian was struck by a motorist near the intersection of U.S. Route 6/PA Route 287 which resulted in a moderate injury. There is a curve approaching this intersection which reduces sight distance; however, there is no other route for trail users traveling to the Borough of Wellsboro, forcing pedestrians and bicyclists to maneuver this dangerous intersection. There are currently no provisions for pedestrians and bicyclists on U.S. Route 6 from Delmar Township to the Borough of Wellsboro. Inadequate shoulder widths combined with a lack of rumble strips and signage poses significant safety concerns for trail users who travel along U.S. Route 6.

In accordance to the USDOT's guidelines, this analysis utilized the recommended unit values for reduced fatalities and injuries. While there were 38 reported accidents, the timeframe provided for that data extended

beyond the recommended timeframe on the guidelines. Therefore, this analysis utilized two accident reports which occurred in 2013 and 2015. Data from PennDOT determined the accident in 2013 resulted in a serious injury and the accident in 2015 resulted in a moderate injury. Assuming a six-year and three-year time frame with one recorded incident during both years, we valued the baseline accident rate for a serious injury at 0.17 percent and the accident rate for a moderate injury at 0.33 percent (both rates were found by taking the number of accidents divided by each timeframe: 1/6 and 1/3). The baseline risks were then multiplied by the associated recommended monetized value from USDOT guidelines. For a serious injury, the baseline risk of 0.17 was multiplied by $1,008,000 times the reduction rate that was determined to be 100 percent and the serious injury benefit was estimated to be $168,000 annually. Similarly, for moderate injuries, the baseline risk rate (0.33) was multiplied by the recommended monetized unit value of $451,200 times the 100 percent reduction rate and the moderate injury benefit was estimated to be $150,400. These annual values were then added together and distributed for 30 years and adjusted for inflation, ultimately equaling $9,743,040. If constructed, this value equates to a positive gain assuming a 100% reduction rate because pedestrians and cyclists will no longer travel along this road.

MARCELLUS SHALE

Northern Tier Regional Planning and Development Commissions conducted a *Marcellus Shale Freight Transportation Study* and examined the issues surrounding transportation. This study listed Wellsboro Borough as one of the municipalities with the greatest bottleneck and found U.S. Route 6 to be one of the most highly congested corridors resulting from the Marcellus Shale gas industry. From 2011 through 2015, Marcellus Shale activity resulted in a 23 percent increase in daily trucks along U.S. Route 6. In 2015, 1,205 trucks drove daily on U.S. Route 6 for Marcellus Shale alone. They estimate the number the trucks traveling in Tioga County for Marcellus Shale will jump to 1,440 by 2020 (daily). A major concern in the region is the impact these operations have on roads that were built of accommodate lower volumes of lighter traffic. Because of this predicted increase in truck traffic, Northern Tier conducted a U.S. Route 6 audit with the intent of providing awareness of areas in need and to consider upgrades when funding is available. The key findings of this study implied that improvements should be made along the corridors that are heavily travelled by this freight; specifically, traffic operations at bottlenecks. Not only is the increased traffic flow inherently dangerous to pedestrians and cyclists but the materials these trucks carry poses an additional danger in the event of an accident. Marcellus Shale trucks traveling along this route can carry up to 85 chemicals that are extremely harmful if they encounter humans, benzene being the biggest risk. Benzene is so toxic that one drop could pollute thousands of gallons of water. [2]

The MCG will serve as a detour for hundreds of individuals who travel on the PCRT and wish to continue the PCT past Wellsboro by connecting a major trail gap, ultimately getting these participants off U.S. Route 6. As one of oldest highways for transporting people, products, and natural resources like lumber, oil, and natural gas, U.S. Route 6 is essential to Tioga County's transportation system and its ability to support economic vitality and help sustain and improve quality of life for its users and the community as a whole. By removing pedestrians and bicyclists activity off U.S. Route 6, Tioga County will improve the safety for an estimated 190,000 annual trail users and more than 7,000 vehicles every day.

[2] Pennsylvania Department of Transportation, Bureau of Planning and Research, Transportation Planning Division. (2018, November). *2017 Traffic Volume Map of Tioga County, Pennsylvania*.

Table displays the recommended monetized values provided by PennDOT.

TABLE 16– VALUE OF REDUCED FATALITIES AND INJURIES

VALUE OF REDUCED FATALITIES AND INJURIES RECOMMENDED MONETIZED VALUE(S)			
MAIS LEVEL	SEVERITY	FRACTION OF VSL	UNIT VALUE
MAIS 1	Minor	0.003	$28,800
MAIS 2	Moderate	0.047	$451,200
MAIS 3	Serious	0.105	$1,008,000
MAIS 4	Severe	0.266	$2,553,600
MAIS 5	Critical	0.593	$5,692,800
Fatal	Not Survivable	1	$9,600,000

ENVIRONMENTAL BENEFITS

The environmental benefits calculated are in terms of emission reduction benefits. In Tioga County's CMAQ application it was noted that there are 1,525 vehicles traveling along U.S. Route 6 from the Borough of Wellsboro to access the PCRT annually. According to the U. S. Environmental Protection Agency, the average passenger vehicle emits 404 grams of Carbon Dioxide (CO_2) per mile. Presently, trails users who wish to visit the Borough of Wellsboro must travel 3.2 miles along U.S. Route 6, emitting approximately 1,212 grams of CO_2 into the air to reach the trailhead, round trips would equal 6.4 miles and emit approximately 2,586 grams of CO_2 into the air. Ultimately, 3,943,040 grams of CO_2 are emitted annually solely by vehicles trying to reach the trailhead. Additionally, these vehicles emit Nitrogen Oxide (NOx), while not in as large quantities as CO_2, this emission is more damaging to the environment. According to the United States Environmental Protections Agency (EPA), an average car releases 1.39 grams per mile travelled. Therefore, these trail users who must drive to the trailhead also emit 13,566 grams of NOx yearly. The MCG project will eliminate the need for an automobile for the estimated 1,525 vehicles traveling from Wellsboro to the trailhead annually. [3]

Adhering to USDOT's guidance, the recommended monetized values for damage costs due to pollutant emissions was utilized and is shown in Table and Table . Before implementing the data into the BCA, the estimated amount of CO_2 and NOx had to be converted to the required unites. CO_2 emissions were converted from grams to metric tons and the NOx was converted from grams to short tons. After these conversions, it is estimated that 3.94 metric tons of CO_2 and 0.015 short ton of NOx re polluted into the air yearly.

The social cost of carbon (SCC) per metric ton of CO_2 was recommended to be monetized at $1 up to 2030 and then increased to $2 until the end of our analysis period. This recommended value represents the values of future economic damages that can be avoided by reducing emissions in each future year by metric tons.

[3] U.S. EPA (March 2019). *The 2018 EPA Automotive Trends Report*. [PDF File] Retrieved from https://www.epa.gov/sites/production/files/2019-03/documents/420s19001.pdf

The value was constructed by discounting the domestic damages caused by its contribution to changes in the global climate from the first year of trail use through the lifecycle of the trail, using a 7 percent discount rate. The recommended monetized value for the damage cost of NOx was $8,300 per short ton. Both values for CO_2 and NOx were inflated from 2016 dollars to 2017 dollars using the GDP deflator.

After monetizing the damages for CO_2 for the first year of trail use up to 2035 by the $1 value it is estimated that the trail will reduce the social cost of carbon by $3.94 annually, after 2035, when the recommended monetized value increased to $2, the trail will reduce the SCC by $7.89, ultimately reducing the SCC by $189.27 for the 30 years of the trails lifecycle. While NOx emissions were less than carbon, the trail would significantly reduce the damage cost of this pollutant by $128.86 annually throughout the trail's lifecycle, resulting in a total reduction in damages of $3,715.84 during the 30-year analysis period. The creation of the trail would fundamentally reduce damages from CO_2 and NOx by $3,983.

While the total cost of reductions for these pollutants may seem low, the analysis only includes the estimated 1,525 vehicles that travel annually to the trailhead. However, this value may be understated due to the increase in the commuters found previously in this analysis. Assuming, at minimum 140 individuals commute to work on their bicycle or by walking, as the results suggest, at least 60 days out of the year, a total of 16,800 trips in their car would be eliminated (accounting for round trips therefore, two trips per day). These individuals were all found to live within one mile of the project's location, therefore, the new commuters could reduce damages up to $6,856.34 in 30 years; and, when combined with those only traveling to the trailhead, a total of $10,839.54 from emission reductions could potentially arise. However, after careful consideration and due to uncertainty on the number of days a new commuter would choose to commute, the additional reduction in environmental damages were excluded from the final results of the analysis to avoid overly estimating the true value of the benefit.

TABLE 17 – RECOMMENDED MONETIZED VALUES – DAMAGE COSTS FOR POLLUTANT EMISSIONS

Recommended Monetized Value(s)	References and Notes
	The Safer Affordable Fuel-Efficient Vehicles Rule for MY2021-MY2026 Passenger Cars and Light Trucks Preliminary Regulatory Impact Analysis (October 2018)" https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/ld_cafe_co2_nhtsa_2127-al76_epa_pria_181016.pdf Values are inflated from 2016 dollars to 2017 dollars using the GDP deflator.

Emission Type	$ / short ton* ($2017)
Carbon dioxide (CO_2)	**
Volatile Organic Compounds (VOCs)	$2,000
Nitrogen oxides (NOx)	$8,300
Particulate matter ($PM_{2.5}$)	$377,800
Sulfur dioxide (SO_2)	$48,900

*Applicants should carefully note whether their emissions data is reported in short tons or metric tons. A metric ton is equal to 1.1015 short tons.

**See Table 22: Social Cost of Carbon (SCC) Per Metric

TABLE 18 – RECOMMENDED MONETIZED VALUES – SOCIAL COST OF CARBON (SCC) PER METRIC TON OF CO_2

Recommended Monetized Value(s)	References and Notes
	The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks (July 2018) https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/ld_cafe_co2_nhtsa_2127-al76_epa_pria_181016.pdf Values are inflated from 2016 dollars to 2017 dollars using the GDP deflator. **Note:** The recommended values for reducing CO_2 emissions reported in Table A-7 represent the values of future economic damages that can be avoided by reducing emissions in each future year by one metric ton. They were constructed by discounting the domestic damages caused by its contribution to changes in the global climate from that year through the distant future, using a 7% discount rate. After using these per-ton values to estimate the total value of reducing CO2 emissions in any future year, the result must be further discounted to its present value as of the analysis year used in the BCA, again using the 7% discount rate.

Year	SCC ($2017)
2017	$1
2020	$1
2025	$1
2030	$1
2035	$2
2040	$2
2045	$2
2050	$2

HEALTH BENEFIT

The Rails-To-Trails Conservancy's mission is to create a nationwide network of trails like the MCG project to build healthier places for healthier people and recently published *Active Transportation for America: The Case for Increased Federal Investments in Bicycling and Walking.*[4] In this journal, the authors evaluate the benefits in public health that a trail can have on a population and put dollar estimates to the economic value of the benefit. Health benefits are quantified on a per year basis nationwide and include the healthcare savings from increased physical activity for the population. This analysis implemented a modest scenario and utilized an annual per capita cost savings of $400. The new recreational pedestrians and new recreational cyclists were added to determine the total new recreational participants for the 30-year life cycle of the trail. Then, the total number of participants per year were multiplied by the annual savings to determine the total annual health benefits. The total health benefits accrued over 30 years accumulate to $4,652,267 after considering a 2 percent yearly inflation rate before discounting.

Tioga County currently has very limited resources and access to recreational opportunities intended to promote a healthy lifestyle and encourage physical activity. In accordance to the Internal Revenue Code (IRC) Section 501(r), health organizations are required to assess the health needs of their communities and adopt implementation strategies aimed at addressing these needs, also referred to as a Community Health Needs Assessment (CHNA) every three years. This process involves collecting and analyzing a large range of data, including demographics, socioeconomic and health statistics, health care resources and hospital data, as well as obtaining community input through interview meetings and surveys with key stakeholders who represent a) persons with specialized knowledge of public health, b) populations of need, or c) broad interests of the community. The CHNA conducted in 2016 for Tioga County found 15.19 percent of the total population was in poverty. Poverty is a key driver of health status and is relevant because it creates many barriers in accessing health services, healthy food choices, and other factors that contribute to poor health due to inactivity and lack of exercise; such as, gym memberships and fitness programs. Aside from poverty creating a barrier toward healthier lifestyles, Tioga County has fewer fitness establishments available to the residents than Pennsylvania and the United States.

The most significant ailments have been identified as a result of lack of exercise are cardiovascular disease, obesity, diabetes, and depression. According to the CHNA, the number of Tioga County adults aged 20 and older who have been told by a doctor that they have diabetes is 3,613. Approximately 10,045 individuals, aged 20 and older, have self-diagnosed themselves as being obese based on their body mass index (BMI). Key informants were asked to provide their opinions on what they felt were the most critical and quality of life issues in Tioga County and what they felt needed to be done. Regarding obesity and lifestyle choices, access to affordable workout centers and recreational alternatives were a leading answer among those who participated.

The MCG project would provide significant health benefits to the community in these issue areas due to its convenient location and no fees required to access the trail. The Rails-to-Trails Conservancy found that the costs in medical expenses and loss of productive lives associated with the obesity epidemic, places a heavy financial burden on communities. Access to public trails can significantly reduce these issues.

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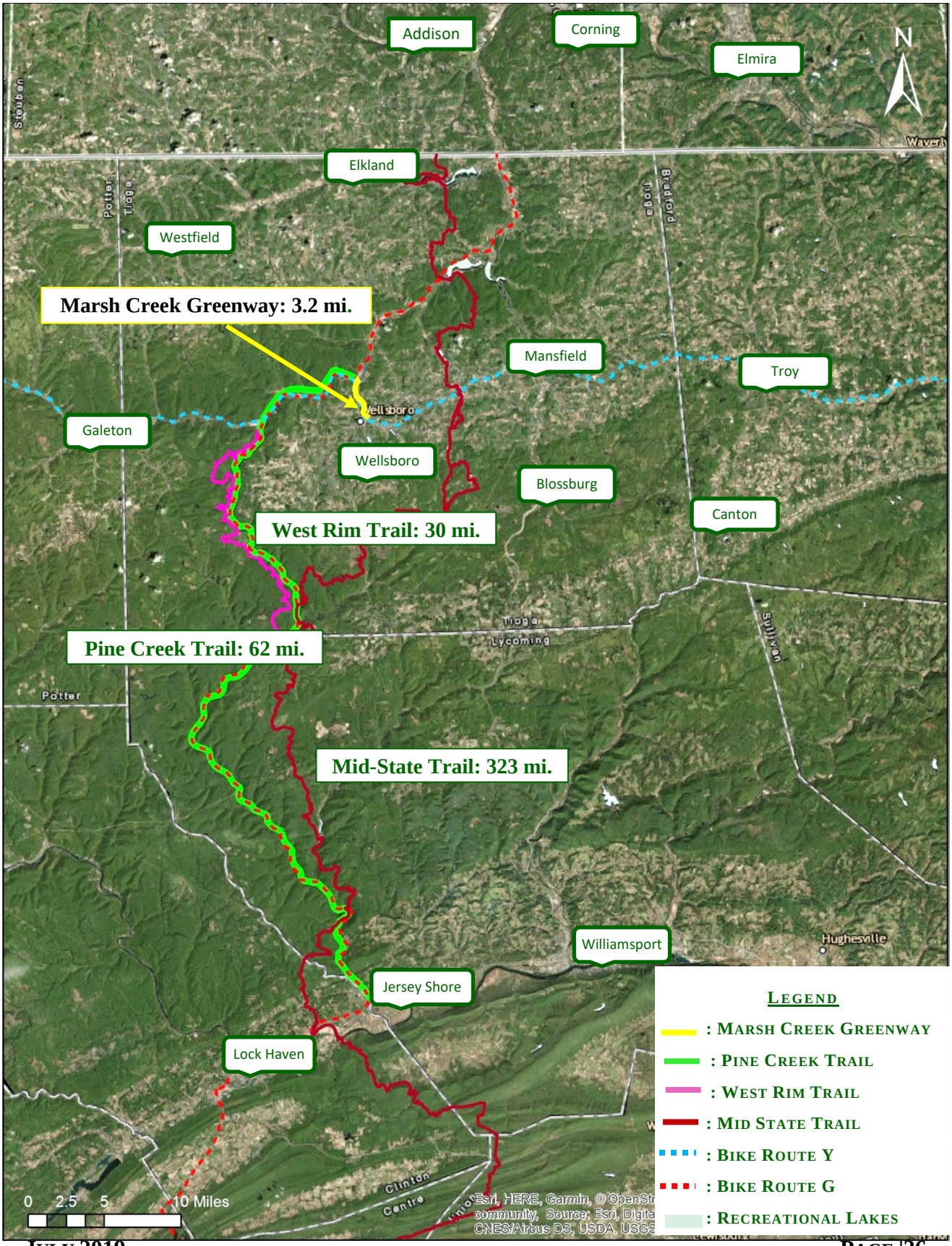
FIGURE 9


Addison
Corning
Elmira
N
Steuben
Waverly
Elkland
Potter
Tioga
Bradford
Westfield
Marsh Creek Greenway: 3.2 mi.
Mansfield
Troy
Wellsboro
Galeton
Wellsboro
Blossburg
Canton
West Rim Trail: 30 mi.
Tioga
Lycoming
Sullivan
Pine Creek Trail: 62 mi.
Potter
Mid-State Trail: 323 mi.
Williamsport
Hughesville
Jersey Shore
Lock Haven
Clinton
Centre
0 2.5 5 10 Miles
LEGEND
: MARSH CREEK GREENWAY
: PINE CREEK TRAIL
: WEST RIM TRAIL
: MID STATE TRAIL
: BIKE ROUTE Y
: BIKE ROUTE G
: RECREATIONAL LAKES

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THANK YOU TO OUR FUNDING PARTNERS

- Benrus Stambaugh
- Delmar Township
- Federal Highway Administration
- Federal Transit Administration
- G&W Railroad
- Growth Resources of Wellsboro
- Kinder Morgan
- Laurel Health Foundation
- PA Department of Conservation and Natural Resources
- PA Department of Environmental Protection
- PA Department of Transportation
- Packer Foundation
- Patterson Foundation
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- Repsol Oil & Gas
- SHELL Appalachia
- Sweet Foundation
- Tioga County Board of Commissioners
- Tioga County Partnership for Community Health
- Wellsboro Social Club
- Develop Tioga