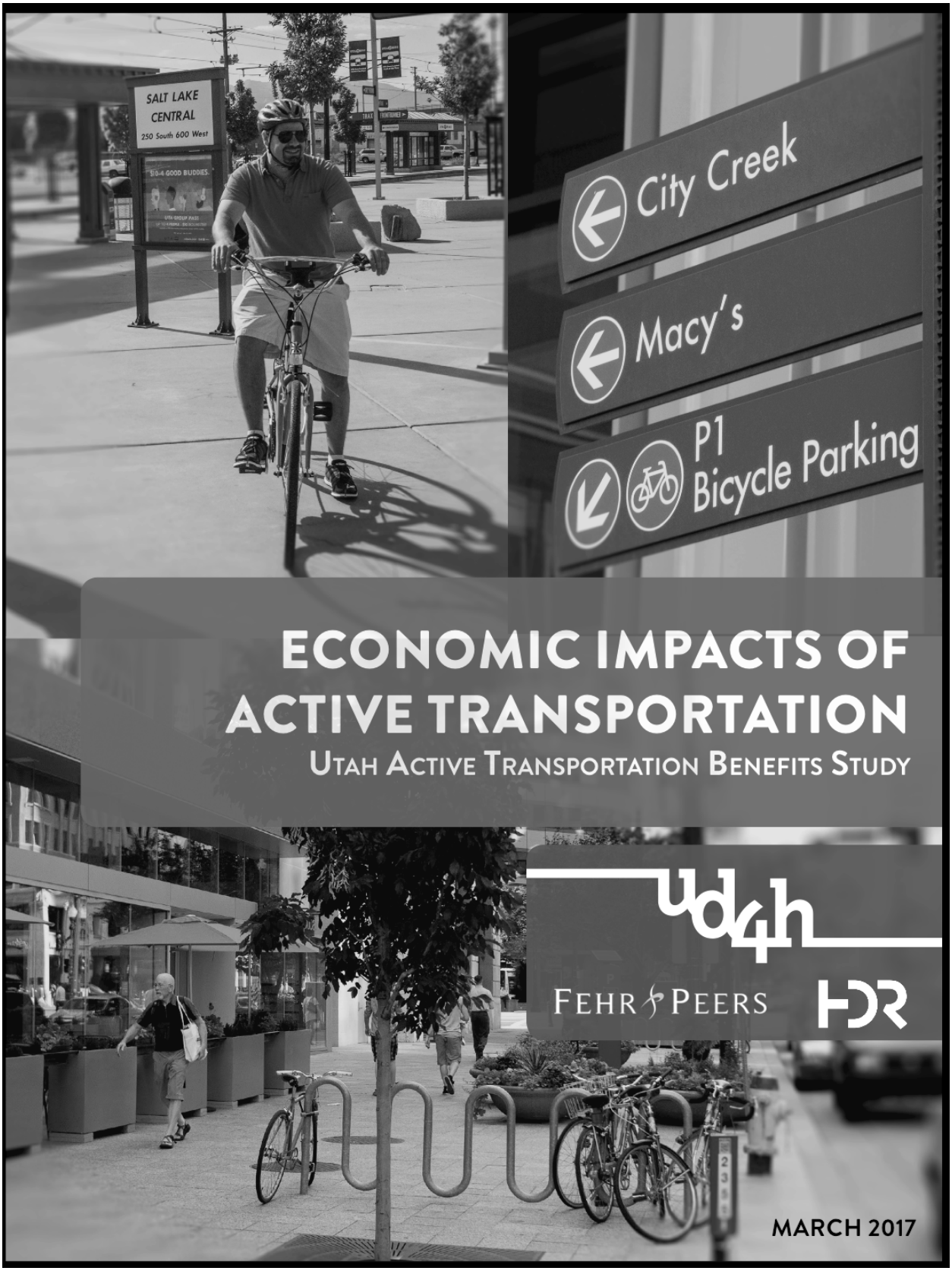

ECONOMIC IMPACTS OF ACTIVE TRANSPORTATION

Utah Active Transportation Benefits Study

UDOT

Fehr & Peers

HDR

MARCH 2017

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Utah Active Transportation Benefits Study
Contract Number 15-1412TP

Economic Impacts of Active Transportation: Utah Active Transportation Benefits Study

Phase 2 - Tasks 4 and 5

Final Report

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Salt Lake City, Utah

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Table of Contents

Figures

Tables

Executive Summary

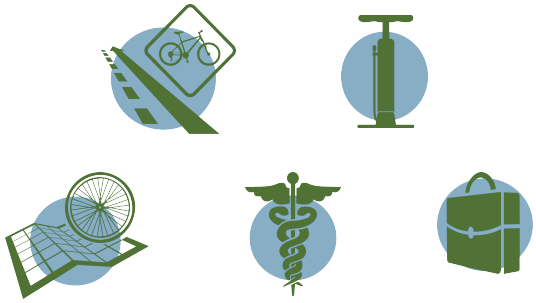
This Utah Active Transportation Benefits Study quantifies fiscal and health benefits of spending on active transportation projects and by people who walk and cycle to help guide policy, planning, investment, and programmatic decisions.

Utah is nationally recognized as a state that has both physical and policy environments that support walking and biking as modes of transport. In 2015, the League of American Bicyclists named Utah the fifth most bike-friendly state for its pro-bike legislation, planning, and education programs. In Utah, 2.5% of people walk to work, slightly below the national median of 2.8% (rank of 27). For commuting to work via bike, Utah is ranked 12th nationally, with a 0.9% commuting bike share. Utah is slightly under the median per capita spending on bicycle and pedestrian projects at $2.32 in Utah compared to $2.36 nationally (1). Annual spending by cyclists for equipment and services is estimated to be $463, or about $0.85 per rider-mile (55).

Despite the increasing popularity of walking, biking, and running in Utah, little has been done to quantify and monetize the benefits that result from active transportation facilities and active travel. Understanding the direct and induced impacts of active transportation helps elevate active travel in funding decisions and priorities. It can help governments and non-profits plan investments in healthy community infrastructure and programs. In response to this need, the Utah Transit Authority and 11 agency collaborators[1] initiated this study to estimate the health and economic benefits[2] of active transportation to inform policy and planning decisions.

This report summarizes the economic impacts of several categories, including:

- Capital construction spending
- Facility maintenance and operations
- Equipment and services
- Tourism
- Healthcare
- Reduced absenteeism



The economic analyses in this report quantify direct effects, using local data when possible about travel behavior, facility spending, household spending, tourism trends, and health impacts of

[1] Funding partners included Utah Department of Transportation, Wasatch Front Regional Council, Mountainland Association of Governments, Utah Department of Health, Bike Utah, Weber-Morgan Health Department, Salt Lake County Health Department, Salt Lake County Office of Regional Development, Salt Lake County Bicycle Advisory Committee, Tooele County Department of Health, Park City, Intermountain

[2] In this project, "benefits" is used in a more general sense and relates to beneficial outcomes of cycling and walking activity. These "benefits" are broader than a strictly "economic benefit" which is an incremental change in the value of cycling or walking related specifically to an investment or policy. Economic benefits also differ from "economic impacts". Generally, economic impacts arise as an outcome of production and expenditures, whereas economic benefits arise from a change in activity or profits. Where necessary, this document differentiates the general term of benefits from economic benefits and economic impacts.

inactivity. Using IMPLAN®, an input-output based regional economic assessment modeling system[3], indirect and induced economic effects were estimated for industry output (sales), jobs, and labor income for the categories. This facilitates estimating local effects of active transportation.

In addition to this report, a series of additional products were also created to support collaborating across sectors to encourage active transportation. These products include:

- **Best Practice in Promoting Active Transportation for Commuting** – this report describes engineering, encouragement, and education strategies;
- **Literature Review of Environmental, Health, and Economic Benefits of Transportation** – this report details other similar studies in North America;
- **Current Condition Fact Sheets** – this set of county specific reports uses a modular design to describe current transportation patterns, environmental conditions, tourism and consumer economic benefits, and health indicators;
- **Health Atlas** – this report helps to visualize the spatial distribution of health indicators across Utah and within metropolitan planning organizations (MPOs).

These products are available from multiple online resources: Bike Utah (www.bikeutah.org/atbenefitsstudy/), Utah Transportation Authority (UTA) (www.rideuta.com), and Urban Design 4 Health (http://urbandesign4health.com/projects/uta-active-transport-benefit-study). Combined with existing spatial distribution of bike lanes and sidewalks in the context of the needs and wants of communities, these tools can provide a compelling case for local decision-makers and advocates for active transportation investment efforts.

Key Findings

- **Direct sales in cycling-related businesses are $132 million**; and after accounting for indirect and induced effects, the economic **impact was $303.9 million, nearly 2,000 jobs, and over $46 million in incom**e in 2015.
- **Over $61 million is spent on bike tourism each year in Utah**; this direct spending multiplies into over $121 million in economic output or total sales, 1,500 jobs, and $46 million in income earned.
- **Nearly 45% of Utahans get less than the recommended 150 minutes per week of physical activity**, and these individuals could save $3.07 in annual healthcare costs for every mile they walk or $0.75 for every mile they bike;
    - Those who are not active at least 150 minutes each **week miss on average 0.63 days of work each year** (61).
    - If 6,410 individuals of the 306,880 adults ages 18-64 in Salt Lake County who report less than 150 minutes of physical activity a week started walking 3 miles or 1 hour a week, **16.8 jobs, $2.6 million in economic output, and $0.9 million in income would be produced from reduced absenteeism**.
- The **Murdock Canal Trail** in Utah County costs $113,000 annually to maintain. **It generates over $3.6 million annually in economic impact**. This is in addition to a one-time economic impact of $26 million and 234 jobs to build the trail.
- Bicyclists who visit **Dead Horse Point trails** while visiting Moab **generate $19 million annually in economic impact** (over $11 million from overnight trips).

[3] For more information on the IMPLAN system, visit http://www.implan.com/

Next Steps for Understanding the Economics of Active Transportation

The following recommended next steps have been identified for stakeholders to take to continue making the case for active transportation infrastructure investments in Utah:

- Meet twice a year to push forward on advisory group goals;
- Create a communication plan to promote the study results;
- Track active transportation construction and operations/maintenance spending annually at the local and state level; and
- Standardize data collection efforts and share data.

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1 Introduction

Utah is nationally recognized as a state that has both physical and policy environments that support walking and biking as modes of transport. In 2015, the League of American Bicyclists named Utah the fifth most bike-friendly state for its pro-bike legislation, planning, and education programs. Comparing the work travel patterns of people in Utah to the rest of the nation, 2.5% of people walk to work, slightly below the national median of 2.8% (rank of 27). For commuting to work via bike, Utah is ranked 12th nationally, with a 0.9% commuting bike share. Utah is slightly under the median per capita spending on bicycle and pedestrian projects at $2.32 in Utah compared to $2.36 nationally (1).

In Utah, little has been done to quantify and monetize the benefits that result from active transportation facilities and active travel. In response to this need, the Utah Transit Authority and 11 agency collaborators[4] initiated this study to estimate the health and economic benefits[5] of active transportation to inform policy and planning decisions. Urban Design 4 Health, in partnership with Fehr & Peers and HDR Engineering completed the Utah Active Transportation Benefits Study to achieve the following goals:

- Create evidence-based, planning decision-support tools that result in greater travel choice, while protecting the natural environmental quality and improving public health.
- Leverage stakeholder engagement, similar studies, and Utah-specific modeling to create an evidence-based, statewide estimate of active transportation benefits (walking and bicycling).
- Provide a fact-based benefit assessment of state and local spending on active transportation.
- Efficiently support and connect into larger economic and planning frameworks, including development of Utah's Unified Transportation Plan, Regional Transportation Plan, and State Transportation Investment Plan.

This project contributes to transportation decision-making paradigms in Utah where health, environmental, economic, and transportation costs and benefits of active modes are viewed in a more comprehensive and integrated manner.

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[4] Funding partners included Utah Department of Transportation, Wasatch Front Regional Council, Mountainland Association of Governments, Utah Department of Health, Bike Utah, Weber-Morgan Health Department, Salt Lake County Health Department, Salt Lake County Office of Regional Development, Salt Lake County Bicycle Advisory Committee, Tooele County Department of Health, Park City, Intermountain Healthcare, and Governor's Office of Energy Development. See Appendix B for additional stakeholders who participated in the study.

[5] In this project, the term "benefits" is used in a more general sense and relates to beneficial outcomes of cycling and walking activity. These "benefits" are broader than a strictly "economic benefit" which refers to an incremental change in the value of cycling or walking that relates specifically to an investment or policy. Economic benefits also differ from "economic impacts". Generally speaking, economic impacts arise as an outcome of production and expenditures whereas economic benefits arise from a change in activity or profits. Where necessary, this document will differentiate the general term of benefits from economic benefits and economic impacts.

This document is the deliverable for Phase Two of the project, which involves the computation of economic impacts of provision of active transportation facilities and user participation. The work builds from Phase One – Task 3.1, which provided a detailed review of economic, environmental, public health and planning studies related to estimating the costs and benefits of active transportation[6]. That report discusses evidence and best practices in quantifying and monetizing active transportation costs and benefits related to equipment manufacturing, retail sales, tourism, infrastructure construction, real estate value impacts, air quality and emission reduction, and health impacts (from both morbidity and mortality perspectives). The case studies were obtained from other states and specific trails and provided different perspectives on the impacts in those places.

This report performs similar types of analyses to estimate economic impacts in Utah of active transportation by and for users, businesses, and public agencies. To perform this analysis, estimates of the total economic impacts from different types of expenditures were modeled. Results are evaluated at the state level, on a county-by-county basis, and through two case studies of paved and mountain trail systems in different parts of Utah. The results are intended to facilitate understanding of the impacts of active transportation infrastructure improvements and participants' activities in different parts of the state. These results can support consideration of active transportation investments in short- and long-range capital plans.

1.1 Objective

The purpose of this study is to provide insight on the contributions that spending on active transportation projects and by people who walk and bicycle can make to regional economies. There are several expenditure categories that are investigated in this report:

- **Capital Construction** of active transportation facilities (e.g. on-road lanes, separated routes, off-road trails) and associated short-term jobs;
- **Facility Maintenance** of active transportation facilities and associated longer-term employment;
- **User Equipment and Services** expenditures on a variety of goods and services (e.g. bicycle equipment and maintenance, shoes and clothing, other miscellaneous goods and services) that support their activities;
- **Tourism** related to active transportation, including both overnight and day trips and associated expenditures on transportation, food, lodging, and other items during the trip;
- **Healthcare** savings that can occur because of users' levels of physical activity and subsequent reduction in risk of illness and its impacts on personal health from physical activity; and
- **Reduced Employee Absenteeism** that can occur from people who are healthier due to their' walking and riding patterns, resulting in higher business productivity.

The total economic impact for each of these types of expenditures is measured in terms of employment, (labor earned) income, and business sales (output). In this effort, the IMPLAN® input-

[6] Urban Design 4 Health (2016). *Literature Review of Environmental, Health, and Economic Benefits of Transportation.* Utah Transit Authority; Salt Lake City, Utah.

output based regional economic assessment modeling system[7] was used to estimate indirect and induced effects on the economy from each category of spending. The results assess the economic impact of providing active transportation facilities and the use of these facilities in different parts of the state.

Stakeholders guiding the project clearly desired a flexible product that could help with active transportation planning and evaluation purposes in multiple contexts. The output from IMPLAN® is provided in a series of tables that cover different geographical areas of study. State-level impacts are performed for equipment and services, and tourism spending. In addition, county-level analyses are performed to allow planners and others interested in understanding the economic impacts of active transportation to estimate several different benefits associated with active transportation and the economy.

This report also provides two case studies illustrating the types of impacts that may be possible with active transportation investment. The first case study is for the Murdock Canal Trail in Utah County – an 18 mile paved multi-user trail which opened in 2013 and that follows the Murdock Canal route from the mouth of Provo Canyon in the south to Thanksgiving Point in the north.[8] The second case investigates the tourism impact of off-road cycling at Dead Horse Point State Park near Moab (Grand County). This case shows how active travel in more rural settings can be an important economic development strategy.

How to Use this Report

This report can be used as a tool to help guide where to invest resources to create communities that promote active travel across Utah. It is written for a wide range of stakeholders interested in creating healthy, vibrant communities that leverage active transportation facilities. In addition to technical explanations of the economic analyses, call out boxes - formatted like this one throughout the document - provide examples on how to use the analyses in local contexts. This will help planners, program managers, and evaluators interpret, incorporate, and apply the figures created to best promote active transportation.

In addition to this report, a series of additional products were also created to support collaborating across sectors to encourage active transportation. These products include:

- **Best Practice in Promoting Active Transportation for Commuting** – this report describes engineering, encouragement, and education strategies;
- **Literature Review of Environmental, Health, and Economic Benefits of Transportation** – this report details other similar studies in North America;
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[7] For more information on the IMPLAN system, visit http://www.implan.com/

[8] http://www.utahmountainbiking.com/trails/Murdock Canal.htm

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2 Review of Economic Evaluation of Active Travel

The next sections provide a high-level summary of the related literature for the areas of environmental, health, and economic benefits of active travel. The literature review drew from state level studies similar to this one (2-7) and from academic, government, and non-profit authored sources when appropriate. It was performed, in part, to identify direct impacts from active transportation that could be easily quantified and monetized for inclusion in an input-output model (see Section 3.2). A more detailed treatment of the literature can be found in the companion document, **Literature Review of Environmental, Health, and Economic Benefits of Transportation**.

2.1 Environmental Benefits

Research indicates that combined pedestrian and bicycle infrastructure and policies applied nationally would result in a cumulative 0.2% to 0.5% reduction in baseline greenhouse gas emissions (8). Using active transportation as an environmental lever results in a relatively low implementation cost that also results in some air-quality related positive public health benefits (9).

Monetizing the environmental health benefits of active transportation infrastructure requires linking the change in built environment and infrastructure to travel behavior; travel behavior to regional emissions and local pollutant exposure; and pollution exposure to health outcomes. There is some evidence that while active travel can result in positive regional health effects through reduced emissions, active travelers may be at higher risk due to local exposure along busier streets and faster inhalation rates (10). The literature suggests, however, that the increased health benefits from physical activity outweigh these particular health risks (11-13).

While this modeling chain linking active transportation to air quality and then health was not investigated in depth during this study, active transportation remains an important tool to managing air quality in many Utah regions that struggle to maintain compliance with National Ambient Air Quality Standards.

2.2 Health Benefits

The Utah Collaborative Active Transportation Study -- conducted by Utah Department of Transportation, Utah Transit Authority, Wasatch Front Regional Council, Mountainland Association of Governments, and Salt Lake County Public Works -- affirmed that active forms of transportation, including walking and bicycling, provide individuals with a low-cost, accessible option to engage in daily physical activity (14). Physical activity contributes to reduced body-mass index (15, 16) and in reduced risk of chronic diseases such as diabetes, stroke, and heart disease (17, 18). This report primarily focused on physical activity-based health gains; however, active transportation also results in more indirect health effects from reduced sedentary time due to time spent in motor vehicles, air quality driven health effects (covered in the previous section), and increased traffic safety[9]. Reduction of illness or injury from all these pathways leads to reduced mortality, a

[9] Regional effects of active travel on health from air quality and traffic safety are generally positive even if the risk for individual active travelers increases due to increased local exposures to pollutants and vehicles.

reduction in direct healthcare expenditures, and an increase in employment productivity.

Physical inactivity is costly. A recent estimate for the U.S. suggested $24.7 billion in direct health care expenditures and another $3.06 billion in reduced productivity due to health effects associated with physical inactivity (19). A recent review suggested there are at least 36 examples of economic analyses of active transportation interventions that include an analysis of physical activity (20). There are two broad ways to monetize physical activity-related health impacts. The first is to link physical activity to premature mortality and then applying a value of statistical life (VSL), such as is done by the World Health Organization's Health Economic Assessment Tool (21) and other authors (11, 20, 22-24). VSL, however, is a valuation rather than exchanged money, making it impossible to integrate it into an economic input-output model.

An alternative approach is to estimate morbidity (or illness) gains from physical activity and then apply direct healthcare expenditures and indirect productivity estimates from the cost-of-illness literature (11, 25). Morbidity approaches must articulate the health behavior or endpoint for which to apply the cost of illness (physical inactivity, obesity, cardiovascular disease, diabetes, etc.), with many choosing physical inactivity (20, 26). This latter method – physical inactivity - is used for this Utah analysis.

2.3 Economic Benefits

In addition to monetizing the environmental and health benefits of active transportation, there are also household, business, and governmental benefits from investing in active transportation. The following are included in the Utah Analysis:

- Costs of **capital improvements and infrastructure maintenance** due to government spending on active transportation infrastructure.
- Household costs of cycling, include purchasing **cycling equipment and goods** from businesses - often small, local businesses that specialize in bicycles or outdoor recreation.
- **Tourism** captures both **day and overnight trips** that occur with the intention of taking advantage of trails and/or events.

Additional economic benefits that likely accrue, but are not accounted for in the Utah Benefits Study, include real estate valuation and active transportation as an economic development strategy. These are not included in the Utah Analysis and thus are briefly described below. More information for each can be found in the companion document, **Literature Review of Environmental, Health, and Economic Benefits of Transportation**.

2.3.1 Increased Real Estate Values

Active transportation facilities serve as an amenity that can increase the desirability and the price of nearby property. There is evidence in the literature of such real estate premiums. Most residents perceive trails as a positive amenity, although rural and suburban residents may value trail access differently (27, 28). Hedonic studies measure the empirical benefits and largely confirm those perceptions. Studies show positive effects of multi-use trail proximity (27, 29-32). Evidence for bike lanes is more mixed. Several studies have shown negative property value effects of bike lanes (28, 32). This may be explained by bike lanes being located on busier roads that, due

to noise and traffic, are generally deemed less desirable as residential locations. There is also a growing literature of hedonic studies linking walkability (usually measured using location-based values from WalkScore[10]) to both residential (31, 33-36) and commercial (37, 38) property values.

Because multi-use trails have been studied the most in residential settings, Table 1 (reproduced from Welch et al, 2015 (39)) provides factors that could be applied in the Utah setting. Note that bike lanes do not show a consistently positive effect, suggesting that calculating a real estate benefit from bike lanes is not appropriate at this time.

Table 1: Comparison of findings from past hedonic studies. Reproduced from Welch et al, 2015 (39).

Study	Facility Type	Location	Value per foot closer in proximity to trail access point (2014$)
Lindsey et al	Multi-use paths	Indianapolis, IN	$6.95
Krizek et al	Multi-use paths Bike lanes	Twin Cities, MN	Positive effect for non-roadside trails. No significant effect on busy streets.
Asabere & Huffman	Multi-use paths	San Antonio, TX	$3,107.64[1]
Parent and Hofe	Multi-use paths	Miami, OH	$4.19
Welch et al	Multi-use local paths Multi-use regional paths Bike lanes	Portland, OR	$1.72 $0.35 $-3.91

[1]Increase in value for houses abutting a trail versus houses not immediately abutting a trail.

2.3.2 Active Transportation as Economic Development

Adding active transportation infrastructure to a community is now an important component of an effective economic development strategy. This is particularly true for areas that want to attract and capitalize on latent demand for neighborhood environments that support active living and can contribute to an overall regional growth strategy. The construction of major active transportation facilities almost universally has limited impact on vehicular access to businesses and their sales. Yet business districts still often resist efforts to improve access for bicyclists, particularly if it means reallocating road space and parking historically utilized by cars (40). Shop owners tend to underestimate the amount of foot traffic arriving by active modes (41, 42). Retailers also tend to resist the transition process of improving the infrastructure for active modes, overestimating the losses during construction of separated lanes (43).

Additional studies that may be of interest to those planning trails as an anchor of less urban areas include trail systems in Virginia (44), the Allegheny mountains (45), Arizona (2), and Vermont(5). For those looking for evidence of consumer habits of active travelers in a more urban setting, see the following reports and articles:

- *300 South Progress Report: Broadway Protected Bike Lane* (46)
- *Bicyclists as Consumers: Mode Choice and Spending Behavior in Downtown Davis, CA* (47)
- *Bicycling Means Better Business: The Economic Benefits of Bicycle Infrastructure* (48)
- *Consumer Behavior and Travel Choices: A Focus on Cyclists and Pedestrians* (49)
- *The Economic Benefits of Sustainable Streets* (50)
- *East Village Shoppers Study* (51)
- *The Economic Case for On-street Bike Parking* (52)

[10] www.walkscore.com

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3 Overview of Analytical Approach

Economic impacts capture the transactions between buyers and sellers linked to spending on a good or service. For active transportation, these expenditures cover the construction and maintenance of active transportation facilities, as well as the equipment and services that are commonly used by participants. The economic impact analysis described here is based on data collected only for cyclists' expenditure patterns. Expenditures by those who walk or run are not considered because walking minimally requires shoes – a common expenditure. However, similar types of impacts would be expected from walking and running expenditures, albeit at a different scale with some different spending patterns. In addition, walking and bicycling can also lead to improved health, which affect short- and long-term health and related healthcare spending and employee absenteeism.

3.1 Description of Economic Impact Analysis

The main objective of an economic impact analysis is to determine the effect of a change in the demand for goods and services on the economic activity in a given area. This change in demand can be the result of decisions made by the government (e.g., building an active transportation facility), firms (e.g., investment in a new store or factory), or households (e.g., increased spending on other goods due to lower transportation costs).

The analysis of total economic impacts builds from data on expenditures and the estimated combined impact of *direct*, *indirect*, and *induced* economic effects – each effect captures a series of related types of spending:

- Direct effect: Refers to the economic activity occurring as a result of direct spending by individuals, businesses, or agencies located in the study area;
- Indirect effect: Refers to the economic activity resulting from purchases by local firms who are the suppliers to the directly affected (first round) and other indirect (secondary rounds) of businesses or agencies; and
- Induced effect: Represents the increase in economic activity, over and above the direct and indirect effects, associated with increased labor income that accrue to workers in the direct and indirect rounds (of the contractor and all suppliers, in our example) and is spent on household goods and services purchased from businesses within the study area.

To illustrate these dimensions of economic transactions, consider a capital construction project. The ***direct*** effect is strictly related to the initial capital investment and its allocation for labor, materials, equipment, fuel, and other items. Spending on these construction cost categories is linked ***indirectly*** to the goods and services purchased by those individuals and firms that supply each element of construction spending and the suppliers to those businesses. The third stage that is traced by economic impact analysis captures the ***induced*** effect of spending by persons who are employed by either directly or indirectly affected businesses. These induced expenditures cover all manner of household needs such as housing, food, transportation, and so forth.

In another example, health improvements of pedestrians or cyclists can reduce their normal healthcare expenditures. In turn, healthcare savings enables households to spend money on more desirable goods and services that have associated indirect and induced effects across the economy. In addition, healthier workers are likely to take fewer sick days, which in turn increases productivity for businesses, which causes additional indirect and induced ripple effects throughout

the economy.

The total economic impact of any type of spending is computed as the sum of all direct, indirect, and induced effects. Mathematically, the sum of these three effects generates a metric called a "multiplier." This value is called a multiplier because it is multiplied by some amount of direct spending to determine total economic impacts. Multipliers for direct spending can be computed for all forms of economic impacts (e.g., employment, output, income, etc.). For example, a multiplier of 1.3 for economic output (i.e., the value of goods and services sold) indicates that every dollar of direct spending generates $1.30 in total output, or an additional $0.30 on top of the initial $1 spent. Or consider a construction project within the state to build a pedestrian/bicycle facility that costs $1 million in direct spending. If the employment multiplier for construction is approximately 10 per $1 million, the project would generate approximately 10 construction jobs in the local economy. The direct effect within the multiplier is always equal to 1 as the direct economic activity serves as the base. Thus, the difference between the multiplier and 1 reflects the indirect and induced expenditures. Higher-valued multipliers indicate that direct spending generates a larger overall response in the local economy than the initial direct effect.

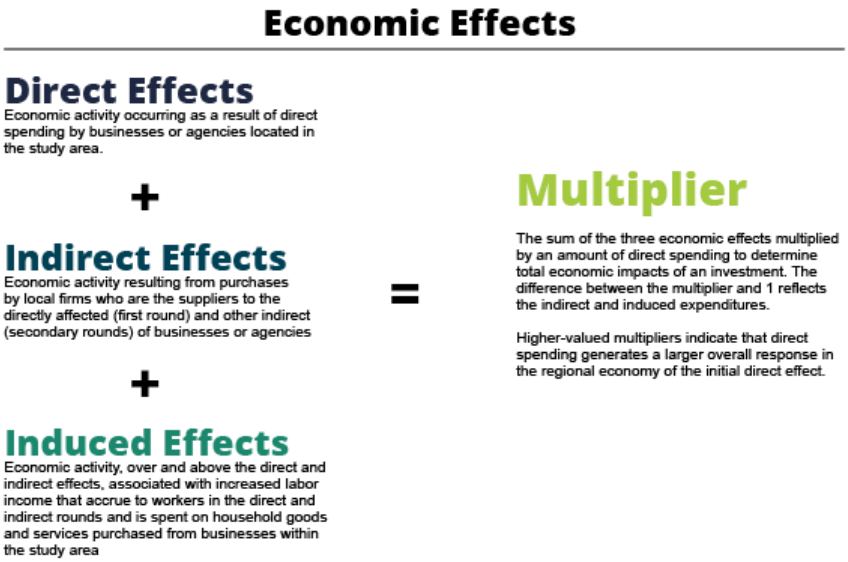


Figure 1. Direct, Indirect, and Induced Impacts

Economic Effect Depends on the Geographic Definition

The size of the multiplier reflects the number of times dollars from the direct spending recirculate through the local economy before eventually "trickling" or "leaking" outside of the study area as exports. Multipliers increase in value with larger study areas that represent broad, diverse economies and thus retain the economic activity in the region.

An important characteristic of economic impact analysis is that indirect and induced effects are captured within a specific economic market, often defined by political boundaries such as a state or county. That is, while indirect and induced effects occur for all types of direct spending, the range of businesses and people affected is defined by the analytical context and purpose for a specific geographic area. For a given geographic boundary, such as a county, the indirect and induced forms of spending effects that occur within that county boundary contribute to the multiplier and those that occur outside the boundary do not. Spending that occurs outside the local economy are said to "leak" out of the local economy. Multipliers increase in value with larger study areas because larger areas reflect a higher degree to which suppliers and purchases can come from within the area. Thus, larger study areas or areas with broader economic bases (more diverse array of industries, higher employment, etc.), such as metropolitan areas, will have larger multipliers.

3.2 Description of IMPLAN® and Estimation of Multipliers

The estimation of all forms of multipliers for all types of spending in all counties in Utah are computed in this project using software called IMPLAN®. IMPLAN® is an input-output based regional economic assessment modeling system developed and maintained by the IMPLAN® Group LLC.[11] The IMPLAN® system consists of a software package and data files that are updated every year. The IMPLAN® data files include transaction information (intra-regional and import/export) on 440 distinct industrial sectors (corresponding to four- and five-digit North American Industry Classification System [NAICS] codes) and data on more than 20 different economic variables, including employment, output and value added. For this study, the IMPLAN® system was populated with the most recent (2015) county-level Utah datasets available and was used to estimate the direct, indirect, and induced impacts associated with active transportation.

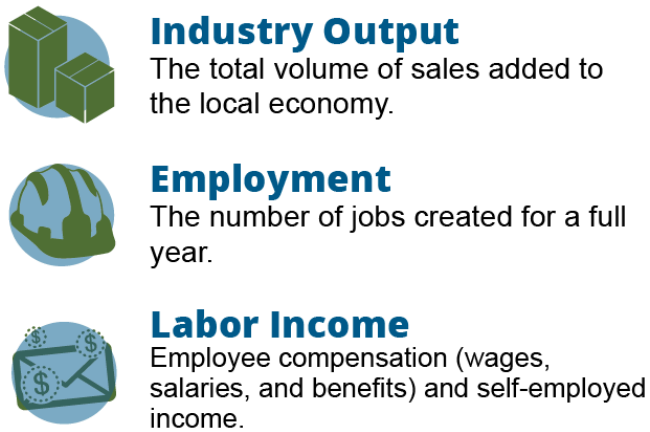


Figure 2. IMPLAN Economic Indicators

IMPLAN® produces economic impacts in terms of industry output, employment (jobs), and labor income. Output is the broadest measure of economic activity and refers to the total volume of sales added to the local economy. With respect to employment, two impact metrics are calculated: labor income and jobs. Labor income includes employee compensation and proprietor income. Employee compensation, in turn, consists of wage and salary payments as well as benefits (health, retirement, etc.) and employer paid payroll taxes (employer side of social security, unemployment taxes, etc.). Proprietor income consists of payments received by self-employed individuals (such as doctors and lawyers) and other business owners. The job impact metric indicates the number of jobs created for a full year. These impacts should not be interpreted as full-time equivalent (FTE) as they reflect the mix of full- and part-time jobs that is typical for each industry. And, strictly speaking, they should not be interpreted as permanent jobs either, but rather as job-years. A job-year can be defined as one person employed for one year, whether part-time or full-time.

The IMPLAN® model uses economic sectors to describe regional economic activity. Those sectors are primarily based on the North American Industrial Classification Scheme (NAICS), varying between 3-4 digit NAICS for service sectors, and 5-6 digit NAICS for manufacturing sectors. IMPLAN® does not have a sector specific to active transportation spending; however the results from the standard sectors are still reasonable approximations of total economic impact. For example, spending multipliers for Equipment and Services are derived from the most similar IMPLAN® industry categories that include more than just cycling-related spending. A bike purchase would be associated with *IMPLAN® Sector 404 – Sporting goods, hobby, musical instruments and book stores*; bike part manufacturing would be associated with *IMPLAN® Sector 365 – Motorcycle,*

[11] For more information on the IMPLAN system, visit http://www.implan.com/.

bicycle, and parts manufacturing.

Broad industry aggregations that include other goods and services beyond cycling do not necessarily undermine the results. Ultimately, the fundamental question is whether these other goods and services where cycling expenditures are grouped have different economic spending leakages. Certainly, industries will differ in this respect. But, at the same time, IMPLAN® purposely groups business activities within larger sectors because the transactions between buyers and sellers across sectors within study area are generally similar. Thus, the multipliers used for cycling-related expenditures are likely to be a reasonable approximation of economic impacts.

Multipliers for other categories of active transportation-related spending are not as affected by these broad industry grouping. As will be discussed below, while capital construction and facility maintenance assume that the spending is applied to typical roadway construction, research results are available to adjust job and income multipliers to reflect the higher proportions of labor typically involved in active transportation facility projects. In addition, economic impacts of tourism activity and healthcare improvement can be estimated more accurately than equipment and services because associated spending changes apply to broad classes of relevant industries (e.g. food, lodging, medical facilities, etc.), not those that entail cycling-specific businesses.

3.3 Overview of Scope of Analysis

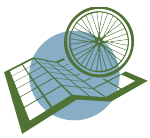
3.3.1 Types of Expenditures

The analysis of total economic impacts in this project covers six categories of spending including:

Capital Construction: This category covers one-time capital expenditures to create active transportation infrastructure

Facility maintenance: Annual costs associated with maintaining active transportation facilities are represented in this type of spending.

Equipment and Services: This category covers durable goods and services purchased by households and include clothing and gear as well as additional equipment, parts and maintenance services, for cycling.



Tourism: This category includes in- and out-of-state cyclists who take day and overnight trips to destinations within Utah expressly for active transportation purposes. Their expenditures on food, fuel, lodging, and other tourism-related services are included.

Healthcare: Healthcare cost savings are generated when an individual's health care needs, and therefore costs, are reduced due to improved health conditions from increased physical activity, such as from choosing to walk or cycle more. These savings include reduced premiums by households and businesses, reduced Medicare and Medicaid expenditures, and reduced out-of-pocket medical expenditures.

Reduced Employee Absenteeism: Businesses can also realize financial gains with lower costs due to reduced rates in employee absenteeism, or sick days. Lower costs in an economic impact analysis are largely equivalent to higher productivity.

Data on total annual spending and facility user levels for each of these categories can be used to estimate a grand total economic impact across all categories. However, one potential area of

overlap that should be noted is in the computation of annual equipment and travel expenditures. That is, if a resident in their home county also travels to another county and spends money on gear, it should be counted in the county where the expenditure occurs, not where that person lives. But taken separately, these categories of impacts enable impacts of active transportation to be estimated under different contexts such as for projects that increase local facility use, and others that aim to stimulate tourism.

3.3.2 Geographic Scales of Analysis

Analyses are performed for three geographic scales: state, county, and facility level. The state-level analysis focuses on the impact of (1) cycling-related equipment and service purchases and (2) tourism expenditures across Utah. These expenditures are based on estimated business sales from data obtained from InfoUSA[12]; in contrast, spending pattern data directly related to walking or running is not available.

At the county level, economic impact multipliers are provided. Differences between county-level multipliers stem from differences in local economic structure of businesses and employment. Higher multipliers for sales output is normally associated with larger economies because it means that less indirect or induced spending (i.e. "leakages") occur outside the county. The county-level results are also provided, for planning purposes, in a normalized fashion to demonstrate their use for typical spending profiles (e.g., construction spending costs per mile, or equipment costs per rider-mile).

Finally, two facility-level case studies are analyzed with spending data by government agencies, cyclists, and visitors to provide examples of how multipliers can be applied to estimate total impacts. One case study covers facility construction and annual cycling use of the Murdock Canal Trail in Utah County, a trail that is assumed to be primarily used by local residents. The second case involves a trail at Dead Horse Point State Park, near Moab. This example illustrates how the multipliers can be used to characterize the economic impact of more tourism-related spending.

Figure 3 and Figure 4 illustrate the process to estimate these impacts for both case studies. In the top row, data on several types of spending are introduced through IMPLAN® multipliers to determine impacts on a per unit basis. Then, data specific to each site are integrated with impact measures to determine total economic impacts in several categories. In both cases, construction, operations and maintenance expenditures are drivers of impacts. For Moab (Grand County), we anticipate that tourism spending would generate direct, indirect, and induced impacts. For the Murdock Canal Trail (Utah County), we expect that users of the trail will have annual spending associated with cycling. In addition, we include health expenditure savings and reduced absenteeism generated by frequent users of this trail being healthier.

[12] InfoUSA is a for-profit company that develops business contact and information databases for marketing purpose -- https://www.infousa.com/about-us/.

Figure 3: Graphical Depiction of Case Study – Murdock Canal Trail

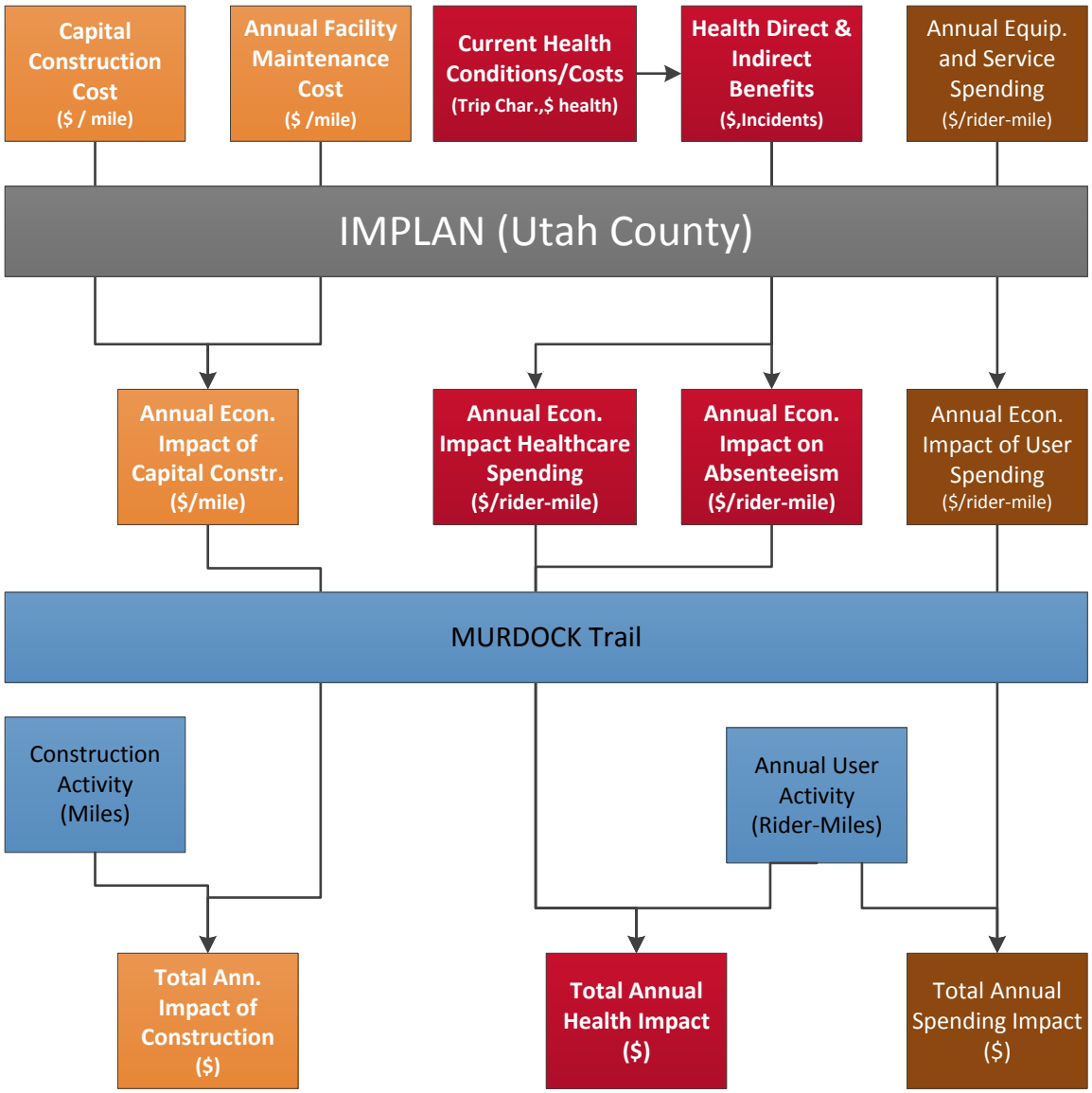
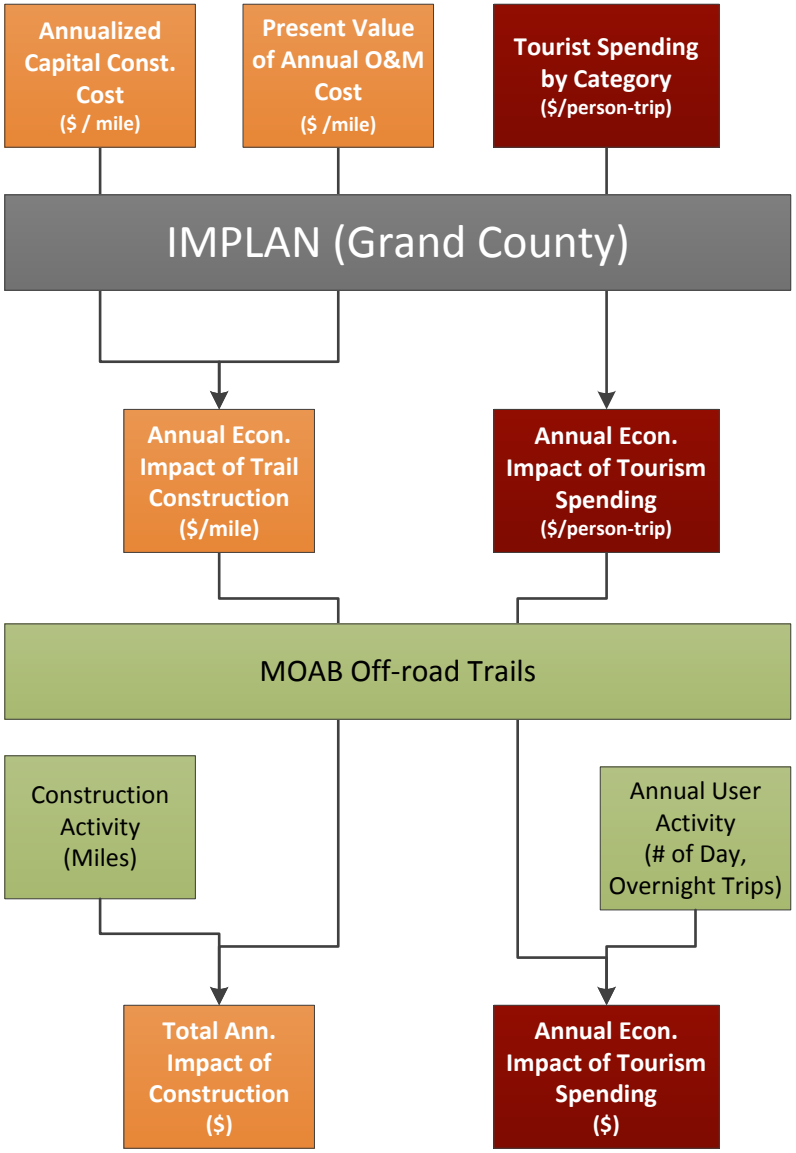


Figure 4: Graphical Depiction of Case Study – Off-Road Trails, Moab, Grand County



3.3.3 Implementation of Analysis

The results are computed from a customized economic input-output model for Utah that is specific to the local combination(s) of sectors affected by active transportation spending. The indirect and induced effects are estimated using data from IMPLAN®, an input-output (I-O) based regional economic assessment modeling system. Multipliers from this system were obtained for industrial sectors that are influenced by active transportation expenditures and applied on a county basis. With respect to spending on equipment and services, cycling spending is grouped with other sectors that have similar economic characteristics in the region, as discussed above. The base expenditure data was combined with the IMPLAN® multipliers and other economic information to generate the total economic impacts (e.g., jobs, earnings, and output) generated by active transportation activity in the state.

Data on economic structure in the state and county are derived from IMPLAN®. Additional economic data on specific businesses is obtained from InfoUSA. InfoUSA is a data provider that collects and sells data on specific businesses, which it compiles from databases of over 4,000 phone directories over 350 new business sources, including new business filings, daily utility connections, county courthouses, and public record notices. InfoUSA data has been assembled for Utah businesses that provide supplies and services to users of active transportation. Revenue and employment data by business is available on businesses in Utah and categorized by Standard Industrial Classification (SIC), either as a primary or secondary activity. To determine which Utah businesses are related to active transportation, SICs were selected if they had a connection to active transportation businesses (see Table 2).

Table 2: Standard Industrial Classification Codes Potentially Related to Active Transportation

SIC Codes	Description		SIC Codes	Description
375102	Bicycle Fabricators		594141	Bicycles-Dealers
394923	Sporting & Athletic Goods		594142	Bicycle Racks & Security Systems
472501	Tours-Operators & Promoters		769974	Bicycles-Repairing
472507	Bicycle Tours		799909	Bicycles-Renting
557106	Motorcycles & Motor Scooters-Dealers		509102	Bicycles-Wholesale
565101	Clothing-Retail		593232	Bicycles-Dealers-Used
566101	Shoes-Retail		594140	Bicycles-Parts & Supplies
594113	Sporting Goods-Retail			

These business types include bicycle manufacturers, bike rack and other supplies retailers, bicycle tourist companies, and others. In some cases, a number of specific businesses were removed from the list provided by InfoUSA because the business was not closely related to active transportation as a key part of their business. Data on businesses used in the analysis include annual revenue and employee information. This data, by identifying the counties for which household spending on cycling can occur, was then used to (1) restrict IMPLAN® multipliers for household spending to the appropriate areas and (2) estimate statewide indirect and induced benefits for the household spending.

4 State-Level Analysis

This section provides an overview of the scale of impacts across Utah from spending by cyclists either near their home or on a day or overnight trip. The focus of the analysis is on commercial impacts of cycling activity because of the availability of spending data on bicycle-related businesses and trips. In contrast, while walking and running are much more common activities, associated spending is more difficult to directly estimate. As such, while walking and running are likely to generate an important economic impact, an estimate is not produced below at the state level. However, if data exists on spending levels for walking or running, the same multipliers provided below could be used to estimate a total economic impact.

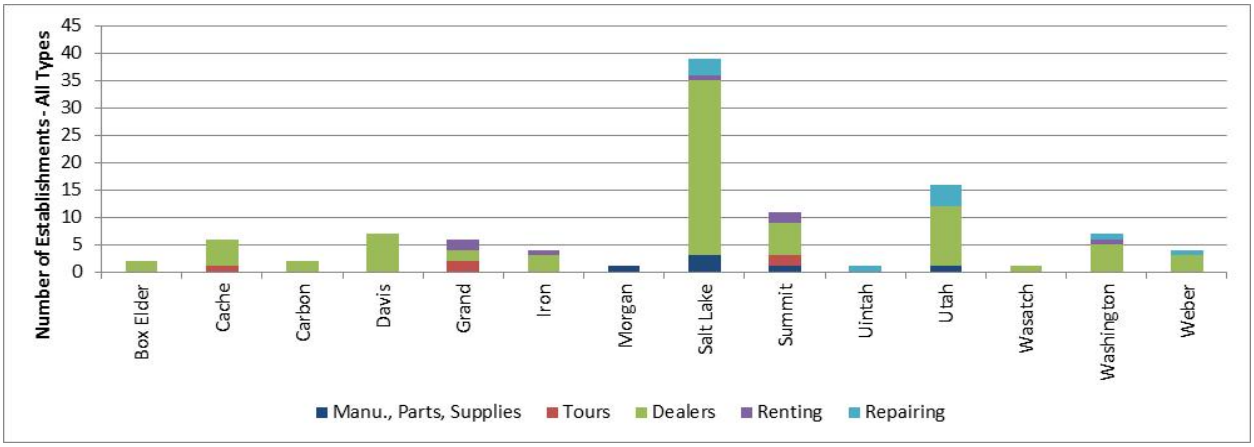
4.1 Equipment and Services

The analysis of cycling-related expenditures across Utah directly uses data from InfoUSA on estimated annual sales in businesses where cycling equipment and service is a primary or secondary activity. InfoUSA identifies businesses based on the types of goods or services they sell, their location by county, total estimated annual revenues, and numbers of employees. In many cases businesses that provide sales or service for cycling also provide services for skiing and winter sports.

The data presented in Figure 5 and Figure 6 includes businesses identified in InfoUSA, but exclude some in which cycling is not a core business. For example, very large retailers of all types of sports equipment, such as Dick's Sporting Goods, are excluded since cycling equipment is a relatively small portion of their overall sales. However, smaller retailers such as Christy Sports, which sells and rents cycling gear in the summer only, but handles skiing in the winter, is included in the data because its sales for cycling are a high proportion of total sales. In contrast, Dick's sells equipment and clothing for most types of sports.

InfoUSA data on the number of establishments by county and type of goods or services are shown in Figure 5 and indicate that Salt Lake County has the largest number of establishments in the state. Most of the businesses are relatively small retailers with about 14 employees per shop. The total number of employees in all cycling-related businesses is highest in Salt Lake County, with about 350 persons, and the next highest is Summit County, with about 225 persons. Utah County's 16 establishments employ around 100 people overall.

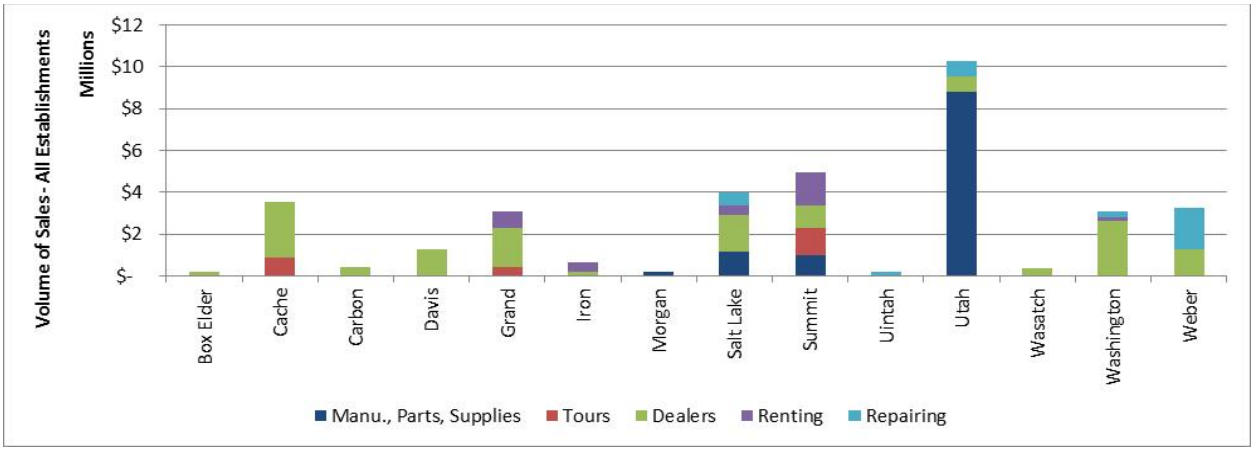
Figure 5: Number of Cycling-Related Establishments by Type and County



The estimated annual volume of sales for each type of business by county is presented in Figure 6. Many places that sell bikes will also repair and/or rent bicycles. In this case, the firms are shown based on their primary SIC code. Also, the presence of tour operators in several of the more tourist destinations can be observed in Cache, Grand, and Summit Counties.

These data indicate the significance of Utah County's cycling manufacturing business – Fezzari Bicycles, which produces customized road and mountain bikes. This company has about 50 employees and produces an estimated $9 million in annual sales. Fezzari alone is the largest bicycle-focused company by sales volume in all of Utah. While the bicycling-related businesses in Salt Lake County employ the largest number of people, the volume of sales is smaller than that in Utah County, because of Fezzari. Interestingly, Summit, Washington, Weber, Cache, and Grand also have comparable sales to Salt Lake County. Part of the reason for strong sales in other counties is because firms there are generating a significant proportion of sales from other types of recreational activities, such as skiing. Because InfoUSA data cannot distinguish sales volumes for cycling from other types of equipment, these data could overestimate the actual influence of cycling. The method used to compensate for this is described below.

Figure 6: Volume of Annual Sales of Cycling-Related Establishments by Type and County



To merge IMPLAN® to the direct economic impacts captured by InfoUSA, the data were adjusted as follows:

- Three categories of IMPLAN® were identified: bicycle fabricators (IMPLAN® 365 motorcycle, bicycle, and parts manufacturing), bicycle retail, repair, and rentals, ski shops (IMPLAN® 404 – Retail - Sporting goods, hobby, musical instrument and book stores), and bicycle tours (IMPLAN® 496 – Other amusement and recreation industries).
- Since cycling-focused businesses make up a relatively small sector within each of these categories (see Table 3), to avoid overestimating sales in these businesses, average output per employee by sector was estimated from InfoUSA data on business revenue and total employment.
- Estimated output per employee was calculated in IMPLAN® to determine estimated cycling-related sales for each type of business category.[13]

[13] As a technical note, default ratios of proprietors' income per worker were integrated with InfoUSA data on output per employee to determine cycling-related sales.

- For ski shops, cycling sales were assumed to be half the total value reported in InfoUSA, assuming that the other half of annual sales were related to ski purchases.
- Total sales were adjusted for some of the businesses based on their description of primary and secondary industry activities.
- Prior to running the state level economic impacts, IMPLAN® study area data were modified to reflect employment and production levels of the specific bicycle industries (manufacturing, retail sales, and tours).

Direct sales in cycling-related businesses are $132 million and make up a significant portion of some economic sectors. For example, within IMPLAN® "Sector 404 - Sporting goods, hobby, musical instruments and book stores", cycling-related retail goods and services contribute 8.7% of output (see Table 3). In "Sector 365 - Motorcycle, bicycle, and parts manufacturing," about 6.9% of output relates to bicycles. Spending on bike tours is under 0.5% of its related sector because there are few actual cycling-related tours and this sector covers a wide range of diversified entertainment businesses. Overall, cycling contributes about 6.4% of its related sectors, and about 0.05% to the state economy overall.

Table 3: Comparison of Cycling-Related Business Sales to Total State Business Activity, by Sector

	Total Sector Output ($ millions)	**Cycling-Related Industry Output ($ millions)**	**Percent of Sector**
Sector 404 – Sporting goods, hobby, musical instrument and book stores	1,366.9	119.5	8.74%
Sector 365 – Motorcycle, bicycle, and parts manufacturing	155.7	10.7	6.89%
Sector 496 - Other Entertainment (including Tours)	545.6	1.9	0.34%
Total Bike-related Sectors	2,068.2	132.1	6.39%
Total Statewide Output	286,632.3	132.1	0.05%
State Gross Regional Product	147,718.9		

Estimated economic impacts of cycling-related annual sales are shown in Table 4. The data indicate that the estimated $132 million in direct annual spending (and sales) on cycling related goods and services across Utah as sourced by InfoUSA, contributes to 805 jobs and $26.8 million in income. The total economic impact, after applying the multipliers listed below, is estimated to generate over $300 million in output, nearly 2,000 jobs and about $77 million in income in 2015.

Table 4: Statewide Impact of Cycling-related Business Sales from Customer Spending (2015)

Statewide Impact	**$ Total Output ($Million)**	**# of Jobs**	**$ Income ($Million)**
Direct Sales and Spending	$132.0	805	$26.8
Multiplier (on direct spending)	2.30	14.94 per $million	0.58
Total Economic Impact	$303.9	1,974	$77.2

4.2 Tourism

Utah is home to a number of nationally significant destinations for tourists from both within and outside of the state. A recent survey of tourists in Utah performed by TNS Global (2014) provides a comprehensive perspective on travelers' activities and expenditures throughout the state (53). These data indicate that about 14.5 million trips are taken to Utah destinations annually. Of these, the survey indicates that about 3% are expressly for cycling purposes, which would amount to about 435,000 cycling-trips. Among all trips, about 28% are day trips while 72% involve an overnight stay (53). Thus, if we can assume that cycling trip characteristics are similar to any average trip, we would estimate that cycling trips are split between about 122,000 day trips and 313,000 overnight trips.

The economic impact of cycling-related tourism is driven largely by the ways in which visitors spend money during their trips. Data on expenditures by tourists' day and overnight trips are obtained from TNS Global (2014) and presented in Table 5. Data from TNS Global (2014) indicate that the total spending for day and overnight trips per party is $124 and $579 (2013$), respectively (53). Survey results indicate that there are 3.7 and 3.3 persons per part y (53). After adjusting expenditures to 2016$, the total costs per person are $34.73 and $181.81 per person-trip. The estimated proportions of spending by traveler for each type of trip are then used to compute spending by category so that they appropriate IMPLAN® multipliers can be applied.

Table 5: Tourism Expenditures for Day and Overnight Trips (53)

	Utah Visitors: Leisure Day Trips		Utah Visitors: Leisure Overnight	
Total	**$34.73**		**$181.81**	
Transportation	34%	$ 11.81	38%	$ 69.09
Food	19%	$ 6.60	26%	$ 47.27
Entertainment	7%	$ 2.43	4%	$ 7.27
Lodging	0%	0	23%	$ 41.82
Shopping	13%	$ 4.51	6%	$ 10.91
Other/amenities	27%	$ 9.38	3%	$ 5.45

With data on estimated numbers of day and overnight cycling-focused trips and spending patterns in Utah (Table 5), a total direct spending on tourism amounts to $61.2 million. This output is associated with over one thousand jobs and nearly $29 million in income. Combining direct sales and spending with multipliers yields an economic impact of about $122 million in output, nearly 1,500 jobs and $46.7 million in income.

Table 6: Statewide Impact of Cycling-related Tourism Spending

Statewide Impact	$ Total Output ($Million)	# of Jobs	$ Income ($Million)
Direct Sales and Spending	$61.17	1,076.0	$28.77
Multiplier (on direct spending)	2.0	24.5 per $million	0.76
Total Economic Impact	$121.90	1,499.0	$46.73

5 County-level Analysis

This section discusses data, methods and results of the economic impact analyses for different counties and each spending category. Results are presented as total economic impacts (as a combined measure of direct, indirect, and induced effects) for output, employment, and income. Two sets of results are presented for each type of spending and county: expenditure multipliers and planning-level impact indicators. Expenditure multipliers represent the total economic impact per dollar of spending. Planning-level impact indicators (e.g. equipment spending per rider-mile) are computed from multipliers and typical cost profiles and can be used to support project-level assessments.

Results are provided in the text for only a sample of selected counties including: Morgan, Salt Lake, Summit, Washington, and Weber; results for all counties are contained in Appendix A. The five selected counties represent a range of conditions in terms of population and regional location around the state. Baseline data for these counties are shown in Table 7. Salt Lake County is the largest and most prosperous with more than one million people, $76 billion in gross regional product (GRP), and an annual median household income of over $62 thousand.

Table 7: Economic and Demographic Characteristics of Selected Counties

County	Land Area (Sq. mile)	Pop. (# of Persons)	Households (# of HHs)	Total Employment (# of Persons)	Number of Industries	GRP ($Bil.)	Median HH Income
Morgan	609	11,065	3,231	4,487	138	$0.2	$74,314
Salt Lake	737	1,107,314	367,015	822,183	441	$76.4	$62,117
Summit	1,871	39,633	13,937	39,534	199	$3.3	$91,773
Washington	2,427	155,602	51,925	84,145	266	$4.7	$50,774
Weber	576	243,645	82,426	125,369	288	$9.5	$56,581

5.1 Capital Construction

5.1.1 Overview of Analysis

Spending on active transportation facility construction generates a range of impacts across the economy. IMPLAN® captures indirect and induced spending for road construction[14]. However, this IMPLAN® sector could underestimate impacts of active transportation facility construction because these facilities tend to be more labor-intensive. To improve impact estimates, job creation and income multipliers from IMPLAN® should be adjusted with results from a recent 2011 study by Garrett-Peltier (54) that documented higher employment multipliers for different types of active transportation projects (see Table 8). These adjustments are important for analyses of active transportation projects because IMPLAN® does not have specific multipliers for active transportation facilities; the closest type of construction is for roadways.

To illustrate the use of these multiplier adjustments, consider a project involving striping crosswalks and bike lanes. Given a project location and the associated jobs and income multipliers for that county, these multipliers should be increased by 9 percent to account for the difference

[14] Roadway construction sector in IMPLAN is Sector 56 ("Construction of new highways and streets").

between multipliers for on-street bicycle and pedestrian facilities (without road construction) (8.42) and general road infrastructure (7.75). Different types of facilities would use a different multiplier adjustment listed in Table 8.

Table 8: Job and Income Multiplier Adjustments for Active Trans. Facility Construction, Maintenance

Project Features	Total jobs per $1 million	Multiplier Adjustment
Bicycle infrastructure only	11.41	1.47
Off-street multi-use trails	9.57	1.23
On-street bicycle and pedestrian facilities (without road construction)	8.42	1.09
Pedestrian infrastructure only	9.91	1.28
Road infrastructure with bicycle and pedestrian facilities	8.53	1.10
Road infrastructure with pedestrian facilities	8.42	1.09
Road infrastructure only (no bike or pedestrian components)	*7.75*	*Base*

Source: Garrett-Peltier, 2011

5.1.2 Results

Indicators of economic impact for capital costs of roads that include bicycle and pedestrian facilities are contained in Table 9. (Results for all counties are in Appendix A.) Results are presented for multipliers (upper part of table) and planning-level indicators that are derived from these multipliers (lower part of table). The small bar chart indicators on the left side of the data values reveal for each type of impact the comparative multipliers for that county compared to others in the state. The bars indicate the percentile to which that county multiplier belongs. Percentiles are grouped by quintile, or 20 percent per bar such that a multiplier with all four bars is within the highest quintile (i.e. over 80 percent). Similarly, a county with three colored bars has a multiplier in the 3rd quintile, or between the 60th and 80th percentiles. If there are no colored bars, then the multiplier is in the lowest quintile. These icons are not shown for the lower sets of results because they would be the same.

Construction spending multipliers indicate that Salt Lake and Washington Counties are among the highest across all counties in the state. Salt Lake County has output multipliers of 1.78, which means that for every dollar spent on construction about $1.78 in total sales are produced in the county. Washington County is among the highest in job creation, with an estimated 11.36 annual jobs for every $1 million spent on roadway projects (before adjusting for the higher labor-intensive construction processes of trails discussed in Table 8). Salt Lake County's and Washington County's diverse economies result in higher multipliers because of the ability to provide a relatively higher range of goods and services from indirectly affected businesses within the county. For construction, this could include raw building materials or construction labor.

Table 9: Economic Impacts of Capital Construction Expenditures

	Total Multipliers per $ of Capital Construction Spending		
Selected Counties	**$ Total Output**	**# of Jobs Per $Million**	**$ Income**
Morgan	$1.33	8.51	$0.41
Salt Lake	$1.78	10.14	$0.57
Summit	$1.41	8.35	$0.46
Washington	$1.62	11.36	$0.41
Weber	$1.41	9.27	$0.41
	Sample Analysis Assumptions: $0.75 Million per mile in Construction Costs; 10% Multiplier Adjustment		
Selected Counties	**$Total Output ($Thous.) per Mile**	**# of Jobs per Mile**	**$Income ($Thous.) per Mile**
Morgan	$1,000	7.0	$338
Salt Lake	$1,338	8.4	$474
Summit	$1,055	6.9	$378
Washington	$1,215	9.4	$339
Weber	$1,055	7.7	$342

In addition, planning-level information from multipliers is provided in the lower half of Table 5 for total economic impacts and impacts per-mile, based on an assumption of total direct construction costs per mile. The lower sets of results in Table 9 illustrate how these multipliers can be used with a sample analysis. For this analysis, it is assumed that estimated facility construction costs are $750,000 per mile[15] and the project can be defined as a "road infrastructure with bicycle and pedestrian facilities" (from Table 8) so that job and income multipliers are adjusted by 10%. Thus, with capital costs of $750,000 per mile, then a project in Salt Lake County would generate total economic impacts per mile of about $1.34 million in output, 8.4 jobs, and about $0.47 million in income (Table 9). In Washington County, the same level of economic impacts per mile amount to over $1.21 million in output, 9.4 jobs and about $0.34 million in income with these jobs (Table 9).

5.2 Facility Maintenance

Similar to capital spending, facility maintenance generates impacts across the economy, though at a significantly smaller scale. IMPLAN® defines a specific sector for maintenance that differs from construction, but both are based on roadway work.[16] To improve estimated impacts, job creation and income multipliers for maintenance should be adjusted in the same was as road construction

[15] Source: Jim Price, Mountainland Assoc. of Governments; $750,000/mile is suggested for planning purposes.

[16] Road maintenance in IMPLAN Sector 64 ("Maintenance and repair construction of highways, streets, etc.").

using results from Table 8 for the specific type of facility.

Table 10 displays similar results for facility maintenance. Multipliers are generally, but not always, slightly higher for maintenance because it is more labor intensive than initial construction. In Utah, the more economically diverse counties such as Salt Lake County and Washington County see less leakage and thus have higher multipliers for maintenance spending than other counties. The lower portion of Table 10 applies the multipliers to an assumed rate of $6,300 per mile per year[17] to maintain a multi-use trail. In addition, job and income multipliers are adjusted by 10% to reflect a project type as defined above.

The planning level metrics in the lower half of Table 10 indicate that maintenance provides small economic impacts. Total economic output per mile of maintenance varies from around $8,500 per mile in Morgan County to $11,700 per mile in Salt Lake County. Job impact multipliers of around 0.07 per mile mean that 1 job is created for every 14 miles of annual maintenance. Income per mile for these employees ranges from $2,860 and $4,060, a range that would reflect differences in prevailing wage rates, labor availability and cost of living in those areas.

Table 10: Economic Impacts of Facility Maintenance Expenditures

	Total Multipliers per $ of Annual Facility Maintenance Spending		
Selected Counties	**$ Total Output**	**# of Jobs Per $Million**	**$ Income**
Morgan	$1.35	10.36	$0.47
Salt Lake	$1.85	12.44	$0.64
Summit	$1.43	10.42	$0.52
Washington	$1.59	13.81	$0.45
Weber	$1.51	12.11	$0.49
	Sample Analysis Assumptions: $6,300 per mile in O&M Costs; 10% Multiplier Adjustment		
Selected Counties	**$Total Output ($Thous.) per Mile**	**# of Jobs per Mile**	**$Income ($Thous.) per Mile**
Morgan	$8.52	0.07	$2.95
Salt Lake	$11.68	0.08	$4.06
Summit	$8.99	0.07	$3.28
Washington	$10.01	0.09	$2.86
Weber	$9.50	0.08	$3.10

[17] Sourced: Jim Price, Mountainland Association of Governments

5.3 Equipment and Services

5.3.1 Overview of Analysis

Cyclists, pedestrians, and runners spend money on a variety of clothing, gear, maintenance services, and other items to support their active transportation activities. Data on expenditures by cyclists has been estimated through surveys of riders and provides a useful measure of the potential that can be created by constructing active transportation facilities. Comparatively less is known about the magnitude and range of expenditures by pedestrians and runners, but it is likely that pedestrian spending per capita is much lower than cyclists. However, is conceivable that the cumulative level of expenditures per year could be of a similar order or magnitude with cyclists since there are many more people who walk or run on a regular basis and purchase a range of shoe and clothing items. It is also reasonable to assume that the wider economic impact of walking and running expenditures would have multipliers that are similar in magnitude with riding-related purchases. However, due to uncertainty about pedestrian and running equipment for active travel, these expenditures not modeled in this report.

Active facility users may live throughout the state; however, the economic impacts from their spending on recreational clothing and gear only occur in counties where related retail, service and manufacturing businesses are located. That is, if a person buys a bicycle, but there is no retail shop in the county where that person lives, then that expenditure leads to economic activity in the county where the spending takes place. Accordingly, only a county with businesses involved in equipment and gear sales and service would generate related economic impacts for that county. Economic impact analysis of equipment sales reports are only for those counties where related businesses are located. For those counties, the IMPLAN® retail sector 404 associated with sporting goods, hobby, musical instruments, and book stores is selected to obtain multipliers. While this category is not exclusive to cycling or walking / running activities, it provides the best approximation for transactions between directly and indirectly affected businesses and employees. Similar to results above, the upper set of results in Table 11 includes multipliers related to actual spending by active transportation participants.

While IMPLAN® provides an estimate of the indirect and induced economic effects, an additional set of computations were used to define a per "rider-mile" basis as follows:

- Annual spending for cyclists spent $463 in 2016$[18] (55).
- Cycling activity in Utah, obtained from the National Household Transportation Survey (2009), across all riders is estimated to be 547 miles per year (56).[19]
- Since maintenance costs and need for replacement equipment are proportional to the distance traveled (a common assumption in transportation economics), cyclists generate direct economic impacts on a per rider-mile basis. This can be estimated by dividing the

[18] This value is higher than spending patterns found from a survey in Colorado (CDOT, 2016), but may still be a reasonable estimate for Utah.

[19] The average annual miles traveled per rider is computed by multiplying 365 days per year by 1.5 miles per day in average distance traveled by bicycle across all users, as reported by NHTS (2009). Note that this daily distance is not likely to be an actual average distance per trip for most trips because it is computed by NHTS from an estimated total annual distance traveled for all riders, including some with low mileage and very infrequent use, and then dividing by 365 days.

annual average operating costs by miles cycled. Annually, cyclists in Utah are estimated to spend about $0.85 per rider-mile.

5.3.2 Results

Results from the economic impact analysis for equipment and miscellaneous expenditures are shown in Table 11. The multipliers shown in the upper part of table indicate that total economic output produced from cyclists' spending is highest in Salt Lake County and amounts to $1.91 in output per $1 spent. Interestingly, the job production in Morgan County per dollar spent on cycling gear is significantly higher than other counties, which indicates that more jobs[20] are created from within the county. However, jobs creation impacts of direct spending are high in Morgan County largely because while it is a small county, it happens to be home to a manufacturer of bike parts (a bike rack system, to be specific) and some manufacturers tend to generate higher indirect and induced effects. Income produced from cycling expenditures is highest in Salt Lake County, indicating a relatively higher number of employees working and living within the community. In contrast, the lower income multiplier for Morgan County likely indicates a wage differential when compared to other counties.

For planning purposes, it can be convenient to evaluate the economic impacts on predicted rider activity levels. For example, if cyclists spend about $0.85 for equipment per mile traveled, then these multipliers can be converted to total impacts per mile traveled. The lower sets of results in Table 11 show economic impact results per thousand-rider miles, which is about the average annual distance of two riders in Utah[21]. To use the results, if approximately 1,800 riders travel the Utah average distance, it would amount to 1 million miles and their expenditures on equipment and services are estimated to be about $850,000 in one year. If all these riders purchased their goods in Salt Lake County, a total output of around $1.87 million; 11 jobs; and $470,000 in Salt Lake County based income would occur. If the equipment and goods were purchased in Washington County, total output would be slightly less - $1.79 million and job creation would be slightly higher with about 14 jobs created.

[20] Small manufacturer of bike racks may account for this multiplier. Please note that this may be overstating the local effect as a significant portion of the racks are likely sold outside of Morgan County and/or Utah.

[21] The average annual distance of bicycle riders in Utah is 547 miles, calculated by multiplying 1.5 miles a day (NHTS, 2009) by 365 days a year.

Table 11: Equipment and Service Spending

	Total Multipliers per $ of Equipment and Service Spending		
Selected Counties	**$ Total Output**	**# of Jobs Per $Million**	**$ Income**
Morgan	1.78	19.31	0.20
Salt Lake	2.21	12.92	0.56
Summit	1.79	10.44	0.39
Washington	2.11	16.97	0.40
Weber	1.84	14.40	0.37
	Sample Analysis Assumptions: $0.85 in Spending per Mile, and 1 Thousand Miles		
Selected Counties	**$Total Output ($Thous.) per Thous. Rider-Miles**	**# of Jobs per Thous. Rider-Miles**	**$Income ($Thous.) per Thous. Rider-Miles**
Morgan	$1.51	0.016	$0.17
Salt Lake	$1.87	0.011	$0.47
Summit	$1.51	0.009	$0.33
Washington	$1.79	0.014	$0.34
Weber	$1.56	0.012	$0.31

5.4 Tourism

5.4.1 Overview of Analysis

Cycling is an activity that can prompt day and overnight trips by individuals from both Utah and other states. Cycling-related tourism includes individual and organized trips and active transportation events (e.g., bike races, gran fondos, and centuries). When traveling, cyclists purchase a variety of goods and services including food and drinks, hotel lodging, fuel, and other miscellaneous items. Data on participants at cycling events along with daily spending patterns of riders provides a reasonable approximation of how day and overnight visitors contribute to the local economy.

The analysis of economic impacts in this report is based on direct spending on travel expenditures related to goods and services that visitors purchase while traveling, (e.g., food, fuel, lodging, and other minor miscellaneous items). Travel expenditure data, as discussed above (see Table 5) is derived from findings from a survey of visitors to sites in Utah by TNS Global (2014) (53). Overall, the study found that 28% of trips last one day and entail under $35 in expenditures on food, transportation, entertainment, shopping, and other amenities. Overnight stays are nearly 3 times larger in number and incur $181.81 in costs per person on average after adding in lodging.

Spending on bicycle-related goods is excluded because these expenditures are captured in the equipment and miscellaneous goods category, as discussed above. Other expenditures that are included in the analysis amount to $183, after adjusting to (2016$). However, this amount includes lodging and not all visitors stay the night when they travel for cycling purposes. Accordingly, the economics of overnight and day visitors are evaluated separately. Data on the proportions of total costs for overnight trips are shown in Table 5.

Economic impacts for tourism-related expenditures by applying the total spending and proportion by sector for day and overnight visitors, respectively with the following assumptions:

- Lodging expenditures (overnight only) were split 50/50 between IMPLAN® sectors 499 hotels and motels, including casino hotels and 500 other accommodations.
- Food spending is split equally among four IMPLAN® sectors: 501 full service restaurants, 502 limited service restaurants, 503 all other food and drinking places, and 400 grocery stores.
- Transportation expenditures are assumed to be primarily on fuel and are allocated to IMPLAN® sector 402 retail gasoline stores.
- To calculate a total multiplier, the proportion of spending on each impact category in Table 12 and Table 13 along with the proportion of each itemized expenditures allocation across the specific IMPLAN® sectors was used to calculate a composite multiplier for each county.
- Composite multipliers in the sample analysis generated total output ($), total number of jobs (per million dollars of direct output), and income ($) in direct spending per person.

5.4.2 Results

Results from the economic impact analysis of day and overnight trips are presented in Table 12 and Table 13. The output, jobs, and income multipliers per dollar spent are similar in magnitude between overnight and day trips, with some counties having higher multipliers for day and others for overnight, and vice versa. The multipliers are also similar in magnitude to those observed for equipment sales and service, as discussed in Table 11. The similarities in multipliers across these sectors would reflect a common level of reliance on goods and service from outside the county.

The lower sets of results in Table 12 and Table 13 reflect the total economic impacts per thousand trips. The most important difference between overnight and day trips is on the economic impact per trip. Among these counties, Salt Lake County would generate the highest level of output for every thousand overnight visitors, at over $352 thousand – an amount that is more than 10 times the value of a similar number of day visitors. More than four jobs are produced from the thousand visitors, and these persons are paid a combined amount of about $144 thousand.

Washington County is home to Zion National Park, other tourist destinations, and a large annual road race. With an economy that has a strong tourism focus, Washington County is able to retain a high level of output and jobs from tourism spending, especially for overnight visitors: $320 thousand in output; 4.5 jobs; $112 thousand in wages for each one thousand overnight visitors.

Table 12: Tourism Expenditures – Overnight Trips

	Total Multipliers per $ of Direct Spending - Overnight Trips		
Selected Counties	**$ Total Output**	**# of Jobs Per $Million**	**$ Income**
Morgan	1.22	20.05	0.39
Salt Lake	1.95	22.40	0.79
Summit	1.53	18.45	0.67
Washington	1.76	24.86	0.62
Weber	1.59	23.08	0.60
	Sample Analysis Assumptions: $182 in Spending per Overnight Trip, and 1,000 Overnight Trips		
Selected Counties	**$ Total Output per Million Overnight trips**	**# of Jobs per Million Overnight trips**	**$ Income per Million Overnight trips**
Morgan	$221.50	3.64	$70.67
Salt Lake	$355.44	4.07	$144.12
Summit	$278.74	3.35	$121.53
Washington	$320.28	4.52	$111.95
Weber	$288.20	4.20	$109.72

Table 13: Tourism Expenditures – Day Trips

	Total Multipliers per $ of Direct Spending - Day Trips		
Selected Counties	**$ Total Output**	**# of Jobs Per $Million**	**$ Income**
Morgan	1.41	19.88	0.34
Salt Lake	2.06	19.09	0.75
Summit	1.62	15.90	0.61
Washington	1.81	21.31	0.53
Weber	1.60	18.76	0.55
	Sample Analysis Assumptions: $35 in Spending per Day trip, and 1,000 Day Trips		
Selected Counties	**$ Total Output ($Thous.) per Thousand Day trips**	**# of Jobs per Thousand Day trips**	**$ Income ($Thous.) per Thousand Day trips**
Morgan	$49.01	0.69	$11.97
Salt Lake	$71.41	0.66	$26.02
Summit	$56.20	0.55	$21.02
Washington	$62.80	0.74	$18.58
Weber	$55.43	0.65	$19.00

5.5 Healthcare

5.5.1 Overview of Analysis

Physical activity from active transportation reduces disease risk and associated healthcare expenditures. Reduced healthcare expenditures likely accrue regardless of baseline physical activity level. However those who are currently inactive are most likely to see significant health impacts and thus decreased healthcare costs. This analysis is focused on the healthcare expenditure cost savings for those who are currently not meeting physical activity recommendations. Specifically, physical activity recommendations define insufficient activity as less than 150 minutes of moderate to vigorous physical activity a week. In 2015, 20.6% of Utah adults reported zero recreational physical activity; an additional 23.8% reported less than the weekly recommended 150 minutes (57).

Active, Insufficiently Active, or Inactive?

The U.S. Surgeon General recommends at least 150 minutes of physical activity each week. Public health surveillance surveys and research coordinate with this recommendation. Those who report **no physical activity are labeled as inactive. 20.6% of Utah adults fall into this category** (BRFSS, 2015).

Those who report **between one and 149 minutes are labeled as insufficiently active. In 2015, 23.8% of Utah adults reported being insufficiently active**.

In this and the next section, the relative proportion of insufficiently active and inactive adults are weighted as appropriate by county and combined to calculate a single "per mile" factor for anyone who is active less than 150 minutes per week (labeled as less than active). **This analysis estimates that across Utah, a less than active person annually spends $3.07 less on healthcare for every additional mile walked and $0.749 for every additional mile biked.** Health district specific estimates are also shown in Table 14. The magnitude of decreased spending on healthcare represents the health benefits of moving towards achieving the recommended levels. A similar approach is used in the next section for worker productivity.

While these predictions were created for those reporting less than 150 minutes of physical activity a week, physically active individuals participating in walking and biking are also expected to accrue health benefits and thus fewer healthcare expenditures, albeit at a lower rate than inactive individuals.

The economic impact analysis of healthcare costs relies on an analysis of the monetary value of reduced annual costs for medical care on a dollar per person-mile basis. After removing individuals who cannot participate in physical activity due to difficulty with walking, one recent study concluded that individuals reporting no physical activity have, on average, an additional $1,061 (2016$) of healthcare expenditures annually (58)[22]. A person who is active, but not enough to meet

[22] While this analysis uses Carlson et al (2015), similar examples exist in the literature. See for example Katzmarzyk PT, Janssen I. The economic costs associated with physical inactivity and obesity in Canada: An update. Canadian Journal of Applied Physiology-Revue Canadienne De Physiologie Appliquee. 2004;29(1):90-115.

the U.S. Surgeon General's recommendations (an insufficiently active person) – or someone who gets between 1 and 149 minutes of physical activity a week – pays an additional $630 (2016$) annually(58).

The average number of miles walked or biked that would be required for inactive and insufficiently active individuals to meet current physical activity recommendations was calculated, adjusting for the ratio of insufficient and inactive in each Utah health district. Using the costs of physical inactivity from Carlson et al (2015) and the assumption of 3 miles per hour for walking and 12 miles per hour for biking, a "per mile" healthcare expenditure reduction factor was calculated. These results are provided in Table 14, organized by Utah Department of Health defined health districts.

Table 14: Healthcare Expenditure Avoided per Person-mile for an Individual Not Currently Meeting Physical Activity Recommendations

		Prevalence Rates of Physical Activity from 2015 BRFSS			Annual Healthcare Expenditure Avoided (2016$) per Person-mile[2]	
Health District	**Counties within Heath District**	**150+ minutes**	**No leisure time activity**	**1-149 minutes of activity[1]**	**Biked**	**Walked**
Bear River	Box Elder, Cache, Rich	54.8%	21.1%	24.1%	$0.748	$2.99
Central	Juab, Millard, Sanpete, Sevier, Piute, Wayne	49.4%	24.0%	26.6%	$0.747	$2.99
Davis County	Davis	57.6%	19.6%	22.8%	$0.749	$3.00
Salt Lake County	Salt Lake County	55.3%	19.8%	24.9%	$0.751	$3.01
San Juan (2015+)	San Juan	Insufficient Data			Use State Average	
Southeast (2015+)	Beaver, Iron, Washington, Garfield, Kane	69.3%	17.8%	12.9%	$0.734	$3.04
Summit	Summit	69.9%	17.4%	12.7%	$0.734	$3.04
Tooele	Toole	46.0%	25.8%	28.2%	$0.747	$3.07
TriCounty	Daggett, Duchesne, Uintah	51.5%	26.5%	22.0%	$0.738	$3.05
Utah County	Utah County	58.2%	18.1%	23.7%	$0.753	$3.08
Wasatch	Wasatch	56.2%	20.7%	23.1%	$0.748	$3.07
Weber-Morgan	Weber, Morgan	53.6%	22.1%	24.3%	$0.747	$3.07
State of Utah		**55.6%**	**20.6%**	**23.8%**	**$0.749**	**$3.07**

(1) Calculated as (100% - (150 or more minutes + no leisure time activity)
(2) Annual expenditure avoided for an individual not currently meeting physical activity recommendations of 150 minutes per week
Sources: Carlson et al. (2015)

Healthcare cost savings impact the economy by diverting spending from healthcare to other sectors. For individuals who increase their physical activity by walking or biking, any reduction of healthcare expenditures is reflected in reduced out-of-pocket healthcare costs, and reductions in

health insurance premiums from which employers and employees would benefit, as well as reductions in government healthcare insurance provision such as Medicare and Medicaid. Guided by 2015 data from the Centers for Medicare and Medicaid Services (60) regarding current split of healthcare expenditures between households, employers, and government, savings in healthcare expenditures were reallocated within IMPLAN® as follows:

- 21 percent of total reduced spending by businesses per employee, was transferred to increased output (via lower production costs);
- 31 percent of total reduced federal spending by government per user, was transferred to other federal spending, potentially outside of Utah;
- 18 percent of total reduced spending by state and local agencies per user, was transferred to other public spending within UT; and,
- 30 percent of reduced spending by households was transferred to general household spending in other areas.

IMPLAN® multipliers were developed for reduced spending by businesses per employee and household spending categories. For reduced spending by businesses as a result of lower healthcare premiums, an average multiplier for all sectors was developed for each county using the IMPLAN® base data. Changes in household spending utilized IMPLAN® internal household spending patterns, organized in $10,000 household income increments. Multipliers were developed by evaluating how one dollar is spent at the median household income spending category. For federal and state spending categories, it is assumed that spending reductions in Medicare and Medicaid due to improved health is transferred to other federal and state spending priorities in the county. Thus, from a county perspective, this assumes that the county economy is unaffected because health spending is diverted from people who need it less because of walking or cycling to other county spending priorities.

5.5.2 Results

The results of reduced health care spending are presented in Table 15. One way to interpret the direct spending multipliers in the upper part of the table is as the differences in spending on healthcare and other household goods and services. For example, in Summit County, the multiplier of less than one means other household expenditures contribute less to the economy than medical care spending.

Despite the fact that reduced healthcare expenditures can slightly shrink the economy, fewer healthcare expenditures result in a net increase in jobs and associated income. Across the five selected

Interpreting Economic Gains from Healthcare Expenditures

The average Utah resident cycles 547 miles per year (National Household Travel Survey, 2009).

The bottom half of Table 15 illustrates how to apply the healthcare expenditure driven economic output to 1,000 additional miles ridden. This is the approximate equivalent of two individuals who currently are not active enough to meet the recommended 150 minutes of physical activity each week taking up cycling at the rate of 9.6 miles – or 48 minutes – a week.

For instance, in Salt Lake County, the healthcare expenditure savings from these two previously less than active people riding at this rate would be expected to result in an increase of $900 in sales output, 0.002 jobs, and $550 in wage related income.

counties, approximately three jobs are created for every $1 million in reduced healthcare expenditures because the reductions are diverted into other household goods and services that are more labor intensive than the healthcare industry. Similarly, the income category within a county reflects wages associated with the additional jobs. However, since medical jobs are high-paying jobs, the multiplier for non-medical job wages is between 60 percent and 70 percent of what would have been earned by spending on medical services.

The lower set of results in Table 15 indicate the magnitude of healthcare savings from one thousand additional miles ridden by those currently not meeting physical activity recommendations. The results indicate that approximately $900 in economic stimulus would be generated by an additional one thousand miles ridden in Salt Lake County. In Morgan County, economic output would be lower due to the diversion of spending from medical care – which appears to happen at a greater rate within the county - to household goods spending outside the county. Health expenditure savings would also contribute to jobs – about two jobs for every one million miles ridden in most counties.

Table 15: Healthcare Cost Savings - Cyclists

	Total Multipliers per $ increase in HH Income (Composite) - Cyclists		
Selected Counties	**$ Total Output**	**# of Jobs Per $Million**	**$ Income**
Morgan	0.89	2.87	0.58
Salt Lake	1.20	2.83	0.73
Summit	0.98	2.71	0.64
Washington	1.12	3.56	0.66
Weber	1.03	2.58	0.65
	Sample Analysis Assumptions: Cyclist - Healthcare Cost Savings per Mile, and 1 Thous. Miles		
Selected Counties	**$Total Output ($Thous.) per Thousand User-Miles**	**# of Jobs per Thousand User-Miles**	**$Income ($Thous.) per Thousand User-Miles**
Morgan	$0.67	0.002	$0.43
Salt Lake	$0.90	0.002	$0.55
Summit	$0.72	0.002	$0.47
Washington	$0.82	0.003	$0.49
Weber	$0.77	0.002	$0.49

Similar results associated with inactive individuals walking are provided in Table 16. Note that the economic impact multipliers are the same for pedestrians and cyclists, because the same industries are affected independent of activity. However, the economic impacts *per mile* for walking are significantly higher than cycling. This is because a moderate walking pace is assumed to be 3 miles per hour versus 12 miles per hour for cycling. Thus walking impacts are about 4 times the magnitude of the cycling impacts for the same number of miles. For example, in Salt Lake County, walking by inactive individuals generates a total output value in healthcare savings of about $3.63 thousand compared to $0.9 thousand for cycling the same number of miles.

Table 16: Healthcare Cost Savings - Pedestrians

	Total Multipliers per $ increase in HH Income (Composite) - Pedestrians		
Selected Counties	**$ Total Output**	**# of Jobs Per $Million**	**$ Income**
Morgan	0.89	2.87	0.58
Salt Lake	1.20	2.83	0.73
Summit	0.98	2.71	0.64
Washington	1.12	3.56	0.66
Weber	1.03	2.58	0.65
	Sample Analysis Assumptions: Pedestrian Healthcare Cost Savings per Mile, and 1 Thous. Miles		
Selected Counties	**$Total Output ($Thous.) per Thousand User-Miles**	**# of Jobs per Thousand User-Miles**	**$Income ($Thous.) per Thousand User-Miles**
Morgan	$2.74	0.009	$1.77
Salt Lake	$3.63	0.009	$2.19
Summit	$2.98	0.008	$1.95
Washington	$3.40	0.011	$2.01
Weber	$3.16	0.008	$2.00

5.6 Reduced Employee Absenteeism

5.6.1 Overview of Analysis

In addition to individual medical cost savings, businesses also benefit from an increase in employee productivity from reduced illness attributable to increased physical activity. Those who are not active at least 150 minutes each week miss on average 0.63 days of work each year (61). Using the same methodology for avoided healthcare expenditures, the number of fewer absentee days by an inactive person for each health district are normalized on a “per mile walked” and “per mile biked” basis (

Table 17). The results were then used in the IMPLAN® model across all industries to determine the wider economic impact. IMPLAN® is then used to compute each worker's daily productivity (output per worker per day), which in turn is combined with IMPLAN® multipliers, and number of absentee days not taken to estimate total impacts.

The estimated absentee reduction value per rider mile is based on the output per employee per day and the annual absentee days not taken per mile. The output per employee per day is the IMPLAN® generated industry output per employee divided by the number of days worked, assumed 250 days annually.

Table 17: Annual Absentee Day Not Taken per Person-mile for an Individual Not Currently Meeting Physical Activity Recommendations

		Annual Absentee Days Not Taken per Mile	
Health District	**Counties within Heath District**	**Biked**	**Walked**
Bear River	Box Elder, Cache, Rich	0.0005506	0.0022026
Central	Juab, Millard, Sanpete, Sevier, Piute, Wayne	0.0005478	0.0021914
Davis County	Davis	0.0005524	0.0022094
Salt Lake County	Salt Lake County	0.0005597	0.0022390
San Juan (2015+)	San Juan	Use State Average	
Southeast (2015+)	Beaver, Iron, Washington, Garfield, Kane	0.0005903	0.002361
Summit	Summit	0.0005906	0.002362
Tooele	Toole	0.0006099	0.002440
TriCounty	Daggett, Duchesne, Uintah	0.0005963	0.002385
Utah County	Utah County	0.0006198	0.002479
Wasatch	Wasatch	0.0006110	0.002444
Weber-Morgan	Weber, Morgan	0.0006102	0.002441
State of Utah		**0.0006128**	**0.002451**

Source: Asay et al. (2016)

5.6.2 Results

Economic impact analysis results of increased productivity are presented in Table 18. The total economic impact multipliers in the upper part of the table are significantly larger than those related to diverted healthcare spending in Table 15. The impact on jobs from productivity is significantly larger than a diversion in health care spending, but income increases are somewhat smaller. Similar to comments discussed above, differences in multipliers between counties are reflective of differences in economic structures in those counties, and the ability of indirectly affected businesses to provide competitive goods and services. In this case, changes in absenteeism reflect an economy-wide expansion of output.

These results are illustrated by estimated economic benefits for an increase in each one thousand miles traveled by inactive individuals. For example, an additional one thousand miles cycled by inactive individuals in Salt Lake and Washington Counties would expand production by more than $0.60 thousand and generate 0.004 additional jobs (

Table 18). Total income in Salt Lake County would expand over $0.23 thousand and over $0.16 thousand in Weber County.

Similar to reduced healthcare spending, the economic impact multipliers are the same for pedestrians and cyclists, and impacts per mile for walking are much larger than that for cycling. If 6,410 individuals of the 306,880 adults ages 18-64 in Salt Lake County who report less than 150 minutes of physical activity a week started walking 3 miles or 1 hour a week, 16.8 jobs, $2.6 million in economic output, and $0.9 million in income would be produced from reduced absenteeism.

Table 18: Reduced Employee Absenteeism - Cyclists

	Total Multipliers per $ increase in HH Income - Cyclists		
Selected Counties	**$ Total Output**	**# of Jobs Per $Million**	**$ Income**
Morgan	1.36	11.31	0.32
Salt Lake	1.79	11.12	0.60
Summit	1.46	10.58	0.46
Washington	1.65	14.61	0.45
Weber	1.44	9.97	0.42
	Sample Analysis Assumptions: Cyclist - Reduction in Sick Days per Mile, and 1 Thous. Miles		
Selected Counties	**$Total Output ($Thous.) per Thousand User-Miles**	**# of Jobs per Thousand User-Miles**	**$Income ($Thous.) per Thousand User-Miles**
Morgan	$0.49	0.003	$0.10
Salt Lake	$0.65	0.004	$0.23
Summit	$0.53	0.003	$0.15
Washington	$0.60	0.004	$0.12
Weber	$0.52	0.004	$0.16

Table 19: Reduced Employee Absenteeism - Pedestrians

	Total Multipliers per $ increase in HH Income - Pedestrians		
Selected Counties	**$ Total Output**	**# of Jobs Per $Million**	**$ Income**
Morgan	$1.36	11.31	$0.32
Salt Lake	$1.79	11.12	$0.60
Summit	$1.46	10.58	$0.46
Washington	$1.65	14.61	$0.45
Weber	$1.44	9.97	$0.42
	Sample Analysis Assumptions: Pedestrian - Reduction in Sick Days per Mile, and 1 Thous. Miles		
Selected Counties	**$Total Output ($Thous.) per Thousand User-Miles**	**# of Jobs per Thousand User-Miles**	**$Income ($Thous.) per Thousand User-Miles**
Morgan	$1.98	0.014	$0.39
Salt Lake	$2.61	0.017	$0.91
Summit	$2.13	0.014	$0.60
Washington	$2.41	0.016	$0.49
Weber	$2.09	0.015	$0.65

5.7 Summary

Table 20 summarizes the multipliers from each of the spending categories and selected counties reported above. This table enables multipliers in different sectors and counties to be more easily compared. For example, Salt Lake County multipliers are among the largest for all types of spending and economic impact indicators, mostly due to it having the largest and most diversified economy. Washington County generates a significant level of output and jobs, especially from day and overnight trips because its economy is oriented for tourism activities. Washington County output, income, and job multipliers would be high for construction and operation and maintenance (O&M) spending because construction labor and materials would be sourced from within the county. These observations are just a few of those that can be made about the economic conditions that lead to differences in impact multipliers in different counties. A more detailed assessment of the reasons for differences between counties is beyond the scope of this effort. The discussion in this report has identified some of the reasons for differences among these five counties, and can be used for similar reasoning about other counties.

Table 20: Summary of Economic Multipliers

	$ Total Output per $ Spent						
Selected Counties	**Capital Construction**	**Facility Maintenance**	**Equipment and Service**	**Tourism - Day Trips**	**Tourism - Overnight Trips**	**Health Care Spending**	**Reduced Absenteeism**
Morgan	1.33	1.35	1.78	1.41	1.22	0.89	1.36
Salt Lake	1.78	1.85	2.21	2.06	1.95	1.20	1.79
Summit	1.41	1.43	1.79	1.62	1.53	0.98	1.46
Washington	1.62	1.59	2.11	1.81	1.76	1.12	1.66
Weber	1.41	1.51	1.84	1.60	1.59	1.03	1.44

	# of Jobs per $Million						
Selected Counties	**Capital Construction**	**Facility Maintenance**	**Equipment and Service**	**Tourism - Day Trips**	**Tourism - Overnight Trips**	**Health Care Spending**	**Reduced Absenteeism**
Morgan	8.51	10.36	19.31	19.88	20.05	2.86	11.31
Salt Lake	10.14	12.44	12.92	19.09	22.40	2.82	11.11
Summit	8.35	10.42	10.44	15.90	18.45	2.70	10.53
Washington	11.36	13.81	16.97	21.31	24.86	3.55	14.58
Weber	9.27	12.11	14.40	18.76	23.08	2.58	9.94

	$ Income per $ Spent						
Selected Counties	**Capital Construction**	**Facility Maintenance**	**Equipment and Service**	**Tourism - Day Trips**	**Tourism - Overnight Trips**	**Health Care Spending**	**Reduced Absenteeism**
Morgan	0.47	0.41	0.20	0.34	0.39	0.58	0.32
Salt Lake	0.64	0.57	0.56	0.75	0.79	0.73	0.60
Summit	0.52	0.46	0.39	0.61	0.67	0.64	0.46
Washington	0.45	0.41	0.40	0.53	0.62	0.66	0.45
Weber	0.49	0.41	0.37	0.55	0.60	0.65	0.42

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6 Case Study Analyses

6.1 Economic Impact of Murdock Canal Trail

6.1.1 Overview of Data

The Murdock Canal Trail case study is an example of how the IMPLAN® multipliers generated through this analysis can be applied to actual costs associated with construction, maintenance, estimated expenditures, and healthcare savings for a project in Utah County.

The trail construction and annual maintenance costs used for the Murdock Canal Trail case study analysis were approximately $1 million[23] per mile and $6,300 per mile, respectively.[24] The Murdock Canal Trail is 18 miles long and connects the Provo River trail (15 miles) and will shortly connect to the Jordan River trail (10 miles in Utah County, with another 45 miles to Salt Lake and Davis County). The trail analyzed here is the backbone of the trail system.

Utah County based multipliers from IMPLAN® were used to estimate indirect and induced effects (See Table 21 for Utah County and Appendix A for other counties). These multipliers were applied in calculations to determine total economic impacts for the construction and annual maintenance of the trail and the continuing annual economic impacts of users. Because the Murdock Canal Trail is an off-street multi-use trail, the employment and income multipliers were increased an additional 23 percent for capital construction and facility maintenance impacts because this is a separated off-road facility (see discussion of adjustment factors prior to Table 8).

Table 21: Utah County Multipliers -- Economic Impact of Construction and Use of Murdock Canal Trail

Multipliers per $ of Spending by Type	$ Total Output	# of Jobs per $1 mil.	$ Income
Capital Construction Spending	1.49	13.03	0.45
Annual O&M Spending	1.55	14.97	0.51
Equipment and Maintenance Spending	2.07	14.98	0.43
Annual Healthcare Savings	1.10	2.96	0.68
Annual Reduced Absenteeism	1.62	11.76	0.50

Additional assumptions are as follows:

- Monthly trail counts for the Murdock Canal Trail in 2014 and 2015 were provided by Mountainland Association of Governments. These counts were annualized and averaged over the two years for a total of 848,214 annual riders.
- The direct impact per annual rider mile was calculated based on the average annual spending per person of $463 (2016$) (55) and an assumption of an average of 547 miles per year(56). This is the equivalent of $0.85 in direct equipment and service spending per annual rider mile.

[23] Murdock Canal trail development included the trail itself; six trailheads and rest stations; and 10 under-crossings (one was 180 ft. long). Annual maintenance is approximately $6,300/mile.
[24] Capital construction and O&M costs were provided by Jim Price, of the Mountainland Association of Governments.

- With respect to healthcare benefits, it is assumed (since no information is currently available) that 20% of users are currently getting less than 150 minutes a week of physical activity and would thus realize health gains and associated decreased healthcare expenditures and increased productivity. As outlined in Section 5.5.1, a previously less than active resident of Utah County is predicted to avoid $0.753 in annual healthcare expenditure per mile. A value of $0.0062 in absentee reduction value per rider mile was also used.

6.1.2 Results

The economic impact of the Murdock Canal Trail is presented in in Table 22. Economic outcomes associated with one-time construction costs of $18 million include a total of $26.8 million of sales output, resulting in an estimated 234 jobs during construction.

Table 22: Estimated Economic Impact of Construction and Use of Murdock Canal Trail

Economic Impact Category (Direct Spending Level)	$ Total Output ($M)	# of Jobs	$ Income ($M)
One-time Spending - Capital Construction ($18 million)	$26.82	234.5	$8.09
Annual Spending			
Annual Facility Maintenance ($113,400)	$0.18	1.70	$0.06
Equipment and Spending ($1,076,000)	$2.22	16.13	$0.46
Annual Healthcare Savings ($636,100)	$0.70	1.89	$0.43
Annual Reduced Absenteeism ($307,000)	$0.50	3.60	$0.15
Total Annual Impact	$3.60	23.31	$1.10

Additional economic benefits result from maintaining the trail. Annual operation and maintenance (O&M) of the trail costs $113,400, resulting in $180,000 annually in overall output, nearly two jobs, and combined wages of $60,000. Spending on equipment and service by more than 848,000 users results in an additional $2.22 million in output every year. Health impacts for nearly 170,000 users (20% of total) who are assumed to be newly active generate $700,000 in output from diverted healthcare spending and $500,000 in total economic impacts from increased productivity (due to fewer sick days). In total, the annual economic impact of the trail is estimated to be over $3.6 million in output, 23.31 jobs, and $1.1 million in income to those workers.

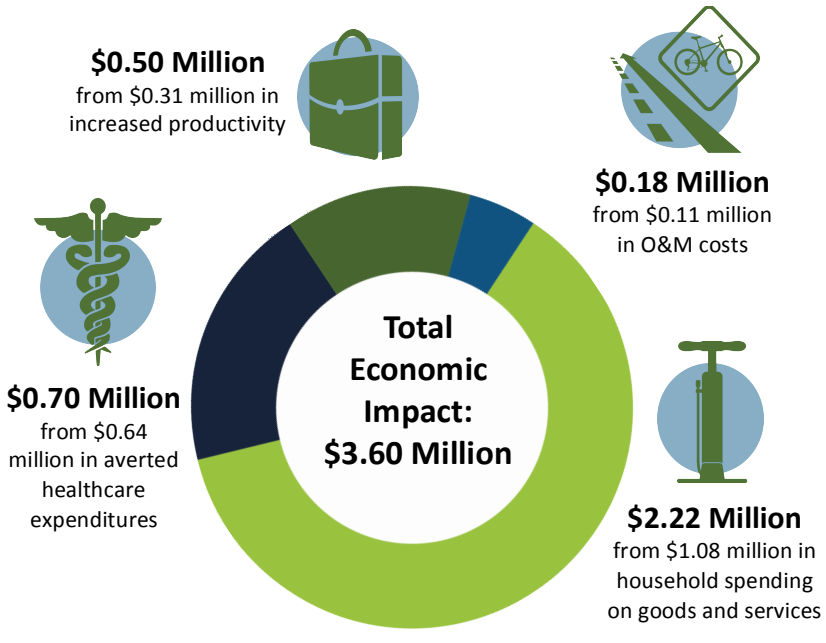

Figure 7. Annual Economic Impact of Murdock Canal Trail

6.2 Economic Impacts of Dead Horse Point State Park Off-Road Trails

6.2.1 Overview of Data

This section discusses details on the analysis of direct impacts from infrastructure and spending profiles of trail users in Moab, and specifically at Dead Horse Point State Park. The analysis includes both direct expenditures for cycling equipment made by local county residents and visitors to the county. Additional expenditures made by visitors to the county related to goods and services purchased while traveling (e.g., food, fuel, lodging, and other minor miscellaneous items) are also included. Note that healthcare impacts are conservatively not included because the total activity levels achieved during a single trip are not, by themselves, enough to generate sustained health benefits.

Table 23 shows the multipliers used in computing total economic impacts for this example and refer directly to Grand County (See Appendix A). These multipliers were applied in calculations to determine total economic impacts for the construction and the continuing annual maintenance of the trail and economic impacts of users.

Table 23: Grand County Multipliers - Economic Impact of Construction and Use of Off-Road Trails

Total Multipliers per $ Spent	$ Total Output	# of Jobs per $1 mil.	$ Income
Capital Construction Spending	1.36	11.69	0.36
Equipment and Maintenance Spending – All Trips	1.54	12.65	0.31
Travel Costs - Day Trips	1.56	19.11	0.46
Travel Costs - Overnight Trips	1.53	21.80	0.58

Additional data used for assumptions is as follows:

- The Discover Moab website includes information on off-road biking at Dead Horse Point State Park[25]. This site indicates that 8.5 miles of trail were recently completed for a cost of approximately $20,000, or about $2,300/mile – a cost that is consistent with other rough estimates available in the region for off-road trails.
- Headwaters Economics published "The Economic Value of Public Lands in Grand County, Utah" in 2011 and later updated it in 2015(62). The report looked at the economic and fiscal role of public lands in the county and identified 333,489 annual visitors to Dead Horse Point State Park in 2014[26]. Additional data on visitors indicated that that 17% of visitors to Moab participated in cycling (NVUM Moab, 2007). Using this figure for Dead Horse Point State park, an estimated 56,693 visitors focused on cycling.
- Based on data from TNS Global (2014), 28% of visitors could be classified as day-trips, and the remaining 72% are overnight visitors. Accordingly, the number of day trips was

[25] See: http://www.discovermoab.com/biking.htm

[26] Note that Bill Stevens of the Bureau of Land Management-Moab and Headwaters Economics in 2012 conducted an IMPLAN analysis that provided the economic impact of direct spending in Grand County, Utah. Mr. Stevens identified several previous reports prepared by Headwaters Economics and BLM Moab as references for sourcing spending profiles for trail users in Grand County, Utah.

estimated to be around 16,000 and the estimated number of overnight trips was about 40,000 (53).

- Spending profiles for day and overnight trips from TNS Global (2014) were used. (See Table 5.) (53)

6.2.2 Results

The economic impacts of the new trails constructed at Dead Horse Point State Park are presented in Table 24. Construction costs of $20,000 generated a one-time benefit of $30,000 in output, 0.3 jobs, and $10,000 in income.

Spending patterns of visitors though would have a sizable and ongoing impact. Equipment and maintenance spending would lead to $6.8 million in output and support over 48 jobs. Other types of spending on lodging and food and transportation would support approximately another 10.5 and 161.8 jobs by day and overnight visitors, respectively, each year. In total, the annual economic impact of trail users leads to $19.1 million in output, over 220 jobs, and about $5.7 million in income.

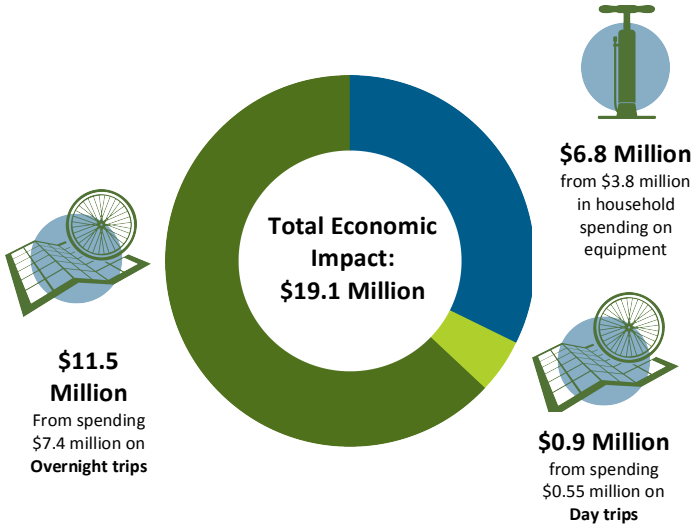

Figure 8 - Annual Impact of Dead Horse Point State Park Bike Trails

Table 24: Economic Impact of Construction and Use of Off-Road Trails

Economic Impact Category (Direct Spending Level)	$ Total Output ($M)	# of Jobs	$ Income ($M)
One-Time Capital Construction Spending ($20,000)	$0.03	0.2	$0.01
Annual Spending			
Equipment and Gear – Overnight Trips ($3,840,000)	$6.8	48.6	$1.2
Travel Costs – Day Trips ($551,300)	$0.9	10.5	$0.3
Travel Costs – Overnight Trips ($7,421,400)	$11.5	161.8	$4.3
Total Annual Impact	$19.1	220.9	$5.7

7 Conclusions

This study and two case studies have demonstrated that significant economic impacts can arise from the construction and maintenance of active transportation facilities and the use of these facilities, contributing to job growth and spending from the wages associated with those jobs. Utahans can also experience economic benefits from improved health due to bicycling and walking.

Some key takeaway points are listed below.

- Active transportation infrastructure investment can result in more indirect and induced spending per construction dollar spent than road construction projects because active transportation construction projects are more labor and less capital and material intensive;
- Annual operations and maintenance spending spurs indirect and induced spending as well. While the operation and maintenance multipliers are often slightly higher than construction, the scale of maintenance spending is a fraction of initial construction investment;
- Expenditures for equipment and gear related to cycling, and related tourism spending can be considerable.
    - Direct sales in cycling-related businesses are $132 million; and after accounting for indirect and induced effects, the economic impact was $303.9 million, nearly 2,000 jobs, and over $46 million in income in 2015.
    - Direct sales form cycling-related tourism generates over $61 million and supports over 1,000 direct jobs. After accounting for indirect and induced effects, the economic impact of cycling related tourism is $122 million in output, nearly 1,500 jobs and $46.7 million in income.
    - While active transportation users are located throughout the state, the economic impacts of these expenditures are limited to the counties where the related shops and services are located;
- Nearly 45% of Utahans get less than the recommended 150 minutes per week of physical activity, and these individuals could save $3.07 in annual healthcare costs for every mile they walk or $0.75 for every mile they bike;
    - Those who are not active at least 150 minutes each week miss on average 0.63 days of work each year (61).
    - If 6,410 individuals of the 306,880 adults ages 18-64 in Salt Lake County who report less than 150 minutes of physical activity a week started walking 3 miles or 1 hour a week, 16.8 jobs, $2.6 million in economic output, and $0.9 million in income would be produced from reduced absenteeism.
- The statewide economic impact of cycling-related tourism generates over $122 million in annual revenue, 1,500 jobs, and $46 million in income earned;
- The Murdock Canal Trail in Utah County costs $113,000 annually to maintain; this generates over $3.6 million annually in economic impact. This is in addition to a one-time economic impact of $26 million and 234 jobs to build the trail.
- Bicyclists who visit Dead Horse Point trails while visiting Moab generate $19 million annually in economic impact (over $11 million from overnight trips).

This study provides a solid basis by which local transportation and public health agencies and their partners can evaluate current spending and plan future active transportation investments and programs. During the course of the study, several next steps were identified:

- **Continue to meet at least twice a year** to sustain multidisciplinary relationships and coordinate the use of this study and other efforts related to supporting active transportation in Utah. Members from the stakeholder committee developed as part of this project should continue to meet.
- **Articulate a communication plan** for the study results. In addition to a timeline, this should include target audiences, roles of stakeholders, key talking points, and additional required "products" to support discussions.
- **Develop statewide inventories of active transportation spending for both capital improvements and maintenance**. A cursory look through regional transportation plans and active transportation plans showed great variation in documentation of planned active transportation investments. Most plans specified strategies but fell short of articulating specific projects with projected costs. A statewide inventory of transportation projects and investments would (1) support an analysis of statewide economic impacts; (2) prompt economic analysis at the local level; and (3) support a better understanding of the relative impact of different facilities across the state.
    - **Integrate trail development in national and state parks into statewide inventories**. Visitors to national and state parks for biking in particular appear to be a significant economic driver, particularly for rural gateway regions. However, existing data specific to cycling is limited.
    - **Engage ski resorts** to capture and refine "off season" biking and recreation occurring at the resorts and supporting the economy.
- **Support and standardize data collection.**
    - **Intercept surveys, conducted while people are cycling/walking,** minimally should document mode, trip purpose, and approximate length/time of the trip. Approximate length and/or time of the current trip would help solidify "per mile" estimates and support more in-depth health modeling. Recreational trips should verify home zip code to understand regional draw. A simple set of recall questions (e.g., how many days did you engage in travel physical activity (PA) and recreation PA; average time per session) would also help identify the extent to which investments are drawing inactive travelers.
    - **Bike facility and sidewalk inventories** are important precursors to more rigorous study. Data should be collected in a consistent manner across the state with updates occurring routinely. Efforts are already underway to have consistent geographic information system (GIS) schema for bicycle infrastructure. Similar efforts should be made for sidewalk inventory.
    - **Consider cross-referencing health surveillance and travel surveys**. Any future iteration of the Utah Household Travel Survey and/or add-on sampling for Behavioral Risk Factor Surveillance Survey or National Household Travel Survey should consider integrating questions from the other discipline's survey. This would support modeling of health based on behavioral change in a consistent way.

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Appendix A. Multipliers by County

Table 25: Capital Construction Expenditures

	Total Multipliers per $ of Capital Construction Spending			Sample Analysis Assumptions: $0.75 Million per mile in Construction Costs; 10% Multiplier Adjustment		
County	$ Total Output	# of Jobs Per $Million	$ Income	$Total Output ($Thous.) per Mile	# of Jobs per Mile	$Income ($Thous.) per Mile
Beaver	$1.21	8.12	$0.31	$909	6.7	$253
Box Elder	$1.30	8.75	$0.34	$971	7.2	$281
Cache	$1.45	10.33	$0.37	$1,089	8.5	$303
Carbon	$1.40	8.61	$0.42	$1,046	7.1	$345
Daggett	$1.20	5.50	$0.55	$901	4.5	$456
Davis	$1.46	8.86	$0.45	$1,093	7.3	$368
Duchesne	$1.44	8.84	$0.41	$1,077	7.3	$340
Emery	$1.21	7.55	$0.33	$910	6.2	$269
Garfield	$1.32	10.25	$0.23	$988	8.5	$191
Grand	$1.36	9.46	$0.36	$1,023	7.8	$300
Iron	$1.39	10.50	$0.32	$1,039	8.7	$263
Juab	$1.22	8.21	$0.31	$914	6.8	$258
Kane	$1.26	10.39	$0.18	$943	8.6	$147
Millard	$1.33	9.82	$0.30	$994	8.1	$249
Morgan	$1.33	8.51	$0.41	$1,000	7.0	$338
Piute	$1.13	9.87	$0.12	$844	8.1	$95
Rich	$1.30	9.44	$0.30	$971	7.8	$246
Salt lake	$1.78	10.14	$0.57	$1,338	8.4	$474
San Juan	$1.26	8.44	$0.30	$942	7.0	$250
Sanpete	$1.34	10.14	$0.29	$1,007	8.4	$242
Sevier	$1.50	10.68	$0.33	$1,122	8.8	$272
Summit	$1.41	8.35	$0.46	$1,055	6.9	$378
Tooele	$1.27	8.31	$0.33	$954	6.9	$275
Uintah	$1.45	8.97	$0.41	$1,089	7.4	$342
Utah	$1.49	9.59	$0.45	$1,117	7.9	$371
Wasatch	$1.31	8.36	$0.37	$981	6.9	$306
Washington	$1.62	11.36	$0.41	$1,215	9.4	$339
Wayne	$1.19	8.72	$0.26	$894	7.2	$213
Weber	$1.41	9.27	$0.41	$1,055	7.7	$342

Table 26: Annual Facility Maintenance Expenditures

	Total Multipliers per $ of Annual Facility Maintenance Spending			Sample Analysis Assumptions: $6,300 per mile in Maint. Costs; 10% Multiplier Adjustment		
County	**$ Total Output**	**# of Jobs Per $Million**	**$ Income**	**$Total Output ($Thous.) per Mile**	**# of Jobs per Mile**	**$Income ($Thous.) per Mile**
Beaver	$1.23	10.24	$0.35	$7.74	0.06	$2.21
Box Elder	$1.31	11.19	$0.37	$8.26	0.07	$2.36
Cache	$1.48	13.23	$0.42	$9.34	0.08	$2.67
Carbon	$1.40	10.61	$0.45	$8.84	0.07	$2.83
Daggett	$1.18	5.74	$0.62	$7.41	0.04	$3.88
Davis	$1.58	11.36	$0.53	$9.96	0.07	$3.34
Duchesne	$1.41	10.65	$0.45	$8.89	0.07	$2.87
Emery	$1.25	9.64	$0.36	$7.90	0.06	$2.27
Garfield	$1.29	12.99	$0.25	$8.13	0.08	$1.60
Grand	$1.42	12.15	$0.42	$8.93	0.08	$2.63
Iron	$1.43	13.56	$0.37	$9.04	0.09	$2.30
Juab	$1.32	11.03	$0.37	$8.30	0.07	$2.34
Kane	$1.32	14.19	$0.20	$8.29	0.09	$1.27
Millard	$1.44	13.53	$0.37	$9.08	0.09	$2.33
Morgan	$1.35	10.36	$0.47	$8.52	0.07	$2.95
Piute	$1.09	12.51	$0.12	$6.89	0.08	$0.75
Rich	$1.37	12.89	$0.35	$8.60	0.08	$2.22
Salt lake	$1.85	12.44	$0.64	$11.68	0.08	$4.06
San Juan	$1.27	10.56	$0.34	$7.99	0.07	$2.13
Sanpete	$1.42	13.74	$0.34	$8.92	0.09	$2.13
Sevier	$1.55	14.00	$0.39	$9.76	0.09	$2.46
Summit	$1.43	10.42	$0.52	$8.99	0.07	$3.28
Tooele	$1.38	11.30	$0.40	$8.70	0.07	$2.53
Uintah	$1.45	11.08	$0.46	$9.16	0.07	$2.87
Utah	$1.55	12.12	$0.51	$9.77	0.08	$3.21
Wasatch	$1.36	10.65	$0.42	$8.58	0.07	$2.62
Washington	$1.59	13.81	$0.45	$10.01	0.09	$2.86
Wayne	$1.29	12.17	$0.29	$8.11	0.08	$1.81
Weber	$1.51	12.11	$0.49	$9.50	0.08	$3.10

Table 27: Equipment and Service Expenditures

	Total Multipliers per $ of Equipment and Service Spending			Sample Analysis Assumptions: $0.85 in Spending per Mile, and 1 Thousand Miles		
County	**$ Total Output**	**# of Jobs Per $Million**	**$ Income**	**$Total Output ($Thous.) per Thous. Rider-Miles**	**# of Jobs per Thous. Rider-Miles**	**$Income ($Thous.) per Thous. Rider-Miles**
Box Elder	1.55	13.49	0.27	$1.31	$0.01	$0.23
Cache	1.81	14.09	0.33	$1.53	$0.01	$0.28
Carbon	1.76	13.22	0.33	$1.49	$0.01	$0.28
Davis	1.92	14.37	0.39	$1.62	$0.01	$0.33
Grand	1.76	12.65	0.31	$1.49	$0.01	$0.26
Iron	1.92	17.25	0.31	$1.62	$0.01	$0.26
Morgan	1.78	19.31	0.20	$1.51	$0.02	$0.17
Salt Lake	2.21	12.92	0.56	$1.87	$0.01	$0.47
Summit	1.79	10.44	0.39	$1.51	$0.01	$0.33
Uintah	1.67	12.19	0.30	$1.41	$0.01	$0.25
Utah	2.07	14.98	0.43	$1.75	$0.01	$0.36
Wasatch	1.87	14.30	0.32	$1.58	$0.01	$0.27
Washington	2.11	16.97	0.40	$1.79	$0.01	$0.34
Weber	1.84	14.40	0.37	$1.56	$0.01	$0.31

Table 28 Tourism Expenditures – Day Trips

	Total Multipliers per $ of Direct Spending - Day Trips			Sample Analysis Assumptions: $35 in Spending per Day trip, and 1,000 Day Trips		
County	$ Total Output	# of Jobs Per $Million	$ Income	$ Total Output ($Thous.) per Thousand Day trips	# of Jobs per Thousand Day trips	$ Income ($Thous.) per Thousand Day trips
Beaver	0.67	11.78	0.27	$23.1	0.41	$9.5
Box Elder	0.73	12.02	0.32	$25.5	0.42	$11.2
Cache	1.69	19.65	0.51	$58.6	0.68	$17.7
Carbon	0.83	10.83	0.39	$28.7	0.38	$13.5
Daggett	0.65	14.04	0.23	$22.7	0.49	$8.1
Davis	1.60	17.98	0.56	$55.5	0.62	$19.5
Duchesne	1.38	18.50	0.39	$48.0	0.64	$13.6
Emery	0.71	12.05	0.29	$24.7	0.42	$10.0
Garfield	0.75	14.05	0.25	$26.1	0.49	$8.8
Grand	1.58	19.11	0.46	$54.9	0.66	$15.9
Iron	1.60	20.16	0.47	$55.7	0.70	$16.3
Juab	0.70	13.97	0.24	$24.4	0.49	$8.2
Kane	1.44	17.98	0.41	$50.1	0.62	$14.3
Millard	0.73	12.60	0.29	$25.4	0.44	$10.2
Morgan	1.41	19.88	0.34	$49.0	0.69	$12.0
Piute	0.63	12.88	0.23	$21.9	0.45	$8.1
Rich	0.74	13.59	0.26	$25.9	0.47	$9.1
Salt lake	2.06	19.09	0.75	$71.4	0.66	$26.0
San Juan	1.33	18.13	0.36	$46.3	0.63	$12.5
Sanpete	0.75	13.10	0.30	$26.1	0.45	$10.3
Sevier	0.77	12.78	0.32	$26.8	0.44	$11.1
Summit	1.62	15.90	0.61	$56.2	0.55	$21.0
Tooele	1.38	15.89	0.51	$48.0	0.55	$17.7
Uintah	1.45	17.52	0.47	$50.4	0.61	$16.2
Utah	1.84	19.35	0.62	$63.8	0.67	$21.5
Wasatch	1.61	20.05	0.44	$55.9	0.70	$15.2
Washington	1.81	21.31	0.53	$62.8	0.74	$18.6
Wayne	0.66	13.29	0.24	$22.9	0.46	$8.2
Weber	1.60	18.76	0.55	$55.4	0.65	$19.0

Table 29: Tourism Expenditures – Overnight Trips

	Total Multipliers per $ of Direct Spending - Overnight Trips			Sample Analysis Assumptions: $182 in Spending per Overnight Trip, and 1,000 Overnight Trips		
County	**$ Total Output**	**# of Jobs Per $Million**	**$ Income**	**$ Total Output per Million Overnight trips**	**# of Jobs per Million Overnight trips**	**$ Income per Million Overnight trips**
Beaver	1.09	19.22	0.42	$197.3	3.49	$77.1
Box Elder	1.19	20.08	0.49	$215.9	3.65	$88.7
Cache	1.61	22.98	0.59	$293.1	4.18	$107.6
Carbon	1.16	15.26	0.50	$211.4	2.77	$91.1
Daggett	1.07	22.10	0.38	$194.1	4.02	$68.9
Davis	1.59	23.59	0.58	$288.7	4.29	$105.5
Duchesne	1.39	22.33	0.49	$252.5	4.06	$89.7
Emery	1.17	19.15	0.46	$212.7	3.48	$83.2
Garfield	1.22	21.86	0.42	$222.3	3.97	$76.3
Grand	1.55	21.80	0.58	$282.2	3.96	$104.6
Iron	1.59	24.64	0.54	$289.0	4.48	$97.6
Juab	1.15	22.40	0.38	$209.5	4.07	$68.3
Kane	1.43	20.89	0.53	$259.7	3.80	$96.7
Millard	1.20	20.26	0.46	$218.2	3.68	$84.1
Morgan	1.22	20.05	0.39	$221.5	3.64	$70.7
Piute	1.03	20.28	0.37	$186.8	3.69	$67.9
Rich	1.20	21.87	0.41	$217.5	3.98	$74.6
Salt lake	1.95	22.40	0.79	$355.4	4.07	$144.1
San Juan	1.31	22.78	0.43	$237.8	4.14	$78.6
Sanpete	1.23	21.05	0.47	$223.9	3.83	$84.5
Sevier	1.26	20.71	0.50	$228.7	3.77	$91.0
Summit	1.53	18.45	0.67	$278.7	3.35	$121.5
Tooele	1.22	17.63	0.47	$221.9	3.21	$85.6
Uintah	1.48	22.16	0.54	$269.1	4.03	$97.9
Utah	1.74	21.84	0.69	$316.1	3.97	$124.7
Wasatch	1.55	22.73	0.54	$281.2	4.13	$97.6
Washington	1.76	24.86	0.62	$320.3	4.52	$112.0
Wayne	1.09	20.81	0.39	$197.5	3.78	$70.6
Weber	1.59	23.08	0.60	$288.2	4.20	$109.7

Table 30: Healthcare Cost Savings - Cyclists

	Total Multipliers per $ increase in HH Income (Composite) - Cyclists			Sample Analysis Assumptions: Cyclist - Healthcare Cost Savings per Mile, and 1 Thous. Miles		
County	**$ Total Output**	**# of Jobs Per $Million**	**$ Income**	**$Total Output ($Thous.) per Thousand User-Miles**	**# of Jobs per Thousand User-Miles**	**$Income ($Thous.) per Thousand User-Miles**
Beaver	0.83	2.21	0.58	$0.61	0.002	$0.43
Box Elder	0.91	2.16	0.59	$0.68	0.002	$0.44
Cache	1.04	2.58	0.63	$0.77	0.002	$0.47
Carbon	0.96	2.02	0.61	$0.72	0.002	$0.46
Daggett	0.84	2.96	0.60	$0.62	0.002	$0.44
Davis	1.00	2.60	0.64	$0.75	0.002	$0.48
Duchesne	0.92	2.76	0.62	$0.68	0.002	$0.46
Emery	0.87	1.56	0.56	$0.64	0.001	$0.41
Garfield	0.93	3.23	0.59	$0.68	0.002	$0.43
Grand	0.99	3.17	0.63	$0.73	0.002	$0.46
Iron	1.03	3.22	0.63	$0.76	0.002	$0.46
Juab	0.88	2.24	0.58	$0.66	0.002	$0.43
Kane	0.92	2.91	0.60	$0.68	0.002	$0.44
Millard	0.88	1.64	0.57	$0.66	0.001	$0.42
Morgan	0.89	2.87	0.58	$0.67	0.002	$0.43
Piute	0.84	3.52	0.55	$0.62	0.003	$0.41
Rich	0.91	2.99	0.58	$0.68	0.002	$0.43
Salt lake	1.20	2.83	0.73	$0.90	0.002	$0.55
San Juan	0.88	2.74	0.59	$0.66	0.002	$0.44
Sanpete	0.95	3.08	0.60	$0.71	0.002	$0.45
Sevier	0.96	2.64	0.61	$0.72	0.002	$0.46
Summit	0.98	2.71	0.64	$0.72	0.002	$0.47
Tooele	0.88	2.05	0.58	$0.66	0.002	$0.43
Uintah	0.98	2.61	0.63	$0.72	0.002	$0.47
Utah	1.10	2.96	0.68	$0.83	0.002	$0.51
Wasatch	0.97	3.08	0.61	$0.72	0.002	$0.46
Washington	1.12	3.56	0.66	$0.82	0.003	$0.49
Wayne	0.86	3.10	0.57	$0.64	0.002	$0.42
Weber	1.03	2.58	0.65	$0.77	0.002	$0.49

Table 31: Healthcare Cost Savings – Pedestrians

	Total Multipliers per $ increase in HH Income (Composite) - Pedestrians			Sample Analysis Assumptions: Pedestrian Healthcare Cost Savings per Mile, and 1 Thous. Miles		
County	$ Total Output	# of Jobs Per $Million	$ Income	$Total Output ($Thous.) per Thousand User-Miles	# of Jobs per Thousand User-Miles	$Income ($Thous.) per Thousand User-Miles
Beaver	0.83	2.21	0.58	$2.52	0.007	$1.76
Box Elder	0.91	2.16	0.59	$2.71	0.006	$1.75
Cache	1.04	2.58	0.63	$3.10	0.008	$1.87
Carbon	0.96	2.02	0.61	$2.88	0.006	$1.82
Daggett	0.84	2.96	0.60	$2.56	0.009	$1.82
Davis	1.00	2.60	0.64	$3.00	0.008	$1.91
Duchesne	0.92	2.76	0.62	$2.82	0.008	$1.90
Emery	0.87	1.56	0.56	$2.67	0.005	$1.70
Garfield	0.93	3.23	0.59	$2.82	0.010	$1.79
Grand	0.99	3.17	0.63	$3.01	0.010	$1.92
Iron	1.03	3.22	0.63	$3.13	0.010	$1.91
Juab	0.88	2.24	0.58	$2.64	0.007	$1.72
Kane	0.92	2.91	0.60	$2.81	0.009	$1.82
Millard	0.88	1.64	0.57	$2.64	0.005	$1.70
Morgan	0.89	2.87	0.58	$2.74	0.009	$1.77
Piute	0.84	3.52	0.55	$2.50	0.011	$1.64
Rich	0.91	2.99	0.58	$2.73	0.009	$1.74
Salt lake	1.20	2.83	0.73	$3.63	0.009	$2.19
San Juan	0.88	2.74	0.59	$2.65	0.008	$1.77
Sanpete	0.95	3.08	0.60	$2.83	0.009	$1.80
Sevier	0.96	2.64	0.61	$2.88	0.008	$1.83
Summit	0.98	2.71	0.64	$2.98	0.008	$1.95
Tooele	0.88	2.05	0.58	$2.71	0.006	$1.78
Uintah	0.98	2.61	0.63	$2.97	0.008	$1.92
Utah	1.10	2.96	0.68	$3.39	0.009	$2.08
Wasatch	0.97	3.08	0.61	$2.97	0.009	$1.87
Washington	1.12	3.56	0.66	$3.40	0.011	$2.01
Wayne	0.86	3.10	0.57	$2.58	0.009	$1.69
Weber	1.03	2.58	0.65	$3.16	0.008	$2.00

Table 32: Reduced Employee Absenteeism – Cyclists

	Total Multipliers per $ increase in HH Income - Cyclists			Sample Analysis Assumptions: Cyclist - Reduction in Sick Days per Mile, and 1 Thous. Miles			
County	$ Total Output	# of Jobs Per $Million	$ Income	$Total Output ($Thous.) per Thousand User-Miles	# of Jobs per Thousand User-Miles	$Income ($Thous.) per Thousand User-Miles	Output per Employee per day
Beaver	1.21	8.20	0.35	$0.44	0.003	$0.13	$617.40
Box Elder	1.25	7.94	0.27	$0.46	0.003	$0.11	$726.57
Cache	1.45	9.94	0.34	$0.53	0.004	$0.12	$659.06
Carbon	1.34	7.29	0.31	$0.49	0.003	$0.14	$829.37
Daggett	1.22	11.78	0.41	$0.44	0.003	$0.10	$396.83
Davis	1.43	10.07	0.42	$0.52	0.003	$0.14	$622.78
Duchesne	1.38	10.80	0.46	$0.50	0.003	$0.14	$519.50
Emery	1.28	5.08	0.21	$0.47	0.003	$0.14	$1,075.42
Garfield	1.36	13.03	0.33	$0.50	0.003	$0.08	$424.13
Grand	1.44	12.75	0.43	$0.52	0.003	$0.11	$453.03
Iron	1.48	12.98	0.39	$0.54	0.004	$0.11	$480.67
Juab	1.23	8.32	0.28	$0.45	0.003	$0.10	$627.30
Kane	1.31	11.53	0.34	$0.48	0.003	$0.09	$463.50
Millard	1.21	5.46	0.22	$0.44	0.003	$0.13	$1,075.86
Morgan	1.36	11.31	0.32	$0.49	0.003	$0.10	$505.48
Piute	1.26	14.41	0.22	$0.46	0.003	$0.04	$333.68
Rich	1.40	11.91	0.32	$0.51	0.003	$0.09	$478.48
Salt lake	1.79	11.12	0.60	$0.65	0.004	$0.23	$674.58
San Juan	1.26	10.72	0.34	$0.46	0.003	$0.09	$500.18
Sanpete	1.40	12.35	0.37	$0.51	0.003	$0.09	$468.91
Sevier	1.37	10.24	0.34	$0.50	0.003	$0.11	$571.29
Summit	1.46	10.58	0.46	$0.53	0.003	$0.15	$549.57
Tooele	1.24	7.43	0.28	$0.45	0.003	$0.13	$755.60
Uintah	1.43	10.09	0.44	$0.52	0.004	$0.16	$596.48
Utah	1.62	11.76	0.50	$0.59	0.004	$0.18	$583.90
Wasatch	1.43	12.31	0.37	$0.52	0.004	$0.11	$469.22
Washington	1.65	14.61	0.45	$0.60	0.004	$0.12	$464.05
Wayne	1.26	12.44	0.27	$0.46	0.003	$0.06	$406.46
Weber	1.44	9.97	0.42	$0.52	0.004	$0.16	$636.58

Table 33: Reduced Employee Absenteeism – Pedestrians

	Total Multipliers per $ increase in HH Income - Pedestrians			Sample Analysis Assumptions: Pedestrian - Reduction in Sick Days per Mile, and 1 Thous. Miles			
County	$ Total Output	# of Jobs Per $Million	$ Income	$Total Output ($Thous.) per Thousand User-Miles	# of Jobs per Thousand User-Miles	$Income ($Thous.) per Thousand User-Miles	Output per Employee per day
Beaver	1.21	8.20	0.35	$1.76	0.012	$0.51	$617.40
Box Elder	1.25	7.94	0.27	$1.82	0.013	$0.44	$726.57
Cache	1.45	9.94	0.34	$2.12	0.014	$0.50	$659.06
Carbon	1.34	7.29	0.31	$1.96	0.013	$0.57	$829.37
Daggett	1.22	11.78	0.41	$1.77	0.011	$0.38	$396.83
Davis	1.43	10.07	0.42	$2.09	0.014	$0.58	$622.78
Duchesne	1.38	10.80	0.46	$2.01	0.013	$0.57	$519.50
Emery	1.28	5.08	0.21	$1.86	0.013	$0.55	$1,075.42
Garfield	1.36	13.03	0.33	$1.99	0.013	$0.33	$424.13
Grand	1.44	12.75	0.43	$2.10	0.014	$0.46	$453.03
Iron	1.48	12.98	0.39	$2.16	0.015	$0.45	$480.67
Juab	1.23	8.32	0.28	$1.79	0.011	$0.38	$627.30
Kane	1.31	11.53	0.34	$1.90	0.013	$0.38	$463.50
Millard	1.21	5.46	0.22	$1.76	0.013	$0.51	$1,075.86
Morgan	1.36	11.31	0.32	$1.98	0.014	$0.39	$505.48
Piute	1.26	14.41	0.22	$1.83	0.011	$0.16	$333.68
Rich	1.40	11.91	0.32	$2.05	0.013	$0.34	$478.48
Salt lake	1.79	11.12	0.60	$2.61	0.017	$0.91	$674.58
San Juan	1.26	10.72	0.34	$1.84	0.012	$0.38	$500.18
Sanpete	1.40	12.35	0.37	$2.04	0.013	$0.38	$468.91
Sevier	1.37	10.24	0.34	$1.99	0.013	$0.43	$571.29
Summit	1.46	10.58	0.46	$2.13	0.014	$0.60	$549.57
Tooele	1.24	7.43	0.28	$1.80	0.014	$0.51	$755.60
Uintah	1.43	10.09	0.44	$2.09	0.014	$0.63	$596.48
Utah	1.62	11.76	0.50	$2.37	0.017	$0.72	$583.90
Wasatch	1.43	12.31	0.37	$2.08	0.014	$0.42	$469.22
Washington	1.65	14.61	0.45	$2.41	0.016	$0.49	$464.05
Wayne	1.26	12.44	0.27	$1.84	0.011	$0.24	$406.46
Weber	1.44	9.97	0.42	$2.09	0.015	$0.65	$636.58

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Appendix B. Stakeholder Committee List

Agency
Utah Transit Authority (UTA)
Bike Utah
Salt Lake County
Grand County
Utah Department of Health
Governor's Office of Energy Development
Utah Department of Transportation (UDOT)
Wasatch Front Regional Council
Mountainland Association of Governments
Salt Lake County Bicycle Advisory Committee
Salt Lake County Health Department
Tooele County Health Department
Weber County Health Department
Davis County Health Department
Envision Utah
UCAIR
Downtown Salt Lake City Alliance
GREENbike
The Kem C. Gardner Policy Institute
Dixie MPO
Cache Valley MPO
City of Moab
Park City
Vernal City
Weber Pathways
Mountain Trails Foundation
PRATT
5 County Association of Governments
Weber-Morgan Health Department
Governor's Office of Economic Development

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Appendix C. Training Exercise

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