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New Hampshire DOT Statewide Pedestrian & Bicycle Transportation Plan and Economic Impact Study

Technical Memorandum #4

Economic Impact Analysis

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Overview

Pedestrian and bicycle infrastructure in New Hampshire generates financial benefits and contributes to the statewide economy in several ways. It generates transportation, health, environmental, and safety benefits for non-motorized transportation users and supports the state economy by creating construction-related jobs, supporting bicycle and pedestrian-oriented businesses, attracting tourism spending, and providing value for adjacent residential properties.

This technical memorandum is divided into five sections of analysis:

1. Economic Impacts of Capital Investment
2. Expenditures of Bicycle and Pedestrian-Oriented Businesses
3. Economic Impacts of Bicycle Tourism
4. Benefits of Non-Motorized Travel
5. Property Values

Events such as the Granite State Wheelers Seacoast Century Ride draw hundreds of out-of-state visitors to New Hampshire to enjoy on-road bicycling

1.1 Executive Summary

Economic Impacts of Capital Investment

According to New Hampshire Department of Transportation (NHDOT) estimates, the Department spend an average of $11 million dollars were spent per year from 2016 to 2018 on pedestrian and bicycle infrastructure projects (e.g. active transportation) including trails, multi-use paths, sideways, intersections, shoulder expansions, bike lane markings, signage, and pedestrian /bicycle safety improvements.

These expenditures are from selected programs such as Transportation Alternatives (TA) plus specific elements from capital projects. An average annual investment of $11 million dollars in pedestrian and bicycle infrastructure supports 71 construction jobs and pays $5 million in income (Table 1). After including the impacts associated with supplier purchases and employee spending, the total impacts associated with pedestrian and bicycle infrastructure investment supports over 130 jobs, pays $8.5 million in labor income, and generates nearly $21 million in business sales in the New Hampshire economy.

Table 1: Economic Impacts from Pedestrian and Bicycle Capital Investment (Avg. Year)

Impact Type	Jobs	Labor Income	Business Sales
Direct Effect	71	$5,043,000	$11,000,000
Supplier Purchases	23	$1,586,000	$4,369,000
Employee Spending	38	$1,944,000	$5,388,000
Total Effect	132	$8,573,000	$20,757,000

Economic Contribution of Pedestrian and Bicycle-Oriented Businesses

Pedestrian and bicycle-oriented businesses contribute to New Hampshire's statewide economy by selling products (walking shoes, bikes, accessories, etc.) to in-state and out-of-state customers. These businesses also employ workers who spend their wages at other local businesses. This is especially true for bicycle touring companies and retail stores located near the state border. Residents are responsible for an estimated 58% ($20.7 million) of sales at pedestrian and bicycle-oriented businesses, while visitors are responsible for the remaining 42% ($14.7 million). Overall, these businesses are responsible for 240 direct jobs and an estimated $35.4 million in annual sales (Table 2).

Table 2. Direct Jobs & Annual Sales by New Hampshire Pedestrian and Bicycle Businesses

Business Type	Jobs	Annual Sales	Sales from Residents	Sales from Visitors
Bicycle shops	200	$29,695,000	$17,817,000	$11,878,000
Clothing and accessories stores	20	$2,670,000	$1,602,000	$1,068,000
Running and other sporting goods stores	15	$2,111,000	$1,267,000	$844,000
Bicycle frame manufacturer	5	$925,000	$9,000	$916,000
Total	**240**	**$35,401,000**	**$20,695,000**	**$14,706,000**

Note: Jobs include both full- and part-time jobs.

When multiplier impacts are included, New Hampshire's pedestrian and bicycle-oriented businesses are responsible for an estimated 335 jobs and $48.7 million sales (Table 3).

Table 3. Economic Contribution: Supplier Purchases and Employee Spending by New Hampshire Pedestrian and Bicycle Businesses

Type of Contribution	Jobs	Labor Income	Value Added (GSP)	Business Sales
Direct contribution	245	$8,388,000	$9,095,000	$35,401,000
Supplier purchases contribution	30	$1,721,000	$3,182,000	$5,116,000
Employee spending contribution	60	$2,967,000	$5,006,000	$8,214,000
Total	**335**	**$13,076,000.00**	**$17,283,000.00**	**$48,731,000.00**

In some cases, these businesses benefit from being located near pedestrian and bicycle facilities like rail trails and greenways. Bike shops provide repair services or rent bikes to people using nearby trails, some of whom are visitors. Running stores sometimes use trails for running clubs or participate in programs to encourage more trail use. Bicycle touring companies also use pedestrian and bicycle facilities including on-street bike routes and off-road paths. No matter the type of business, there is general consensus among people the Alta team (team) interviewed that more pedestrian and bicycle facilities would benefit New Hampshire's economy and the overall active transportation culture.

Economic Impacts of Bicycle Tourism

An estimated 200,000 out-of-state visitors came to New Hampshire in 2018 for bicycle tourism. These estimates are based off overnight-tourism visitors including specific assumptions regarding bicycle tourists and spending profiles. Visitors were segmented into four primary groups: Day visitors, overnight visitors (two-night stay), self-guided tours, and guided tours (Table 4). The average spending per day ranged from $35 (day visitors) to $379 per day (guided tours). Overall spending from all visitors was an estimated $28 million with 85% of that spending coming from visitors with a two-night stay.

Table 4: Average Spending per Day and Total Spending

Bicycle Profile	Avg. Spending Per Day	# of Visitors	% of Total	Total Spending	% of Total
Day Visitors	$35	56,178	28%	$1,951,000	7%
2 Night Stay	$175	136,714	68%	$23,977,000	85%
Self-Guided	$283	7,224	4%	$2,041,000	7%
Guided Tour	$379	520	0.3%	$197,000	1%
Total	**N/A**	**200,635**	**100%**	**$28,166,000**	**100%**

Most of this spending is concentrated in accommodations (45%) and food and beverage (24%) with the remaining 32% split between transportation, entertainment, and retail (Table 5).

Table 5: Total Spending by Category

Spending Category	2018	% of Total
Accommodations	$12,605,000	45%
Food & Beverage	$6,625,000	24%
Transportation	$2,617,000	9%
Entertainment	$1,488,000	5%
Retail	$4,832,000	17%
Total	**$28,167,000**	**100%**

This spending by out-of-state visitors supports 269 jobs, $8 million in labor income, over $14 million in value added, and over $28 million in business sales for tourism-oriented businesses (Table 6). After including the additional impacts associated with supplier purchases and employee spending, bicycle related tourism contributes to the state's economy by supporting nearly 400 jobs, close to $14 million in labor income, almost $24 million in value added, and over $43 million in business sales. Additional economic impacts associated with bicycle tourism are likely to occur as bicycle facilities are expanded to attract additional out-of-state visitors.

Table 6: Economic Impact of Bicycle Visitor Spending

Impact Type	Jobs	Labor Income	Value Added	Business Sales
Direct Impacts	269	$8,349,000	$14,625,000	$28,167,000
Supplier Purchases	41	$2,336,000	$3,854,000	$6,433,000
Employee Spending	63	$3,171,000	$5,323,000	$8,745,000
Total Impacts	**372**	**$13,856,000**	**$23,802,000**	**$43,345,000**

Benefits of Non-Motorized Travel

This analysis focused on transportation, health, and environmental benefits of walking and bicycling activity in New Hampshire. These estimates illustrate how investments in New Hampshire's pedestrian and bicycling network can contribute to the state's economy and improve residents' quality of life. Existing pedestrian and bicycle trips in New Hampshire that replace motorized vehicle trips are estimated to help residents save $2.1 billion in transportation, environmental, and health costs over the next 20 years (or an average of $105 million per year).

The transportation benefits associated with a reduction in motor vehicle trips and vehicle miles travelled (VMT) include cost savings for households (e.g., transportation expenses), congestion reduction, roadway maintenance, and reduced collisions. Reducing VMT helps save New Hampshire residents $1.9 billion in transportation costs over a 20-year period.

Reduction in VMT also helps the environment by improving air quality through the reduction of greenhouse gases and criteria pollutants such as particulate matter ($PM_{2.5}$), nitrous oxides (NO_x), sulfur dioxides (SO_x), volatile organic compounds (VOC), and carbon dioxide (CO_2). Overall, this reduction in motorized vehicle trips prevents 1.0 million metric tons of greenhouse gas and criteria pollutant emissions from entering the atmosphere over a 20-year period (equivalent to a $70.1 million in mitigation cost savings).

An estimated 20% of New Hampshire adults and 12% of New Hampshire youths report little or no leisure-time physical activity. Additional walking and bicycling increase physical activity levels, which can help reduce healthcare costs for New Hampshire residents. A physically inactive person becoming physically active reduces the probability of suffering from chronic diseases or missing work for health-related reasons. These health benefits are estimated to save each newly-active person $1,539 per year in healthcare costs. Currently, walking and bicycling helps an estimated 6,000 New Hampshire residents meet the Centers for Disease Control & Prevention's (CDC) recommended weekly hours of physical activity, helping to prevent an estimated $176.0 million in healthcare cost savings.

Property Values

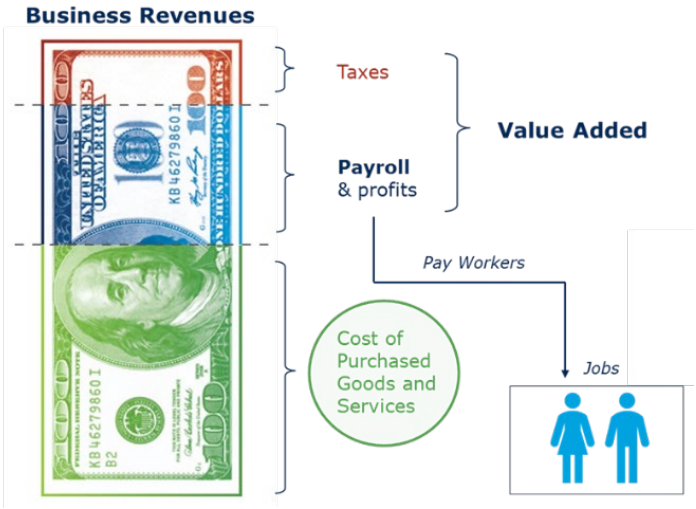
Some studies show that the value of homes near pedestrian and bicycle facilities is higher than for other homes because buyers are willing to pay more to be close to this amenity. However, based on the research conducted for the Statewide Pedestrian and Bicycle Transportation Plan, these facilities appear to have minimal impact on prices or property values to date. While some homeowners do value living near rail trails, that value is not currently reflected in housing sale prices or the amount of time it takes for houses to sell. In some cases, interviewees from the real estate profession mentioned that some facilities are simply too recent to have made a difference on property values but some increases in the future are expected.

Overall, pedestrian and bicycle facilities do improve quality-of-life, which is an impact difficult to quantify, but can nonetheless makes a community a more desirable place to live. Over time, this increased desirability is expected to translate into higher property values. In one community, a rail trail increased the number of people arriving to a grocery store by bicycle. By providing connections to similar destinations, trails could add value to homes that have access to such facilities. Stores near trails can also see increased sales, which is an effect the team documented in the section on expenditures at pedestrian and bicycle-oriented businesses.

1.2 Economic Modeling Approach

When the economy experiences a change, this is often referred to as an economic impact, which is represented by an economic impact measure. The relationship between the four primary economic impact measures is presented in Figure 1. Business sales reflect the total economic activity, measuring the value of goods, services, or capital expenditures. Value-Added reflects the "value" that has been added to purchased raw materials, intermediate inputs, or services, which is calculated by the difference in business sales and the cost of purchased goods and services. Labor income includes total wages, salaries, and benefits paid to employees. Jobs are the number of jobs created.

Figure 1: Relationship between Economic Impact Measures



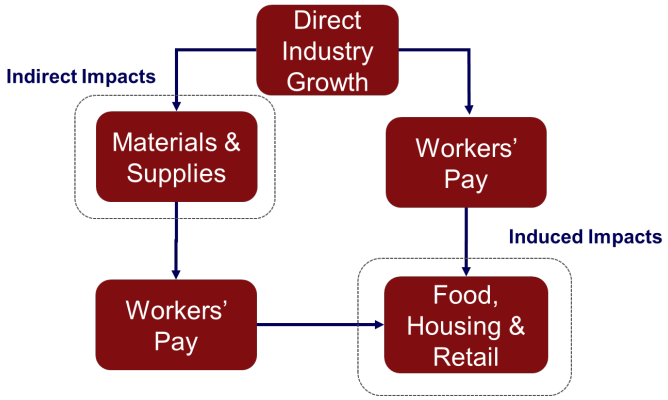
Source: EDR Group

State and local spending on pedestrian and bicycle infrastructure in New Hampshire (direct impacts) generates economic activity within the state's economy. For capital projects, this includes spending on right-of-way, professional services (engineering and design), utilities, roadways, pavement, and other categories. For out-of-state tourists, this includes spending on accommodations, food & beverage, transportation, entertainment, and retail. New Hampshire businesses supported by construction or tourism spending also purchase materials, goods, and/or services from other New Hampshire businesses to support their operations. This spending is commonly known as Supplier Purchase (indirect) impacts (Figure 2) which generates additional jobs, income, and business sales.

In addition, construction, tourism-oriented, and supplier company employees spend their wages in the local economy on household purchases such as food, health care, housing, retail, entertainment, and other expenses known as Employee Spending (induced) impacts. Since these impacts are generated from the initial direct spending, they are referred to as "multiplier" impacts because they generate additional waves of economic activity that cycle through the economy until the spending is exhausted or leaks out of the state. The team used the IMPLAN economic model[1] to estimate these multiplier impacts.

[1] IMPLAN is the most widely used input-output model in the United States with data derived from the Bureau of Economic Analysis (BEA), Bureau of Labor Statistics (BLS), U.S. Census, and U.S. Department of Commerce to reflect the current economic measures (e.g. jobs, payroll, value-added, and business sales) for over 536 industry classifications corresponding to two to five digit groups in the North American Industry Classification System (NAICS). It also enables estimates of multiplier effects as these dollars re-circulate within the New Hampshire economy.

Figure 2: Supplier and Employee Spending Impacts



Source: EDR Group

1.3 Detailed Results

1.3.1 Economic Impacts of Capital Investment

Introduction

Investments in pedestrian and bicycle infrastructure include construction of multi-use paths, conversion of former rail lines into trails, expansion of sidewalks, and expanded shoulders with bicycle lanes. Investments in this infrastructure generate construction-related economic impacts throughout New Hampshire.

Methodology

According to New Hampshire Department of Transportation (NHDOT) estimates, the Department spent an average of $11 million dollars was spent per year from 2016 to 2018 on active transportation projects, including trails, multi-use paths, sideways, intersections, shoulder expansions, bike lane markings, signage, and bicycle/pedestrian safety improvements. These expenditures include the total of select programs such as Transportation Alternatives (TA) plus specific elements from capital projects (e.g. expanded road shoulders) and were gathered from capital investment data from NHDOT for statewide and local public agency (LPA) supported projects. An average was calculated over the past three years to smooth out any anomalies (e.g. high or low spending years) that may exist for a particular year.

The team used the IMPLAN economic model to estimate the economic impacts associated with $11 million dollars in capital investment. Economic impacts are expressed in terms of the change in jobs, labor income, value added, and business sales. In addition to the impacts associated with construction activity, there is additional economic activity known as "multiplier effects" which includes supplier purchases and employee spending.

Findings

An average annual investment of $11 million dollars in pedestrian and bicycle infrastructure supports 71 construction jobs and pays $5 million in labor income (Table 7). After including the impacts associated with supplier purchases and employee spending, the total impacts associated with pedestrian and bicycle infrastructure investment support over 130 jobs, pays $8.5 million in labor income, and generates nearly $21 million in business sales in the New Hampshire economy. Jobs associated with supplier purchases are concentrated in industries such as wholesale trade, architecture/engineering, commercial/industrial machinery, and truck transportation. Jobs associated with employee spending are concentrated in industries such as health care (hospitals & physicians), real estate, restaurants, retail, and wholesale trade.

Table 7: Economic Impacts from Bicycle and Pedestrian Capital Investment (Avg. Year)

Impact Type	Jobs	Labor Income	Business Sales
Direct Effect	71	$5,043,000	$11,000,000
Supplier Purchases	23	$1,586,000	$4,369,000
Employee Spending	38	$1,944,000	$5,388,000
Total Effect	132	$8,573,000	$20,757,000

1.3.2 Expenditures of Bicycle and Pedestrian-Oriented Businesses

Introduction

The purpose of this section is two-fold. First, it measures the statewide economic contribution of businesses that sell products related to walking and bicycling (e.g., shoes, bicycles, accessories). Second, it investigates how pedestrian and bicycle facilities (e.g., rail trails and bike lanes) impact sales at businesses located nearby. For instance, does a bike shop located near a rail trail see more sales than it would if it was located elsewhere? Together, this information provides a picture of how spending on products related to walking and bicycling supports the New Hampshire economy.

New Hampshire is home to retail stores, bicycle touring companies, and a bicycle frame manufacturer that serve those who walk, run, hike and bicycle. Collectively, these businesses generate $35.4 million in annual sales. They are located throughout the state and serve a combination of residents and out-of-state visitors. Some of these companies benefit from their proximity to pedestrian and bicycle facilities and increased customers and sales.

Methodology

To measure the economic contribution of New Hampshire's pedestrian and bicycle businesses, the team relied on a combination of primary and secondary data sources. Primary data came from phone interviews with owners and employees at 11 businesses. Secondary data on employment and sales

came from Infogroup, a private data provider.[2] These sources were combined to better understand the role walking and bicycle-related businesses play in the New Hampshire economy.

The team used Infogroup to (1) identify all known businesses oriented toward pedestrians and cyclists, and (2) estimate the number of jobs and amount of business sales at those businesses. Data gathered from phone interviews was used to identify (1) the portion of business sales related to pedestrians and bicyclists, and (2) the portion of in-state versus out-of-state sales. Because only a subset of businesses in New Hampshire were interviewed, the team expanded the interview findings to all businesses in Infogroup to arrive at a statewide estimate.

The team interviewed owners or employees at bike shops, running stores, clothing and accessory stores, sporting goods stores, and bike touring companies. Interviewees were posed a series of questions while also allowing for open-ended input. They were asked about their products, customers, sales, and opinions regarding nearby pedestrian and bicycle facilities. Asking about products sold allowed the team to separate out sales of pedestrian and bicycle goods from other goods (e.g., bicycles sold at a store that also sells skis).

The team then synthesized business data and interview findings to estimate the overall economic contribution of pedestrian and bicycle businesses, which includes direct contribution plus contributions from supplier purchases and employee spending. The additional impacts were estimated using IMPLAN, the leading economic modeling software system in the United States used by federal, state, and local government agencies as well as universities to estimate economic impacts. For businesses that sell a wide variety of products (e.g., clothing), direct sales and employment were adjusted to only reflect products sold to pedestrians and bicyclists using information gained through interviews. The analysis reflects all sales from both New Hampshire residents and out-of-state visitors.

Summary of Business Interviews

The retail store participating in the interviews sell a variety of products that cater to walkers, runners and bicyclists. Trail running and mountain biking products sell especially well in New Hampshire, which customers often purchase before visiting popular destinations such as the White Mountains. At bicycle retail stores, owners have seen growth in e-bike sales, a trend that reflects utilitarian bicycling purposes like commuting or running errands.

Average Spending

Average spending at walking/running/hiking and bicycle retail stores varies considerably. Bicycles are generally the most expensive item customers buy, with an average purchase ranging from $500-$900. Walking and running shoe purchases range from $120-$130. Clothing and accessories for walkers, runners and bicyclists range from $25-$80 per item. In New Hampshire, these retail businesses experience their highest sales during the summer and again during the winter holiday months.

[2] Infogroup collects detailed data on individual companies around the U.S. They collect this data through a combination of web research and phone calls to companies.

The cost of New Hampshire bicycle tours also varies. At one company, tours cost $40 per person for a two-hour tour. At another company, half-day tours for 1-4 people cost $200 and whole-day tours cost $350. Bicycle touring companies are busiest in the summer and see little activity in colder months. These figures are for touring companies based in New Hampshire. Additional touring companies based elsewhere have organized trips that pass through the state as well.

Source of Spending

Looking specifically at retail stores, the share of resident versus visitor spending varies based on location. Residents are responsible for an estimated 58% of sales at walking, running and bicycling-related businesses, while visitors are responsible for the remaining 42%. Because New Hampshire has no sales tax and borders three states that do, stores located near the border have higher shares of visitor spending. For these stores, up to 50% of customers may come from out-of-state. When stores located further from the border are included, the average share of customers who are visitors is around 40%. Both resident and visitor spending is included in the analysis.

For bicycle touring companies, the share of customers who are visitors is higher, ranging from 50% to 95% depending on where the tours begin and end. Tours that originate and remain in New Hampshire tend to attract more residents, whereas tours that originate in other states and pass through New Hampshire attract more non-residents. For the bicycle frame manufacturer Independent Fabrication, less than one percent of their sales are from New Hampshire residents.

Retail Stores

The Alta team interviewed businesses located near rail trails and designated, on-street bicycle routes. These businesses include sporting goods stores, running stores, and bicycle stores. Some of these businesses credit nearby pedestrian and bicycle facilities with increasing their sales. Others currently see no impact but would expect to if the nearby facilities were expanded or improved. Overall, store owners and employees see these facilities as a positive but wish there were more of them.

Omer & Bob's is located blocks from the Northern Rail Trail in Lebanon. They sell running shoes, bicycles, skis, and other sporting goods. They also offer bicycle rentals, and most customers renting bicycles from their store plan to use the rail trail. While rentals are "not a huge part of their business," the offering keeps them busy on weekends. Overall, the rail trail and greenway increase pedestrian and bicycling activity in the area because they offer places to walk, run, and ride in an area with few options. An employee at Omer & Bob's believes that building more pedestrian and bicycle facilities throughout the state would create a cycle that would generate more sales for retail stores.

Buchika's Ski & Bike Shop in Salem is located directly adjacent to the Salem Rail Trail. They sell bicycles, skis, snowboards, clothing, and accessories. Because the rail trail section located behind the store is unpaved and attracts few riders, it generates little additional business for them. The main advantage the trail provides is that customers can use it to test ride bicycles. The employee interviewed felt they would see increased sales if the section of trail behind the store was paved. They would also consider renting bicycles if it was paved.

Benson Ski & Bike Shop is located across from the Windham Depot to Derry rail trail. They sell bicycles, kayaks, skis, snowboards, and other goods. They occasionally do repair work for cyclists using the rail trail. In some cases, cyclists stop at the shop while passing by. Cycles Etc., a bicycle and apparel store in Salem, is also located near the Windham trail and serves trail customers, although they do not track how many.

Retail stores that rent bicycles encourage customers to use off-road facilities located nearby. It is uncommon for people to purchase bicycles for the sole purpose of using nearby facilities, but the facilities attract visitors who also shop. Rentals at Omer & Bob's increased after the store relocated from Hanover to their current location in Lebanon near the Northern Rail Trail.

Runner's Alley is a running store with locations in Concord, Manchester, and Portsmouth. Store employees sometimes use off-road trails for run club meetups. They also participate in a program that encourages people to use trails more regularly for walking and running. Program participants are provided with a "passport" that they sign each time they use a new trail. As they use trails, they can bring their passports to local businesses for discounts.

Touring Companies

Two types of bicycle touring companies were also interviewed: those based in New Hampshire and those based elsewhere that lead tours that pass through the state. These touring companies typically share the road with cars, although some include portions of a rail trail or other off-road facility. Tours typically last several hours and include 2-6 people in each group. Because bicyclists ride with vehicle traffic, touring companies tend to emphasize safe riding practices. This includes wearing reflective vests, learning about New Hampshire bicycle laws, and riding on roads with relatively low speed limits and traffic volumes. According to one of the touring companies, some people are deterred from tours because of concerns over safety.

All the tour operators that the team spoke with agreed that providing more off-road bicycle facilities would be beneficial to their business and the broader bicycling culture in New Hampshire. Having off-road facilities would also attract different customers who are especially concerned about safety, including families with young children, novice bicyclists, and older adults. Even when touring companies use off-road facilities like rail trails, they try to avoid those that allow ATVs. Tours sometimes avoid trails even when they are available because they are under-maintained and in poor condition (e.g., potholes, frost heaves).

Economic Contribution

New Hampshire's walking, running and bicycling-related businesses not only promote community health through physical activity and active transportation, but also contribute to the statewide economy. Most of these businesses are also locally-owned, meaning they support the communities they do business in by keeping dollars in the local economy.

Direct Economic Contribution

Approximately 60 retail stores in New Hampshire cater specifically to bicyclists and runners.[3] Many more stores sell a variety of sporting goods that include bicycles, running shoes, and related accessories. Additionally, one bicycle frame manufacturer called Independent Fabrication is located in Newmarket, New Hampshire. These businesses generate an estimated $35.4 million in annual pedestrian- and bicycle-related sales, with approximately 58% coming from residents and 42% coming from visitors (Table 8).[4] These annual sales support approximately 240 jobs. These direct jobs and sales represent those at all businesses catering to pedestrians and bicyclists, not just those the team interviewed.

There are four known bicycle touring companies that operate tours in New Hampshire and are estimated to support five jobs and $486,000 in annual sales. However, because the economic impact of guided tours is also included in Subtask 6.3 "Economic Impacts of Tourism," these results were not included in Table 8 to avoid double counting.[5]

Table 8. Direct Jobs & Annual Sales by New Hampshire Pedestrian and Bicycle Businesses

Business Type	Jobs	Annual Sales	Sales from Residents	Sales from Visitors
Bicycle shops	200	$29,695,000	$17,817,000	$11,878,000
Clothing and accessories stores	20	$2,670,000	$1,602,000	$1,068,000
Running and other sporting goods stores	15	$2,111,000	$1,267,000	$844,000
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Total	**240**	**$35,401,000**	**$20,695,000**	**$14,706,000**

Note: Jobs include both full- and part-time jobs.

Economic Contribution from Supplier Purchases & Employee Spending

New Hampshire businesses that sell products to walkers, runners, and bicyclists generate more than direct sales. When these businesses purchase goods, services, and building space from in-state suppliers, it supports economic activity in the wholesale trade, warehousing, and real estate industries. Additionally, when employees at walking, running and bicycling-related businesses and supplier businesses spend their paychecks in New Hampshire, they support additional economic activity

[3] Infogroup data.

[4] The team adjusted total sales from clothing and accessories stores and other sporting goods stores to remove sales not associated with bicyclists and runners. In interviews, we asked stores about their sales to come up with the adjustment factors. We also asked stores about the share of their customers who are residents and the share who are from outside New Hampshire.

[5] The economic impact of guided tours was estimated from two difference sources: (1) business interviews (Subtask 6.2) and (2) spending by guided tour visitors (Subtask 6.3). To be conservative, the lower estimate of guided tour visitor spending was used in the overall analysis, but the interview findings were included in Subtask 6.2.

Understanding retail margins. Retail businesses re-sell products that they purchase from suppliers. This means that when a retailer makes a sale, only a portion of the sales amount represents revenue to the business. When analyzing the economic contribution of these sales, it is therefore important to consider only the post-margined revenue in the retail sector. In Table 9, the team adjusted the business sales of supplier purchases and employee spending to reflect retail margins.

Table 9. Economic Contribution: Supplier Purchases and Employee Spending by New Hampshire's Walking, Running and Bicycle-related Businesses

Type of Contribution	Jobs	Labor Income	Value Added (GSP)	Business Sales
Direct contribution	245	$8,388,000	$9,095,000	$35,401,000
Supplier purchases contribution	30	$1,721,000	$3,182,000	$5,116,000
Employee spending contribution	60	$2,967,000	$5,006,000	$8,214,000
Total	**335**	**$13,076,000.00**	**$17,283,000.00**	**$48,731,000.00**

1.3.3 Economic Impacts of Bicycle Tourism

Introduction

The objective of this portion of the analysis is to estimate the contribution of bicycle tourism to the New Hampshire economy. A 2017 study estimated spending by bicycle tourists nationally totaled $97 billion ($83 billion in trip related spending and $14 billion in gear/accessories), supporting nearly 850,000 jobs, $28.5 billion in salaries and wages, and $6.3 billion in state and local taxes[8]. Several states have commissioned studies and surveys of the economic benefits of bicycle and trail-related tourism to better understand the economic contribution of this segment of the tourism market. These studies can help government agencies to better understand the role that trails and bicycle infrastructure plays in attracting bicycle tourism and to outline strategic investment decisions to expand bicycle facilities and trail networks. Typically, visitor estimates are based on intercept surveys or trail counts which establish the foundation for any bicycle tourism impact analysis. For states that have not implemented surveys or conducted trail counts, they often focus primarily on bicycle-related events and/or use statewide tourism data and apply certain assumptions and estimates to identify a subset of the tourism market related to bicycling.

[6] These two types of effects are often referred to as indirect and induced effects, respectively.

[7] Labor income includes employee wages plus the value of benefits (e.g., employer contributions to health care and retirement). Value added is equivalent to gross state product (GSP), and includes labor income plus proprietor income (i.e., profits) and taxes.

[8] The Outdoor Industry Association, "The Outdoor Recreation Economy", 2017.

As the reader will see in the description of the analysis below, bicycling is not an insignificant contributor to economic well-being in New Hampshire. Bicycle related tourism contributes to the state's economy by supporting nearly 400 jobs, nearly $14 million in labor income, and $43 million in business sales.

Methodology

New Hampshire has not yet commissioned any statewide surveys or trail counts. Therefore, estimates for bicycle visitors were developed by using overnight tourism data combined with assumptions from other studies. The overnight tourism data is based on a 2018 Report: "New Hampshire Travel Impacts" by Dean Runyan Associates prepared for the New Hampshire Department of Business and Economic Affairs, Division of Travel and Tourism Development (DBEA/DTTD). The purpose of the study was to "…document the economic significance of the travel industry in New Hampshire from 2011-2017."

According to this report, 11.3 million overnight visitors came to New Hampshire in 2018 and the New Hampshire DBEA/DTTD also estimated that 85% of these visitors were for leisure purposes. Since only a subset of these visitors are assumed to come to New Hampshire for bicycling purposes, the team assumed a certain percentage of these visitors came to New Hampshire for bicycling purposes based on a review of several bicycle economic impact studies.

In a 2017 report "Economic Impacts of Active Transportation: Utah Active Transportation Benefits study" prepared for the Utah Transit Authority (UTA), a 2014 survey of tourists in Utah is cited. Based on the data collected from the survey, an estimated 3% of all visitor trips to Utah were expressly for bicycling purposes. In another report "Bicycle Tourism in Maine: Economic Impacts and Marketing (2001)" prepared for the Maine Department of Transportation, an estimated 5% of all overnight leisure trips were determined to have a bicycling component. Given the Utah study is more recent than the Main study (2014 vs. 2001), the Utah study bicycle visitor estimate (3%) was used in the analysis, however it was reduced in half (to 1.5%), because the bicycling season in New Hampshire runs for half the year (late Spring to Fall) and because Utah is a better-known national outdoor recreation destination (especially for both bicycling and mountain biking) that attracts millions of visitors per year. The Utah report additionally estimated that 28% of all bicycling trips were day trips while 72% involved an overnight stay. These same percentages were also applied to the New Hampshire overnight visitor data to estimate the additional portion of visitors that come to New Hampshire to bicycle just for the day (56,176 visitors). Table 10 below presents the sequence of visitor estimates and assumptions applied in order to estimate the total number of bicycling visitors that came to New Hampshire in 2018.

Because there are different profiles of bicycling visitors, the team applied certain assumptions regarding overnight bicycle visitors used in a 2001 report "Bicycle Tourism in Maine: Economic Impacts and Marketing Recommendations" prepared for the Maine Department of Transportation. In this study, it was assumed 94.6% of all overnight visitors that bicycled in Maine, did so for only one day or less. This assumption was modified to expand to two nights based on insights provided by members of the Granite State Wheelers (GSW) and other New Hampshire bicycle advocacy groups that weekend out-of-state visitors will likely drive to New Hampshire on Friday evening, bike ride on Saturday, and return home on Sunday morning. The remaining trip cyclists are assumed to participate in multi-day rides and include self-guided tours (4%) and Guided Tours (0.36%).

Table 10: Bicycle Visitor Estimates

Category	2018	
Overnight Visitors	11,330,000	
% Leisure Trips	85%	
Leisure Trips	9,630,500	
% Overnight Bike Trips	**1.5%**	**% of Total**
Overnight Bicycle Visitors	**144,458**	**72%**
2 Night Trips	136,714	68%
Self-Guided Tour	7,224	4%
Guided Tour	520	0.4%
Day Visitors	**56,178**	**28%**
Total Visitors	**200,635**	**100%**

The average spending for each bicycle visitor profile was estimated based on information from bicycle tourism companies and spending profiles for day/multi-day trips as outlined in the 2016 report "The Economic Impact of Bicycling in the Central Shenandoah Valley" prepared for the Central Shenandoah Planning District Commission. This report was selected because of (1) its recent publication (2016), (2) its proximity to New Hampshire (e.g., East Coast), and (3) representative of an average spending profile compared to other studies. Guided tours were estimated to cost on average $379[9] per day while self-guided tours were slightly less at $283[10] per day. Overnight trips which include two nights of accommodations were estimated as $175[11] per visit while day visitors were estimated to spend about $35[12] per day. Table 11 below presents the average spending per bicycle profiles and total spending based on the estimated number of visitors per profile.

Table 11: Average Spending per Day and Total Spending

Bicycle Profile	Avg. Spending Per Day	# of Visitors	% of Total	Total Spending	% of Total
Day Visitors	$35	56,178	28%	$1,951,000	7%
2 Night Stay	$175	136,714	68%	$23,977,000	85%
Self-Guided	$283	7,224	4%	$2,041,000	7%

[9] Based on the average spending per day of a 5 day/4 night guided bicycle tour that crosses Vermont and New Hampshire (https://greatfreedomadventures.com/tour-item/gravel-grinder-bike-tour-vermont)

[10] Based on the average spending per day of a 6 day/5 night self-guided bicycle tour that crosses Massachusetts, New Hampshire, and Maine (https://www.easyridertours.com/self-guided-bicycle-tours/new-england-coasting.html)

[11] Based on the average spending per night of $132 according to the Dean Runyan report "New Hampshire Travel Impacts" in 2017. Modified to include an additional cost of $44 for a second night of accommodations.

[12] Based on the average daily spending according to the report "Economic Impacts of Active Transportation: Utah Active Transportation Benefits study" (https://www.bikeutah.org/atbenefitsstudy)

Guided Tour	$379	520	0.3%	$197,000	1%
Total	**N/A**	**200,635**	**100%**	**$28,166,000**	**100%**

Most of the spending for overnight visitors revolves around accommodations and food/beverage with a slightly higher amount spent on accommodations for visitors who stay one day/two nights for a weekend trip (Table 12)[13]. The self-guided and guided tours have similar spending profiles based on the Central Shenandoah Valley report and the retail category includes bike repairs, bike supplies, and other retail spending. Spending on accommodations was removed from the day visitor spending profile and the remaining spending categories were then re-balanced to equal 100%.

Table 12: Bicycle Profile Spending by Category

Spending Category	Day Visitor	2 Night Stay	Self-Guided	Guided Tour
Accommodations	0%	50%	33%	33%
Food / Beverage	43%	22%	29%	29%
Transportation	17%	7%	11%	11%
Entertainment	10%	5%	6%	6%
Retail	31%	16%	21%	21%
Total	**100%**	**100%**	**100%**	**100%**

Economic Impacts

The team used the IMPLAN economic model system to provide insight into the contribution of bicycle tourism to the New Hampshire economy. In 2018, New Hampshire businesses are estimated to have received a net revenue of over $28 million dollars from out-of-state bicycle visitor tourism. Most of this spending is concentrated in accommodations (45%) and food and beverage (24%) with the remaining 32% split between transportation, entertainment, and retail (Table 13).

[13] As outlined in the 2016 report "The Economic Impact of Bicycling in the Central Shenandoah Valley" prepared for the Central Shenandoah Planning District Commission.

Table 13: Total Spending by Category

Spending Category	2018	% of Total
Accommodations	$12,605,000	45%
Food & Beverage	$6,625,000	24%
Transportation	$2,617,000	9%
Entertainment	$1,488,000	5%
Retail	$4,832,000	17%
Total[14]	**$28,167,000**	**100%**

This spending by out-of-state-visitors supports 269 jobs, $8 million in labor income, over $14 million in value added, and over $28 million in revenues for tourism-oriented businesses (Table 14). After including the additional impacts associated with supplier purchases and employee spending, the total impacts support 372 jobs, nearly $14 million in labor income, almost $24 million in value added, and over $43 million in business sales.

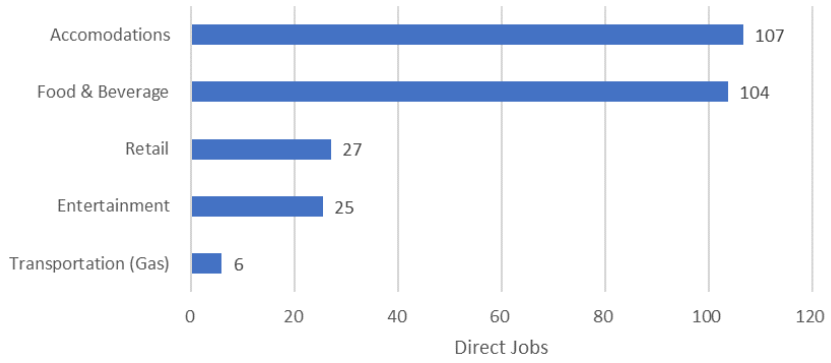
Table 14: Economic Impact of Bicycle Visitor Spending

Impact Type	Jobs	Labor Income	Value Added	Business Sales
Direct Impacts	269	$8,349,000	$14,625,000	$28,167,000
Supplier Purchases	41	$2,336,000	$3,854,000	$6,433,000
Employee Spending	63	$3,171,000	$5,323,000	$8,745,000
Total Impacts	**372**	**$13,856,000**	**$23,802,000**	**$43,345,000**

Figure 3 below presents the number of jobs in each tourism-oriented industry supported by visitor spending. Most of the jobs are in the accommodations industry, primarily because this is the largest category of spending. Food and beverage have the next highest quantity of jobs created because it represents 24% of total spending and also because it has a relatively low business-sales-to-job ratio (Figure 4). The lowest amount of supported jobs is in the transportation spending industry (e.g. gas stations) primarily because only a portion of total sales (16%) are in-state industry revenue (the remaining dollars are remitted to oil companies and other industries).

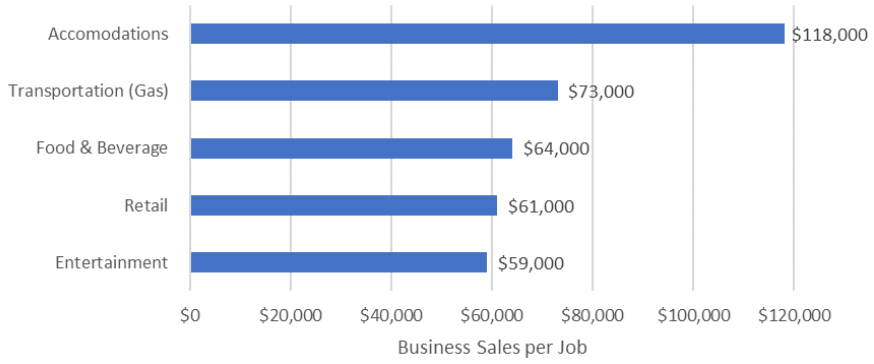
[14] Numbers may slightly differ from Table 11 due to rounding.

Figure 3: Profile of Direct Impacts by Industry



The highest business sales per job[15] are in the accommodations industry with nearly $120,000 per job (Figure 4). The other four categories of spending have a range of average business sales per job from $59,000 to $73,000. The ratio of business sales to jobs determines the direct job impacts associated with visitor spending.

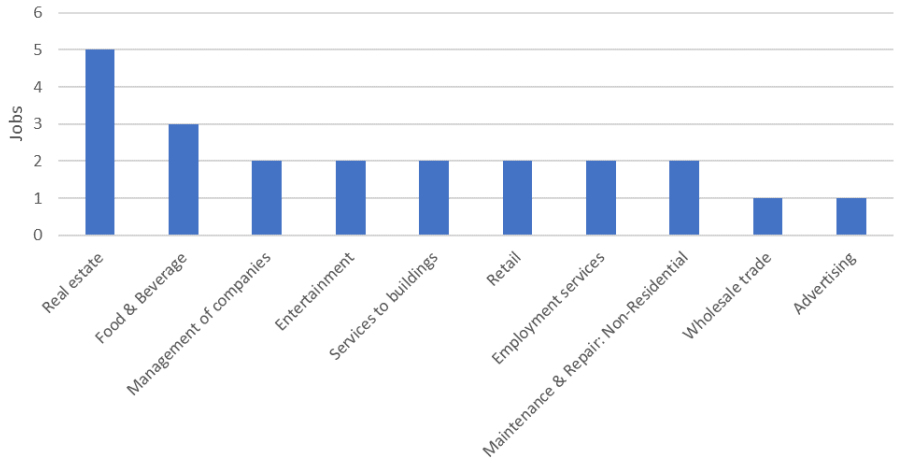
Figure 4: Average Business Sales per Job by Industry: Direct Jobs



A profile of the industries most affected by supplier purchases are presented in Figure 5 below. Most of the impacts are concentrated in the real estate industry which includes rental payments for tourism-oriented business. Other impacts include food and beverage, management of companies, entertainment, and services to buildings.

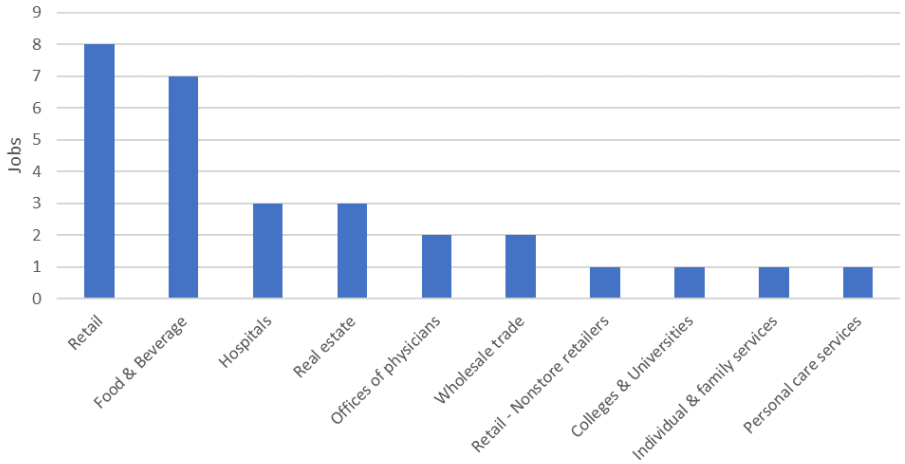
[15] These ratios reflect post-margin business sales, reflecting net industry sales.

Figure 5: Profile of Supplier Purchases by Industry



Impacts associated with employee spending are concentrated in retail, food & beverage, health care (hospitals, physicians), and real estate (rental payments) as shown in Figure 6.

Figure 6: Profile of Employee Spending by Industry



1.3.4 Benefits of Non-Motorized Travel

Introduction

This section of the memorandum contains an economic impact analysis of the state of New Hampshire's pedestrian and bicycling activity. Specifically, this analysis looks at the estimated number of walking and bicycling trips by New Hampshire residents each year, the estimated number of motor vehicle trips reduced by walking and bicycling trips, and the resulting transportation, health, and environmental

benefits. These estimates are intended to demonstrate how investments in New Hampshire's pedestrian and bicycling network can contribute directly and indirectly to the state economy and improve residents' quality of life. Where appropriate, the estimated benefits are expressed in monetary terms[16] so that the various impact areas associated with walking and bicycling in New Hampshire can be more easily compared to one another.

Limitations

Even with extensive primary and secondary research incorporated into this analysis, it is not possible to accurately forecast the precise impacts of various walking- and bicycling-related factors. Accordingly, all estimated benefits are rounded and should be considered rough order-of-magnitude estimates instead of precise amounts. All monetary estimates are presented in undiscounted 2019 inflation-adjusted dollars.

Summary

Existing walk and bicycle trips in New Hampshire are estimated to help residents save $2.14 billion in transportation, environmental, and health costs over the next 20 years, (or an average of $107 million per year). If New Hampshire's walk and bicycle rate increased to that of Maine, an additional $0.53 billion in cost savings compared to existing conditions might be realized. If New Hampshire's walk and bicycle rate increased to that of the Vermont, an additional $1.34 billion in cost savings compared to existing conditions might be realized.

Vehicle Trip Reduction Estimates

Using walk and bicycle commute mode share as a proxy for historic pedestrian and bicycle counts requires extrapolating from a general estimate of how many people commute with these modes on a typical day in New Hampshire, and to get to an estimate of how many walk and bicycle trips take place for any purpose on a typical day in the state.

Commute Trip Estimates

The first step in the extrapolation process is estimating the number of annual walk and bicycle commute trips. This analysis assumes that the rolling daily walk and bicycle commute estimates from ACS represent a typical weekday in New Hampshire and account for seasonal changes. The daily walk and bicycle commute trip estimates are then multiplied by a factor of 260 weekdays to arrive at an annual estimate.

[16] Note that the financial benefits do not take into account the potential lost time and revenues that some commuters or others may experience through walking and bicycling which in most cases is a slower form of transportation relative to driving a motor vehicle

All Trip Purpose Estimates

According to the 2017 National Household Travel Survey (NHTS), commute trips only represent a fraction of all walk and bicycle trips. Table 15 shows that for every walk commute trip, there's approximately 11.6 other walk trips in the United States. Similarly, Table 16 shows that for every bicycle commute trip in the United States, approximately 7.5 other bicycle trips take place. Applying these factors to the estimated number of annual walk and bicycle commute trips gives an estimate of the total number of bicycle and walk trips per year in New Hampshire. Table 17 and Table 18 show the existing walk and bicycle commute rates in New Hampshire. Currently, New Hampshire is ranked 26th in the country for combined walking and bicycling commute rates. To become the 10th ranked state in the country (Maine) would require increasing its combined rate to 4.4% or to 6.3% to become the 4th ranked state (Vermont).

*Table 15: Walk Trip Purpose Multipliers**

Trip Purpose	Walk Trip Ratio
Utilitarian Trips to Commute Trips	8.77 trips : 1 trip
School Trips to Commute Trips	0.68 trips : 1 trip
Social/Recreational Trips to Commute Trips	2.18 trips : 1 trip
Total	11.63 trips : 1 trip

*Source: National Household Travel Survey (2017)

*Table 16: Bicycle Trip Purpose Multipliers**

Trip Purpose	Bike Trip Ratio
Utilitarian Trips to Commute Trips	5.33 trips : 1 trip
School Trips to Commute Trips	0.46 trips : 1 trip
Social/Recreational Trips to Commute Trips	1.68 trips : 1 trip
Total	7.47 trips : 1 trip

*Source: National Household Travel Survey (2017)

*Table 17: State Commute Mode Share Rankings**

State	Bike Commute Mode Share	Walk Commute Mode Share	Combined Mode Share
Vermont	0.7%	5.6%	6.3% (4th)
Maine	0.4%	3.9%	4.4% (10th)
New Hampshire	0.3%	2.8%	3.0% (26th)

*Source: American Community Survey (2013-2017)

Table 18: Commute Mode Share Estimates

Year	Walk Commute Mode Share (Estimated Daily Walk Commute Trips)			Bicycle Commute Mode Share (Estimated Daily Bicycle Commute Trips)		
	Existing (26th Rank)*	Maine (10th Rank)†	Vermont (4th Rank)†	Existing (26th Rank)*	Maine (10th Rank)†	Vermont (4th Rank)†
2019	2.8%	2.8%	2.8%	0.3%	0.3%	0.3%
2020	2.8%	2.8%	2.9%	0.3%	0.3%	0.3%
2021	2.8%	2.9%	3.1%	0.3%	0.3%	0.3%
2022	2.8%	3.0%	3.2%	0.3%	0.3%	0.3%
2023	2.8%	3.0%	3.3%	0.3%	0.3%	0.4%
2024	2.8%	3.1%	3.5%	0.3%	0.3%	0.4%
2025	2.8%	3.1%	3.6%	0.3%	0.3%	0.4%
2026	2.8%	3.2%	3.8%	0.3%	0.3%	0.4%
2027	2.8%	3.2%	3.9%	0.3%	0.3%	0.4%
2028	2.8%	3.3%	4.0%	0.3%	0.3%	0.5%
2029	2.8%	3.4%	4.2%	0.3%	0.3%	0.5%
2030	2.8%	3.4%	4.3%	0.3%	0.4%	0.5%
2031	2.8%	3.5%	4.5%	0.3%	0.4%	0.5%
2032	2.8%	3.5%	4.6%	0.3%	0.4%	0.6%
2033	2.8%	3.6%	4.7%	0.3%	0.4%	0.6%
2034	2.8%	3.6%	4.9%	0.3%	0.4%	0.6%
2035	2.8%	3.7%	5.0%	0.3%	0.4%	0.6%
2036	2.8%	3.8%	5.2%	0.3%	0.4%	0.7%
2037	2.8%	3.8%	5.3%	0.3%	0.4%	0.7%
2038	2.8%	3.9%	5.4%	0.3%	0.4%	0.7%
2039	2.8%	3.9%	5.6%	0.3%	0.4%	0.7%

* Source of existing commute mode share data: American Community Survey, 2013-2017 five-year estimates
† Assumes linear increase from existing commute mode share to 4th and 10th ranked commute mode share shown in **Table 3** over 20-year period

Table 19 below shows the estimated number of walk and bicycle trips that take place in New Hampshire for any trip purpose based on the commute trips shown in Table 18 and the commute to all trip multipliers in Table 15 and Table 16.

Table 19: Annual Walk and Bicycle Trip Estimates

	Estimated Annual Walk Trips for All Trip Purposes			Estimated Annual Bicycle Trips for All Trip Purposes		
Year	Existing (26th Rank)	Maine (10th Rank)	Vermont (4th Rank)	Existing (26th Rank)	Maine (10th Rank)	Vermont (4th Rank)
2019	156,712,000	156,712,000	156,712,000	9,618,000	9,618,000	9,618,000
2020	157,030,000	161,672,000	168,391,000	9,628,000	10,102,000	10,866,000
2021	157,346,000	166,666,000	180,153,000	9,638,000	10,589,000	12,123,000
2022	157,659,000	171,692,000	192,000,000	9,648,000	11,080,000	13,389,000
2023	157,971,000	176,751,000	203,931,000	9,657,000	11,574,000	14,665,000
2024	158,280,000	181,844,000	215,946,000	9,666,000	12,071,000	15,950,000
2025	158,587,000	186,970,000	228,045,000	9,675,000	12,572,000	17,243,000
2026	158,892,000	192,128,000	240,228,000	9,684,000	13,076,000	18,547,000
2027	159,195,000	197,320,000	252,495,000	9,692,000	13,584,000	19,859,000
2028	159,496,000	202,545,000	264,847,000	9,701,000	14,095,000	21,180,000
2029	159,795,000	207,803,000	277,282,000	9,709,000	14,609,000	22,511,000
2030	160,091,000	213,095,000	289,802,000	9,717,000	15,127,000	23,851,000
2031	160,386,000	218,419,000	302,406,000	9,724,000	15,648,000	25,200,000
2032	160,678,000	223,777,000	315,093,000	9,732,000	16,172,000	26,558,000
2033	160,968,000	229,167,000	327,866,000	9,739,000	16,700,000	27,925,000
2034	161,257,000	234,591,000	340,722,000	9,746,000	17,231,000	29,302,000
2035	161,542,000	240,048,000	353,662,000	9,753,000	17,766,000	30,688,000
2036	161,826,000	245,538,000	366,686,000	9,760,000	18,304,000	32,083,000
2037	162,108,000	251,061,000	379,795,000	9,766,000	18,846,000	33,487,000
2038	162,388,000	256,617,000	392,988,000	9,773,000	19,391,000	34,900,000
2039	162,665,000	262,207,000	406,265,000	9,779,000	19,939,000	36,323,000

Recued Motor Vehicle Trip Estimates

After estimating the number of annual walk and bicycle trips in New Hampshire, the next step in the analysis is estimating how many of those walk and bicycle trips replace motor vehicle trips. Using a comparison of local and national mode share data, Table 20 and Table 21 show motor vehicle trip replacement factors for commute, utilitarian, college, K-12 school, and social/recreational trips. For example, if bicycling was not an option for New Hampshire commuters, an estimated 54.2% of commuters who currently bicycle to

Table 20: Trip Reduction Multipliers for Walking

Trip Purpose	Motor Vehicle Trips Replaced by Walk Trips[1]	Walk Trip Distance
Commute Trips	54.9%	0.72 miles
Utilitarian Trips	88.8%	0.83 miles
College Trips	85.0%	0.43 miles
K-12 School Trips	54.6%	0.69 miles
Social/Recreational Trips	15.5%	1.12 miles

work might drive. The rest might walk, take transit, telecommute, or use another mode of transportation. Table 22 shows the estimated annual vehicle trips reduced from bicycling and walking trips.

Reduce Vehicle-Miles Traveled Estimates

The 2017 National Household Travel Survey found that the distance traveled for bicycle and walk trips varied by the trip purpose Table 20 and Table 21[17] also show the average walk and bicycle trip distances by trip purpose. Table 23 shows the estimated annual number of vehicle-miles traveled (VMT) reduced from walking and bicycling trips.

Table 21: Trip Reduction *Multipliers for Bicycling*

Trip Purpose	Motor Vehicle Trips Replaced by Bicycle Trips[2]	Bicycle Trip Distance
Commute Trips	54.2%	2.47 miles
Utilitarian Trips	87.1%	2.28 miles
College Trips	77.9%	1.31 miles
K-12 School Trips	53.2%	1.36 miles
Social/Recreational Trips	15.5%	2.73 miles

[17] Table note 2: Motor vehicle replacement factors were estimated through a comparison of local commute mode share data from the American Community Survey (2013-2017) and national mode share data for all trip purposes from the 2017 National Household Travel Survey.

Table 22: Vehicle Trip Reduction Estimates

	Estimated Annual Vehicle Trip Reductions from Walking			Estimated Annual Vehicle Trip Reductions from Bicycling		
Year	Existing (26th Rank)	Maine (10th Rank)	Vermont (4th Rank)	Existing (26th Rank)	Maine (10th Rank)	Vermont (4th Rank)
2019	120,829,000	120,829,000	120,829,000	7,004,000	7,004,000	7,004,000
2020	121,080,000	124,663,000	129,849,000	7,019,000	7,373,000	7,944,000
2021	121,330,000	128,524,000	138,934,000	7,035,000	7,745,000	8,891,000
2022	121,578,000	132,409,000	148,084,000	7,050,000	8,120,000	9,844,000
2023	121,825,000	136,321,000	157,299,000	7,066,000	8,497,000	10,805,000
2024	122,070,000	140,258,000	166,579,000	7,081,000	8,877,000	11,773,000
2025	122,313,000	144,220,000	175,924,000	7,096,000	9,259,000	12,747,000
2026	122,555,000	148,208,000	185,334,000	7,112,000	9,645,000	13,729,000
2027	122,795,000	152,222,000	194,809,000	7,127,000	10,032,000	14,718,000
2028	123,034,000	156,262,000	204,349,000	7,142,000	10,422,000	15,713,000
2029	123,271,000	160,327,000	213,954,000	7,157,000	10,815,000	16,715,000
2030	123,506,000	164,417,000	223,624,000	7,171,000	11,211,000	17,725,000
2031	123,740,000	168,534,000	233,359,000	7,186,000	11,609,000	18,741,000
2032	123,973,000	172,676,000	243,159,000	7,201,000	12,010,000	19,764,000
2033	124,203,000	176,843,000	253,024,000	7,215,000	12,413,000	20,794,000
2034	124,433,000	181,036,000	262,954,000	7,230,000	12,819,000	21,831,000
2035	124,660,000	185,255,000	272,949,000	7,244,000	13,227,000	22,875,000
2036	124,886,000	189,499,000	283,009,000	7,259,000	13,638,000	23,926,000
2037	125,110,000	193,769,000	293,134,000	7,273,000	14,052,000	24,984,000
2038	125,333,000	198,065,000	303,324,000	7,287,000	14,468,000	26,049,000
2039	125,554,000	202,386,000	313,578,000	7,301,000	14,887,000	27,120,000
SUM	2,588,078,000	3,376,723,000	4,518,058,000	150,256,000	228,123,000	353,692,000
DIFF	-	788,645,000	1,929,980,000	-	77,867,000	203,436,000

Table 23: Vehicle-Miles Traveled Reduction Estimates

	Estimated Annual Vehicle-Miles Traveled from Walking			Estimated Annual Vehicle-Miles Traveled from Bicycling		
Year	Existing (26th Rank)	Maine (10th Rank)	Vermont (4th Rank)	Existing (26th Rank)	Maine (10th Rank)	Vermont (4th Rank)
2019	99,242,000	99,242,000	99,242,000	16,011,000	16,011,000	16,011,000
2020	99,517,000	102,502,000	106,822,000	16,057,000	16,877,000	18,199,000
2021	99,791,000	105,784,000	114,456,000	16,104,000	17,749,000	20,403,000
2022	100,065,000	109,087,000	122,145,000	16,150,000	18,628,000	22,623,000
2023	100,337,000	112,413,000	129,889,000	16,196,000	19,512,000	24,859,000
2024	100,609,000	115,760,000	137,687,000	16,242,000	20,402,000	27,112,000
2025	100,880,000	119,129,000	145,540,000	16,287,000	21,299,000	29,381,000
2026	101,150,000	122,520,000	153,448,000	16,333,000	22,202,000	31,665,000
2027	101,420,000	125,933,000	161,410,000	16,379,000	23,111,000	33,966,000
2028	101,688,000	129,368,000	169,427,000	16,424,000	24,025,000	36,283,000
2029	101,956,000	132,825,000	177,499,000	16,469,000	24,946,000	38,616,000
2030	102,223,000	136,303,000	185,625,000	16,515,000	25,874,000	40,966,000
2031	102,489,000	139,804,000	193,806,000	16,560,000	26,807,000	43,331,000
2032	102,755,000	143,326,000	202,042,000	16,605,000	27,746,000	45,713,000
2033	103,020,000	146,870,000	210,332,000	16,650,000	28,692,000	48,111,000
2034	103,284,000	150,437,000	218,677,000	16,694,000	29,643,000	50,525,000
2035	103,547,000	154,024,000	227,077,000	16,739,000	30,601,000	52,955,000
2036	103,809,000	157,634,000	235,531,000	16,784,000	31,565,000	55,401,000
2037	104,071,000	161,266,000	244,040,000	16,828,000	32,535,000	57,863,000
2038	104,331,000	164,920,000	252,604,000	16,872,000	33,511,000	60,342,000
2039	104,591,000	168,595,000	261,222,000	16,917,000	34,493,000	62,836,000
SUM	2,140,775,000	2,797,742,000	3,748,521,000	345,816,000	526,229,000	817,161,000
DIFF	-	656,967,000	1,607,746,000	-	180,413,000	471,345,000

Transportation Benefits

Replacing motor vehicle trips with walk and bicycle trips can help reduce household transportation costs, traffic congestion costs, roadway maintenance costs, and safety costs. Table 24 shows that for every vehicle-mile reduced from increased walking and bicycling, New Hampshire can expect to generate $0.81 in transportation benefits.

Table 24: Transportation Benefit Multiplier

Transportation Benefit Multiplier	Value
Household Transportation Cost Savings[3]	$0.40 per VMT Reduced
Traffic Congestion Cost Savings[4]	$0.09 per VMT Reduced
Roadway Maintenance Cost Savings[5]	$0.15 per VMT Reduced
Collision Cost Savings[6]	$0.17 per VMT Reduced
Total Transportation Cost Savings	$0.81 per VMT Reduced

[3] "Our Driving Costs, AAA (2016). <http://exchange.aaa.com/automobiles-travel/automobiles/driving-costs/#.Vw_xCPkrKUk>
[4] Crashes vs. Congestion: What's the Cost to Society?, AAA. (2011) <http://www.camsys.com/pubs/2011_AAA_CrashvCongUpd.pdf>
[5] Kitamura, R., Zhao, H., and Gubby, A. R. Development of a Pavement Maintenance Cost Allocation Model. Institute of Transportation Studies, University of California, Davis.
[6] Average Annual Miles per Driver by Age Group. FHWA. https://www.fhwa.dot.gov/ohim/onh00/bar8.htm; Using Figure ES.3 "Cost of Crashes and Congestion per Vehicle Mile Traveled." http://www.camsys.com/pubs/AAA.pdf. Values adjusted based on "Crashes vs. Congestion: What's the Cost to Society?" AAA, 2011. Figure 3, pg 13.

Applied to the vehicle-miles traveled reduction estimates in Table 23, existing walk and bicycle trips in New Hampshire can help residents save $1.9 billion in transportation costs over a 20-year period, as shown in Table 25.

If New Hampshire's walk and bicycle rate increased to that of the 10th ranked state (Maine), an additional $0.45 billion in transportation cost savings might be realized over a 20-year period. If New Hampshire's walk and bicycle rate increased to that of the 4th ranked state (Vermont), an additional $1.11 billion in transportation cost savings might be realized over a 20-year period.

Table 25: Estimated Transportation Benefits

Year	Estimated Annual Transportation Cost Savings from Walking and Bicycling		
	Existing (26th Rank)	Maine (10th Rank)	Vermont (4th Rank)
2019	-	-	-
2020	$92,331,000	$94,358,000	$97,363,000
2021	$92,587,000	$96,655,000	$102,688,000
2022	$92,843,000	$98,968,000	$108,050,000
2023	$93,097,000	$101,295,000	$113,450,000
2024	$93,351,000	$103,636,000	$118,888,000
2025	$93,604,000	$105,993,000	$124,363,000
2026	$93,856,000	$108,363,000	$129,875,000
2027	$94,108,000	$110,749,000	$135,425,000
2028	$94,359,000	$113,149,000	$141,013,000
2029	$94,609,000	$115,564,000	$146,638,000
2030	$94,858,000	$117,994,000	$152,300,000
2031	$95,107,000	$120,438,000	$158,000,000
2032	$95,355,000	$122,897,000	$163,738,000
2033	$95,603,000	$125,371,000	$169,513,000
2034	$95,849,000	$127,859,000	$175,325,000
2035	$96,095,000	$130,362,000	$181,175,000
2036	$96,340,000	$132,880,000	$187,062,000
2037	$96,585,000	$135,412,000	$192,987,000
2038	$96,829,000	$137,959,000	$198,949,000
2039	$97,072,000	$140,521,000	$204,949,000
SUM	$1,894,438,000	$2,340,423,000	$3,001,751,000
DIFF	-	$445,985,000	$1,107,313,000

Environmental Benefits

Reductions in vehicle-miles traveled can also have an impact on air quality. Table 26 shows the estimated particulate matter, nitrous oxide, sulfur oxide, volatile organic compounds, and carbon dioxide that a typical motor vehicle emits for every mile driven.

Table 26: Estimated Emissions Multipliers

Greenhouse Gas/Criteria Pollutant	Emissions per Vehicle-Mile Traveled (metric tons)	Associated Mitigation/ Clean-up Cost per Vehicle-Mile Traveled
Particulate Matter (PM)[7]	0.00000005	$0.0167
Nitrous Oxides (NO_x)[6]	0.00000069	$0.0052
Sulfur Oxides (SO_x)[6]	0.00000001	$0.0003
Volatile Organic Compounds (VOC)[6]	0.00000103	$0.0020
Carbon Dioxide (CO_2)[8]	0.00042047	$0.0052

[6] Average Annual Miles per Driver by Age Group. FHWA. https://www.fhwa.dot.gov/ohim/onh00/bar8.htm; Using Figure ES.3 "Cost of Crashes and Congestion per Vehicle Mile Traveled." http://www.camsys.com/pubs/AAA.pdf. Values adjusted based on "Crashes vs. Congestion: What's the Cost to Society?" AAA, 2011. Figure 3, pg 13.
[7] Benefit-Cost Analysis Guidance for Discretionary Grant Programs, U.S. Department of Transportation. December 2018.
[8] Corporate Average Fuel Economy for MY2017-MY2025 Passenger Cars and Light Trucks (August 2012), page 922, Table VIII-16,"Economic Values Used for Benefits Computations (2010 dollars)". <http://www.nhtsa.gov/staticfiles/rulemaking/pdf/cafe/FRIA_2017-2025.pdf>

Applying these emission estimates to the estimated vehicle-miles traveled reductions in Table 23, existing walk and bicycle trips in New Hampshire can help prevent 1.0 million metric tons of greenhouse gas and criteria pollutant emissions from entering the atmosphere over a 20-year period (equivalent to a $70.1 million in mitigation cost savings), as shown in Table 27.

If New Hampshire's walk and bicycle rate increased to that of the 10th ranked state (Maine), an additional 0.4 million metric tons of emissions could be prevented from entering the atmosphere over a 20-year period (equivalent to an additional $24.8 million in mitigation cost savings). If New Hampshire's walk and bicycle rate increased to that of the 4th ranked state (Vermont), an additional 0.9 million metric tons of emissions could be prevented from entering the atmosphere over a 20-year period (equivalent to an additional $61.5 million in mitigation cost savings).

Table 27: Estimated Environmental Benefits

Year	Estimated Annual Greenhouse Gas & Criteria Pollutant Emission Reductions (metric tons)			Estimated Annual Emission Mitigation Cost Savings		
	Existing (26th Rank)	Maine (10th Rank)	Vermont (4th Rank)	Existing (26th Rank)	Maine (10th Rank)	Vermont (4th Rank)
2019	49,000	49,000	49,000	-	-	-
2020	49,000	50,000	53,000	$3,418,000	$3,531,000	$3,698,000
2021	49,000	52,000	57,000	$3,428,000	$3,654,000	$3,989,000
2022	49,000	54,000	61,000	$3,437,000	$3,777,000	$4,282,000
2023	49,000	56,000	65,000	$3,447,000	$3,902,000	$4,577,000
2024	49,000	57,000	70,000	$3,456,000	$4,027,000	$4,874,000
2025	49,000	59,000	74,000	$3,465,000	$4,153,000	$5,174,000
2026	50,000	61,000	78,000	$3,475,000	$4,280,000	$5,475,000
2027	50,000	63,000	82,000	$3,484,000	$4,408,000	$5,779,000
2028	50,000	65,000	87,000	$3,493,000	$4,537,000	$6,084,000
2029	50,000	67,000	91,000	$3,503,000	$4,666,000	$6,392,000
2030	50,000	68,000	96,000	$3,512,000	$4,797,000	$6,702,000
2031	50,000	70,000	100,000	$3,521,000	$4,928,000	$7,014,000
2032	50,000	72,000	105,000	$3,530,000	$5,060,000	$7,328,000
2033	51,000	74,000	109,000	$3,539,000	$5,193,000	$7,644,000
2034	51,000	76,000	114,000	$3,549,000	$5,326,000	$7,962,000
2035	51,000	78,000	118,000	$3,558,000	$5,461,000	$8,283,000
2036	51,000	80,000	123,000	$3,567,000	$5,596,000	$8,605,000
2037	51,000	82,000	127,000	$3,576,000	$5,732,000	$8,929,000
2038	51,000	84,000	132,000	$3,585,000	$5,869,000	$9,256,000
2039	51,000	86,000	137,000	$3,594,000	$6,007,000	$9,585,000
SUM	1,001,000	1,354,000	1,879,000	$70,137,000	$94,904,000	$131,632,000
DIFF.	-	353,000	878,000	-	$24,767,000	$61,495,000

Health Benefits

More people walking and bicycling can help encourage an increase in physical activity levels, which may help reduce healthcare costs for New Hampshire residents. As shown in Table 28, 20% of New Hampshire adults and 12% of New Hampshire youths report little or no leisure-time physical activity.

Table 28: Estimated Health Multipliers

	Value
Physically Inactive Adults in New Hampshire[9]	20%
Physically Inactive Youths in New Hampshire[8]	12%
Healthcare Cost Savings for Newly Active Persons[10]	$1,539

[9] State Indicators Report on Physical Activity, Centers for Disease Control and Prevention (2014), <http://www.cdc.gov/physicalactivity/downloads/pa_state_indicator_report_2014.pdf>
[10] Inadequate Physical Activity and Health Care Expenditures in the United States, <http://www.cdc.gov/nccdphp/dnpao/docs/carlsonphysical-activity-and-healthcare-expenditures-final-508tagged.pdf>

The health benefits from a physically inactive person becoming physically active and having a reduced probability of suffering from chronic diseases or missing work for health-related reasons can save the residents of the state approximately $1,539 per newly active person per year in healthcare costs.

Currently, walking and bicycling helps an estimated 6,000 New Hampshire residents meet the Centers for Disease Control & Prevention's (CDC) recommended weekly hours of physical activity, helping to prevent an estimated $176.0 million in healthcare cost savings.

As shown in Table 29, if New Hampshire's walk and bicycle rate increased to that of the 10th ranked state (Maine), an additional 1,000 residents might meet the CDC's recommended weekly hours of physical activity on average over a 20-year period (equivalent to an additional $64.0 million in healthcare cost savings). If New Hampshire's walk and bicycle rate increased to that of the 4th ranked state (Vermont), an additional 5,000 residents might meet the CDC's recommended weekly hours of physical activity on average over a 20-year period (equivalent to an additional $167.1 million in healthcare cost savings).

Table 29: Estimated Health Benefits

Year	Estimated Number of Residents Meeting CDC's Recommended Weekly Hours of Exercise			Estimated Healthcare Cost Savings		
	Existing (26th Rank)	Maine (10th Rank)	Vermont (4th Rank)	Existing (26th Rank)	Maine (10th Rank)	Vermont (4th Rank)
2019	-	-	-	-	-	-
2020	6,000	6,000	6,000	$8,605,000	$8,895,000	$9,364,000
2021	6,000	6,000	7,000	$8,626,000	$9,210,000	$10,150,000
2022	6,000	6,000	7,000	$8,647,000	$9,526,000	$10,942,000
2023	6,000	6,000	8,000	$8,669,000	$9,844,000	$11,740,000
2024	6,000	7,000	8,000	$8,690,000	$10,164,000	$12,543,000
2025	6,000	7,000	9,000	$8,711,000	$10,487,000	$13,352,000
2026	6,000	7,000	9,000	$8,731,000	$10,812,000	$14,166,000
2027	6,000	7,000	10,000	$8,752,000	$11,139,000	$14,987,000
2028	6,000	7,000	10,000	$8,773,000	$11,467,000	$15,813,000
2029	6,000	8,000	11,000	$8,794,000	$11,798,000	$16,644,000
2030	6,000	8,000	11,000	$8,814,000	$12,132,000	$17,482,000
2031	6,000	8,000	12,000	$8,834,000	$12,467,000	$18,325,000
2032	6,000	8,000	12,000	$8,855,000	$12,804,000	$19,173,000
2033	6,000	9,000	13,000	$8,875,000	$13,144,000	$20,028,000
2034	6,000	9,000	14,000	$8,895,000	$13,485,000	$20,888,000
2035	6,000	9,000	14,000	$8,915,000	$13,829,000	$21,753,000
2036	6,000	9,000	15,000	$8,935,000	$14,175,000	$22,625,000
2037	6,000	9,000	15,000	$8,955,000	$14,523,000	$23,502,000
2038	6,000	10,000	16,000	$8,975,000	$14,873,000	$24,384,000
2039	6,000	10,000	16,000	$8,995,000	$15,226,000	$25,273,000
AVG.	6,000	7,000	11,000	-	-	-
SUM	-	-	-	$176,046,000	$240,000,000	$343,134,000
DIFF.	-	1,000	5,000	-	$63,954,000	$167,088,000

Total Benefits

Existing walk and bicycle trips in New Hampshire are estimated to help residents save an estimated average of $107 million in transportation, environmental, and health costs annually, the equivalent to $2.14 billion over the next 20 years (see Table 30).

If New Hampshire's walk and bicycle rate increased to that of the 10th ranked state (Maine), an additional $0.53 billion in cost savings might be realized over a 20-year period. If New Hampshire's walk and bicycle rate increased to that of the 4th ranked state (Vermont), an additional $1.34 billion in cost savings might be realized over a 20-year period.

Table 30: Estimated Total Benefits (undiscounted)

	Estimated Annual Benefits from Walking and Bicycling		
Year	Existing (26th Rank)	Maine (10th Rank)	Vermont (4th Rank)
2019	-	-	-
2020	$104,355,000	$106,784,000	$110,424,000
2021	$104,641,000	$109,519,000	$116,827,000
2022	$104,927,000	$112,271,000	$123,274,000
2023	$105,212,000	$115,041,000	$129,767,000
2024	$105,497,000	$117,828,000	$136,305,000
2025	$105,780,000	$120,633,000	$142,888,000
2026	$106,063,000	$123,456,000	$149,517,000
2027	$106,344,000	$126,296,000	$156,191,000
2028	$106,625,000	$129,154,000	$162,910,000
2029	$106,905,000	$132,029,000	$169,674,000
2030	$107,184,000	$134,922,000	$176,484,000
2031	$107,463,000	$137,833,000	$183,339,000
2032	$107,740,000	$140,761,000	$190,239,000
2033	$108,017,000	$143,707,000	$197,184,000
2034	$108,293,000	$146,671,000	$204,175,000
2035	$108,568,000	$149,652,000	$211,211,000
2036	$108,843,000	$152,651,000	$218,292,000
2037	$109,116,000	$155,667,000	$225,418,000
2038	$109,389,000	$158,701,000	$232,590,000
2039	$109,660,000	$161,753,000	$239,806,000
SUM	$2,140,622,000	$2,675,329,000	$3,476,515,000
DIFF	-	$534,707,000	$1,335,893,000

1.3.5 Property Values

Introduction

For the purposes of this analysis, pedestrian and bicycle facilities refer to rail trails, shared-use paths, greenways, and marked bike lanes. Some studies show that prices for homes near pedestrian and bicycle facilities are higher than for other homes because buyers are willing to pay more for this amenity. The purpose of this analysis is to determine whether this relationship exists in New Hampshire.

Methodology

To assess the impact of pedestrian and bicycle facilities on property values, the team interviewed realtors, property assessors, and a town planning director. Interviewees were identified by first locating well-known pedestrian and bicycle facilities using Google Maps. Most of the identified facilities are rail trails. The team then used Google Maps and the real estate website Zillow to identify realtors who have sold homes within a short walk or bicycle ride to the facilities. Next, assessors and the planning director were contacted in several of the municipalities that are home to a rail trail.

One of the challenges encountered was the lack of sales volume data in many of the small New Hampshire towns studied, making it difficult to compare properties near trails to those that are farther away. To address these challenges, interview and web findings were supplemented with research from academic studies. These studies cannot be applied directly to New Hampshire because of the unique nature of each facility and its impact on nearby properties, however, the studies reviewed still provide general context on the range of possible impacts.

Interview Findings

Interviewees were unable to precisely quantify the impact of pedestrian and bicycle facilities on property values. In some cases, this was because they do not track the data needed to conduct an empirical analysis. In other cases, the facilities referenced are too new to have an effect (i.e., less than two years old).

Most interviewees said that pedestrian and bicycle facilities currently have no quantifiable effect on property values, while a few mentioned a mixed effect that largely depends on whether homeowners perceive trails to be a positive or a negative. One realtor interviewed has sold homes near the Cheshire Trail in Keene and is of the opinion that rail trails influence property values “in both ways” depending on the preferences of the homeowners. While some people use the trail for walking, running, or bicycling, others use it for snowmobiling and riding ATVs (primarily on portions of the corridor outside of Keene). People engaged in these activities tend to view the trail positively, while others see it as a negative because of the associated noise, vandalism, and litter.

Another realtor who has sold homes near the Goffstown Rail Trail believes that proximity to the facility is considered a benefit but does not think it affects home prices. This realtor responded that most

homebuyers do not factor proximity to rail trails into their search; however, they generally react positively when she tells them a house is located near one. This is especially true for dog-owners.[18]

Despite not having an impact on residential real estate prices, the Goffstown realtor and a realtor in Keene do consider rail trails and other pedestrian and bicycle facilities to be community assets because they provide options for people to get outside, exercise, and interact with one another. The planning director for the City of Lebanon echoes this sentiment, seeing sidewalks and bike lanes as community assets because residents want expanded connectivity and alternative travel options other than a car. He is unsure whether these facilities affect property values in the short-term, but believes that because they make areas more livable, they will eventually increase the value of nearby properties.

The City of Manchester's residential assessor thinks that the Goffstown Rail Trail/Piscataquog Trail will eventually increase the value of abutting houses, but that it is too soon to tell since parts of the trail are still in development. The first section was completed between 2004-2005 with additional improvements in 2015 and 2018. Currently, the trail is nearly continuous from Downtown Goffstown to the east bank of the Merrimack River with extensions beyond planned during 2020-2022. The trail primarily passes through city-owned land and not residential neighborhoods, meaning there is little direct access for homeowners. There are currently no plans to develop the city-owned land. However, the assessor interviewed thinks the value of rail trails is that they make a community more attractive.

The assessor in the Town of Salem noted that it is too soon to know the impact of the Salem Rail Trail, which had a major section completed in 2018. (It will be difficult to estimate the impact until there are more home sales, which are currently down from historic levels.) The assessor in the Town of Claremont could not offer an opinion on the impact of the Sugar River Trail on property values, as the Town does not collect enough data to draw comparisons between properties located near the trail and properties located farther away. His feeling is that the trail has likely had no impact.

The Lebanon planning director said the Mascoma River Greenway has been popular since opening in the summer of 2018. He also said that the City is currently working on projects to connect the greenway to a nearby rail trail in order to increase usage. According to the director, the greenway has led to increased sales at Price Chopper, an adjacent grocery store along NH Route 4 which has striped bike lanes.[19] The number of customers arriving by bike grew after the greenway opened, which prompted the store manager to install additional bike racks. The greenway also passes by some nearby houses, but the planning director was not aware of any increased sales prices or additional demand for housing near the greenway.

Research Based on Empirical Analysis

Researchers have tried to estimate the impact of greenways, rail trails, and other bicycle and pedestrian amenities on residential housing values. These studies generally find that values increase with proximity

[18] The realtor responded that she doesn't mention rail trails or other bike-ped facilities during meetings with clients, but decided to start doing so after speaking with the Alta team.

[19] Section 6.2 discusses impacts on bike-ped businesses specifically.

to these pedestrian and bicycle facilities, although there is variation in the range of price increases. Houses located near these facilities have also been shown to sell faster than those located elsewhere.

Example findings include the following[20,21,22]:

- Homes sold near the Minuteman Bikeway and Nashua River Trail in Massachusetts sold at 99.3 percent of their list price, while homes not located near these facilities sold at 98.1% of their list price.[23] Additionally, homes near the facilities sold in an average of 29.3 days compared with 50.4 days for homes not near the facilities.
- Each foot increase in the distance to a trail in Ohio decreased the sale price of properties by $7.05, meaning value increases with closer proximity.
- Properties adjacent to a rail trail in Wisconsin sold for an average of 9% more than comparable properties located elsewhere.
- Properties located within 50 meters of bike paths in Delaware sold for $8,800 more than similar homes that are not near the paths.
- The average price for homes sold near greenways in Indianapolis was 10% higher than the average for all homes.
- Properties along greenways in Colorado sold for 32% more than properties located 3,200 feet away.
- Properties near, but not adjacent to, a trail in Seattle sold for an average of 6% more than comparable properties located elsewhere.
- Subdivision lots immediately adjacent to a trail sold for 9% more than lots not immediately adjacent. Adjacent lots also sold faster than non-adjacent lots.

Other research echoes what some interviewees shared about the mixed impacts of pedestrian and bicycle facilities. Specifically, a 2006 study found that "on-street bicycle facilities and roadside trails may not be as universally appreciated as many think, and that not all homeowners consider bicycle facilities to be amenities at all."[24] So the mixed responses on the impacts on residential property values from the interviews are in line with other research findings.

[20] https://www.railstotrails.org/resource-library/resources/the-impact-of-the-little-miami-scenic-trail-on-single-family-residential-property-values/?tag=Economic+impact

[21] http://www.brucefreemanrailtrail.org/pdf/LA-Metro-Bike-paths-safety-property-values.pdf

[22] https://www.americantrails.org/resources/home-sales-near-two-massachusetts-rail-trails

[23] Homes considered "near" the facilities were those that mentioned the bikeway or trail in their listing.

[24] http://www.brucefreemanrailtrail.org/pdf/krizek2.pdf

1.4 Appendix: IMPLAN Uses

In addition to estimating multiplier impacts, the IMPLAN economic model was also used to:

1. To fill in data gaps to estimate direct impacts (e.g. jobs, labor income, and value-added)
2. Apply retail margining to isolate only the economic activity associated with the retail industry.

1.4.1 Filling in Data Gaps to Estimate Direct Impacts

Economic ratios from the IMPLAN economic model were used to determine the employment, labor income, and valued added associated with the visitor spending. These business sales, labor income, and value-added-to-job ratios were derived primarily from county-specific Bureau of Economic Analysis (BEA) and Bureau of Labor Statistics (BLS) of Labor data sets. These ratios reflect a measure of productivity (e.g. a measure of effectiveness in terms of business sales per job) and income level (e.g. labor income to job) for each category of visitor spending.

1.4.2 Retail Margining

The concept of retail margining is critical to all economic analyses of visitor spending. While spending on retail reflects the value of the item sold, only a portion of the sales is actual revenue for the retail store. This portion, referred to as margin costs, reflects the "mark-up" value that retail stores add to the price of goods to cover their operating costs and profit. To isolate the revenues that accrue to retailers, a margin percentage was applied to the value of all retail goods sold. Only the mark-up that produces revenue for retailers and revenue generated by that mark-up supports employee payroll and operating costs of business (e.g., rents, utilities, business machines, and other business expenses)—not gross revenue collected by the retail business or industry. For example, if retail sales total $1 million, only $200,000 of these sales may be revenues earned by retail establishments, since it may have cost the stores $800,000 to purchase the items for sale from wholesalers or distributors.

This margining process is used to estimate the jobs and labor income generated from these sales. In addition to applying the average state margin rate (34%) to all retail sales, a 16% margin rate was also applied to all transportation spending on fuel (e.g. gasoline)[25]. Fuel sales are like retail sales in the sense that most gasoline refinement and production usually does not occur in the same location as where gas is sold. Using this approach, the margined gas sales only reflect the industry activity associated with gas stations, not the broader petroleum refinement industry.

[25] Margin rates are internal to the IMPLAN economic model.