



# **A Review of Literature: The Economic Benefits of Bicycling**

**Lynn Weigand, Ph.D.**

**Portland State University**  
■ **Center for Urban Studies**  
■ ■ **Center for Transportation Studies**  
■ ■ ■ **Initiative for Bicycle and Pedestrian Innovation**

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**Initiative for Bicycle and Pedestrian Innovation  
Center for Transportation Studies, Portland State University  
PO Box 751, Portland, OR 97207-0751  
ibpi@pdx.edu  
<http://ibpi.usp.pdx.edu>**

## INTRODUCTION

Bicycling is growing in popularity both as a form of transportation and for recreation. Between 1977 and 1995, the number of bicycle trips in the U.S. more than doubled (Pucher, Komanoff, & Schimek, 1999). As the number of cyclists increases, communities are realizing that the convergence of cycling facilities, participants and industry can be a significant driver of and contributor to local economies. In the past few years, a growing number of public agencies, advocacy organizations, industry groups and academic researchers have mobilized to document the growing economic benefits of bicycling, both to justify public spending on facilities and to demonstrate the dollars and cents value of this form of transportation and recreation.

This paper is intended to review what we know about the economic impact of bicycling. It will summarize the studies that have examined the impact of bicycling on local, regional and state economies in the forms of production, sales, jobs, income and tax revenues, primarily from industry (manufacturing and retail) and tourism. While cycling has been shown to confer other benefits in the form of externalities, such as avoided costs, congestion reduction, environmental, recreational, personal health and so-called “green dividends”, these topics are beyond the scope of this paper and will not be discussed here.

The studies reviewed here can be divided into three categories which are described below and used to organize this paper. The categories also differentiate between studies of economic impact and those of economic value as defined by Lindsey et al. (Lindsey & Nguyen, 2004). The first two categories presented here document economic impact – the effects of particular projects in terms of economic activity, jobs, or earnings. The third category documents the economic value which is traditionally used for cost-benefit or return on investment analysis.

The first category is comprised of traditional economic analyses that focus on bicycling as a sector or cluster. They are generally undertaken or commissioned by a public

agency to document the financial benefits can be attributed to bicycling. These studies typically include categories such as industry (which includes manufacturing, sales and repair) and tourism. They measure both direct and indirect benefits in the form of dollars and jobs. They often also measure induced economic impact or the activity generated when the bicycle related employees and employers spend their money. Tourism studies also may include figures on revenue generated by event or tour fees and revenue from food, lodging and incidentals purchased by visitors.

The second category of studies is more narrowly focused on the economic impact of a specific facility, usually a trail, to the local, regional or state economy. These studies are generally performed by or under contract with a public agency that is interested in the return on the investment in the facility. They tend to look primarily at the additional trail users or tourists that come and spend money as a result of the new or improved trail, and the spin-off effects on business, including sales (or output), jobs and income.

The third area of inquiry focuses on ways to document economic value for cost-benefit or return on investment analysis. A variety of methods have been employed to assess economic value of facilities, such as trails, that are used for cycling. These include the travel cost method and contingent valuation, which measure the facility in terms of its use value as a public good or amenity. While these methods can place a dollar amount of the value of the facility for analysis, they do not calculate the amount of revenue that a facility can generate for a public agency in the form of tax revenues. The relationship between facilities, property values, and resulting increases in property tax revenues to the local jurisdiction is the subject of studies that are grounded in earlier work linking parks, open space and greenways with higher valuations of adjacent and nearby properties. The economic return to the community is the estimated increase in tax revenue associated with the rise in property values.

It is important to note that trails are generally multi-use facilities, so the results of the studies

in the second and third categories are not necessarily specific to bicycle-related impacts. However, they are included in this review because trails are an important component of the overall bicycling environment and generate use by both local and visiting cyclists. The concept of biking as a primary use of trails is supported by research on trail use. For example, a survey of users of the Heritage Rail Trail County Trail in York County, PA found that biking was the predominant activity for 80% of the respondents (York County Department of Parks and Recreation, 2002). A 2006 study of visitors on three of Wisconsin's rail trails found that 64% of the surveyed visitors were in the area to bike on the trails (Governor's Bicycle Coordinating Council, 2006).

## ECONOMIC IMPACT OF BICYCLING INDUSTRY AND TOURISM

### Overview

Measuring the economic impact of bicycling is not a common activity in most states and communities judging by the small number of studies located. We found reports from three states and one city that had conducted in-depth analyses of the economic impact of bicycling Colorado (Colorado Department of Transportation, 2000), Maine (Maine Department of Transportation, 2001), Wisconsin (Wisconsin Department of Tourism, 2000) and the City of Portland, Oregon (Alta Planning and Design, 2006). The primary finding of these reports is that bicycling and related industry, sales and service activities are a significant economic force and provide a strong source of both direct and indirect revenue and jobs. However, since the studies were all conducted in places with relatively large amounts of bicycle-related industry and activities, the results should be used with caution as they may not be transferable to other locales.

This section provides an overview of the four economic reports and summarizes their findings relative to the economic impact of bicycling. While the goal of each of the studies was similar – to measure the direct and indirect economic impact of bicycling and

related activities – each organized their research and presented their data using slightly different metrics, making it difficult to compare their results. Although three of the reports were conducted on a statewide basis, the size of the states, level of tourism, and relative popularity of bicycling varied among them. The fourth report was conducted at the local, not state, level, so the measures and results need to be considered within its geographic scope. The data in tables 1-5 were found in these four reports.

### Summary of the Economic Impact Reports

This section summarizes the findings of reports on economic impacts of bicycling that have been published by state and location governments in the U.S.

#### *The Economic Impact of Bicycling in Wisconsin (2006)*

The Governor's Bicycle Coordinating Council issued a report on the economic impact of bicycling prepared by the Bicycle Federation of Wisconsin and the Wisconsin Department of Transportation. The study's scope included the economic impact of bicycling from industry and tourism. Its authors calculated the total gross economic impact of bicycling by summing the direct, indirect and induced impacts on employment, income and output as measured by a standardized model called the Regional Economic Model Inc. (REMI).

#### *The Economic Impact of Bicycling in Colorado (2000)*

The Colorado Department of Transportation's Bicycle and Pedestrian Program commissioned a study conducted by the University of Colorado at Denver in 2000 to assess the economic impact of bicycling and walking in Colorado. The research included an economic analysis of the impacts of bicycling within the state and a random household survey. The resulting report documents the total economic benefit from bicycling to the state from manufacturing, sales and tourism.

#### *Bicycle Tourism in Maine (2001)*

Maine's Department of Transportation published a summary of its findings on bicycle-related tourism in the state in 2001. The report was intended to document the

benefits of bicycle tourism to business and provide recommendations to enhance the state as a tourist destination. The report does not appear to include non-tourism related bicycling revenue, jobs or sales.

***Bicycle-Related Industry Growth in Portland (2006)***

The City of Portland, Oregon commissioned a study in 2006 to “get a complete picture of the economic impact of bicycling to the City of Portland” ((Alta Planning and Design, 2006), p. 1). The authors conducted a survey of more than 100 businesses within the city to identify gross revenue and their growth as well as the impact of Portland’s bike-friendly reputation on business.

**Economic Impacts of Manufacturing/Industry/Retail/Service**

According to the website of the National Bicycling Dealers Association, the U.S. bicycle industry was a \$6 billion industry in 2007, including the retail value of bicycles, related parts, and accessories through all channels of distribution (2008). The state and local agencies that measure the industry’s economic value generally include manufacturing of bicycles and associated parts, wholesalers, distributors, and repair services in addition to retail sales. Some studies, such as Wisconsin’s, also count other services and jobs, such as education and advocacy organizations and bike couriers, and public and private sector professionals who plan, design and build bike facilities. As the popularity of bicycling grows in a region, whether for transportation or recreation, it fuels a demand for products and services that is reflected through increased products, sales and services. The value of this activity is what these economic studies are designed to capture.

Analysis of this sector generally examines the total output or sales from these activities, the number of jobs provided, and the amount of personal income generated. In some areas where bicycling is popular, this can be a significant economic driver when the value of these inputs are combined. Table 1 below shows the total estimated economic impact of bicycling-related activities reported by each of the four studies. These numbers provide important data by demonstrating the

economic value of bicycling to a state or locality. However, due to the differences in methodology as well as the size and demographics of the jurisdictions, the data cannot be used for comparisons. For example, Wisconsin’s study generated the total economic impact by adding the value of the total output and personal income related to bicycling from both direct and indirect sources. Colorado’s study added revenue and annual payroll to determine the total economic impact for their state.

**Table 1: Estimated Total Economic Impact**

Location	Total Impact
Wisconsin	\$556,468,956
Colorado	\$1,000,000,000+
Maine	\$66,800,000
City of Portland	\$63,000,000

Most of the reports used a slightly different metric to describe the total output generated by bicycling, as shown in Table 2. As with the total economic impact, the take-away message in all of the studies is the fact that bicycling generates significant revenue or sales for its state or city.

**Table 2: Revenue/Output Generated by Bicycling**

Location	Revenue/Output
Wisconsin (measured by total output)	\$447,996,836
Colorado (measured by total revenue)	\$1,000,000,000+
Maine (measured by total spending by tourists)	\$36,300,000
City of Portland (measured by total revenue)	\$63,000,000 *

*Note: Portland’s study defined total economic impact as the total revenue generated by bicycling sectors, therefore, the total of \$63,000,000 is the same for both categories as shown in Tables 1 and 2.*

**The studies all agree that bicycling provides jobs. The combination of manufacturing, sales, service and tourism-related activities generates employment at a variety of levels and income types in each location as shown in**

Table 3.

**Table 3: Number of Jobs Generated by Bicycling**

Location	Number of Jobs
Wisconsin (direct)	2400
Colorado (direct)	2519
Maine	Not reported
City of Portland	600-800

**Table 4: Payroll or Income Generated by Bicycling**

Location	Payroll/Income
Wisconsin (measured as income)	\$108,472,120
Colorado (measured as payroll)	\$59,000,000
Maine	Not reported
City of Portland	Not reported

### **Economic Impacts of Bicycle-Related Tourism**

The economic impact of bicycling tourism is based on the idea that facilities, such as trails, or events, either attract people to visit a region or induce them to stay longer. While bike-related tourism has been shown to generate positive economic benefits to an area, it is beyond the scope of this paper to debate the pros and cons of recreation-based tourism as an economic development strategy. This discussion will focus on the findings of the state and local studies that estimate the value of bicycle tourism-related activities.

Overall, the reports show that bicycle-related tourism is a significant generator of revenue to their states and city. While each has calculated the value differently, the numbers demonstrate the value of bicycle tourism and events to local and state economies as shown in Table 5.

**Table 5: Total Value of Bicycle-Related Tourism**

Location	Value of Tourism
Wisconsin	Not reported
Colorado (total revenue by cycling tourists at CO resorts)	\$141,000,000 – 193,000,000
Maine (total tourist spending)	\$36,000,000
City of Portland (income from tours, races, rides, events)	\$7,169,630

### **General Bicycle-Related Tourism**

The economic impact of bike-related tourism is usually calculated by estimating or counting the number of visitors (and local residents) who are participating in self-guided and organized tours, rides and events. The reports use the average amounts these tourists spend on food, lodging and other goods and services while visiting to arrive at a figure that represents the total economic value of the visits. For example, the Maine Department of Transportation estimates that bicycle tourists spend between \$25 (day trips) to \$115 per day (guided tours) on a combination of retail, services, lodging, food and transportation. This method yields good estimates of economic activity, but is not an exact science.

### **Bicycle Event Tourism**

Bike events, such as races and tours, are a subset of bicycle-related tourism that attract visitors to an area, either to participate or to watch. These economic impacts of these activities are easier to quantify because many of the factors are known, such as the number of days in the region, the number of participants, and their origin. From this information, it is relatively straightforward to derive the value of lodging, meals, fees and other purchases made relating to the event. Following is a brief summary of some of the findings related to the economic impacts of bicycle events.

### **Bike Tours**

Wisconsin’s study cites a 2004 events guide listing 57 one-day bicycle tours ranging from 750 – 200,000 riders and several multi-day tours that range from 40 to more than 1100 riders. While multi-day events often include lodging and meals, the meals are often provided by and benefit vendors in the communities where the riders stay. This means the entry fees from the events, which ranged from approximately \$30,000 to almost \$500,000, can be counted toward the economic impact of the event. Additionally, tour sponsors reported that the events brought bicyclists from 40 other states and they spent an average of \$57 - \$60 per day in addition to the tour fees. The Wisconsin report concluded that the two largest multi-day tours, the Great Annual Bicycle Adventure Along the Wisconsin River and

Sprocket's Annual Great Bicycle Ride Across Wisconsin generated a combined economic impact between \$3.7 and \$6.2 million in 2004. Colorado's bicycle tours generate approximately \$640,000 in revenue to the state while charity rides provide \$3.4 million.

Portland's 2006 study estimates that tours, races, rides and events generate \$7,169,630 per year, or about 11% of the total economic activity related to bicycling including registration fees, food, lodging and incidentals. On an annual basis, approximately 40,000 people participate in more than 21,000 small- and medium-sized events and rides in and around the city.

### **Bike Racing**

Bicycle racing is a popular and growing sport in Wisconsin, according to their 2006 study. Organized racing can include road races, criterium races, cross-country races, mountain bike, cyclo-cross, velodrome and BMX events as well as multi-sport races. Both the racers who travel to participate in the event, and the spectators who watch, spend money on food and lodging. While most of the impacts have not been reliably quantified, the Wisconsin report cites event promoters who estimate that bike races have the potential to generate up to \$1 million per day combined from participants, vendors and visitors.

Portland is home to the Alpenrose Velodrome, one of only 20 similar tracks in the country, giving Portland a national reputation in bike racing. Portland's report estimates revenue from race events in the city at \$226,000, including track, road, and cyclocross. Colorado estimates that races statewide generate \$2 million.

Other states have demonstrated the economic benefits of bicycle racing events as well. In 2007, the Tour de Georgia, a seven-day pro state race generated a direct economic impact of \$27.56 million (Hong, 2007). Over its five-year history, the race has attracted 2.8 million spectators and resulted in \$148 million in economic benefit to the state.

### **Conclusions**

Most of the information on this topic is appears in the form of reports generated by

public agencies or consulting firms. The data from these reports provide strong evidence that bicycling can be a significant contributor to local and state economies in terms of sales and jobs from industry and tourism. However, most of the studies located for this review focus on locations where bicycling appears to be a popular activity. It would be difficult to generalize the results of this study too broadly, especially to areas where bicycling is less prominent, either for transportation or recreation, or to places that do not have a reputation or setting for outdoor, recreation-based tourism. That said, in places where bicycling is prevalent, the research shows that it can become a specialized business cluster that produces economic return, both directly and indirectly.

Additional research is needed to build a stronger case for the economic benefits of bicycling. It is also important to study the impacts in communities where bicycling and facilities are less prevalent to determine which, if any, of the elements of the industry or tourism are transferable to other locations. For example, places lacking a bicycle industry presence might still benefit from bike-related tourism if they have attractive trails, or vice versa. Larger studies comparing and contrasting cities or regions would shed more light on this.

## **ECONOMIC IMPACT OF FACILITIES**

### **Overview**

Another area of focus on this topic is documenting the economic impacts of a specific facility, usually a trail. The underlying premise is that trails can provide an increase in the number of visitors to an area that increases the likelihood of money being spent there (Schoutens, 2006). As stated earlier in this paper, the majority of visitors to these trails engage in bicycling as their primary activity. Therefore, it is logical to assume that many of the economic impacts from the trail users can be attributed to bicycling.

Research on trail use and economic impacts originated in the early 1990s as some of the first rails to trails conversions were complete,

providing some of the first longer trail facilities for hiking and cycling in the U.S. Economic impact studies often were conducted or commissioned by agency responsible for the trail to demonstrate the economic benefit or return on investment in the trail. Many of the studies used some type of user survey, either self-administered or intercept, to obtain information about the purpose of trail use and spending patterns. The research on the economic impact of trails has found that they generate revenue from those who use them, mostly through the purchases made by trail users for food, lodging and incidentals. However, the results vary depending on the length and location of the trail and its attractiveness to potential visitors from outside the area. An article on the economic impacts of trails on the National Trails Training Partnership website (Sjoquist, 2008) claims that trail-related expenditures range from \$1 per day to more than \$75 per day in the U.S.

One of the first studies was a cooperative effort of the National Park Services and Pennsylvania State University in 1990-91 that examined the benefits and effects of three rail to trail conversions (Moore, Graffe, & Gitelson, 1992). The trails included the Heritage Trail, a 26-mile crushed limestone trail in Iowa, St. Marks Trail, a 16-mile paved trail outside Tallahassee, Florida, and the Lafayette/Moraga Trail, a 7.6 mile paved trail in a suburban area east of San Francisco, California. The researchers conducted user counts and surveys, follow-up mail surveys and a survey of a sample of residential land owners. In terms of economic benefits, they concluded that the users spent an average of \$3.97 per day (Lafayette/Moraga), \$9.21 per day (Heritage) and \$11.02 per day (St Marks), and the new money brought into the region by trail visitors from outside the county ranged from \$294,000 to \$630,000, although the report did not specify whether that was an annual or total amount. The Park Service study was a model for a subsequent user study of the Little Miami Scenic Trail near Cincinnati, Ohio. The research, published by the regional council of governments, found an estimated 150,000 – 175,000 trail visits annually on a 27-mile portion of the trail, with 66% of the trail users on bicycles. The study

also found that trail users spent approximately \$3.1 - \$3.7 million annually on trip-related expenses and goods (Ohio-Kentucky-Indiana Regional Council of Governments, DATE). A 1994 report on the economic impacts of the Northern Central Rail Trail in Maryland found that an estimated 450,000 people used the trail in 1993. The report concluded that the direct economic inputs to the state via tax revenue from the trail were \$303,750, with the trail generating 264 jobs statewide and the value of goods purchased because of the trail to be more than \$3,380,000 (Maryland Greenways Commission, 1994).

As can be seen in the more recent studies economic impacts of various trails, summarized below, most continue the model set by the Park Service, focusing on the number of visits or visitors generated by the trail, the average amount that each visitor spent, and the total revenue or sales that can be attributed to trail users. All of the trail studies document spending by trail users that benefits local businesses, primarily for food, lodging and activity-related shopping.

#### *Western Wisconsin Trails (2000)*

A user survey of three rail trails, ranging from 21.5 to 32 miles in length, conducted for the Wisconsin Department of Tourism, found that visitors who were specifically in the area to bike the trails, spent an average of \$26.43 per person per day (Wisconsin Department of Tourism, 2000).

#### *Fox River Trail, Wisconsin (2001)*

This report examined the impact of this new, 14-mile trail during its first six months of existence and found that county trail pass revenue increased from \$7,784 to \$58,618 after the trail opened. In addition, the county staff surveyed 42 businesses on or near the trail. The results indicated that 13 of the 33 responding businesses saw increased sales after the trail opened, and that the number of trail users who visited those responding ranged from one to as many as 200 per day. This study did not attempt to document any specific sales revenue attributable to the trail. (Brown County Planning Commission, 2001)



*Heritage Rail Trail County Park, Pennsylvania (2002)*

This report documents the results of two studies conducted for the York County Department of Parks and Recreation on the use and economic impact of the Heritage Rail Trail County Park. An initial survey was conducted in 1999, not long after the trail opened, to provide baseline information. A follow up survey was conducted in 2001. The second survey found that 65.6% of respondents spent an average of \$8.33, primarily on food, in connection with their trail visit. However, the majority of trail users reside within the county, resulting in more day use of the trail than overnight travel. (York County Department of Parks and Recreation, 2002)

*Northern Outer Banks Trail, North Carolina (2003)*

A study of this trail that is part of a coastal tourist area, found that 680,000 tourists spend time bicycling there and that the bicycle facilities are an important factor for tourists deciding to visit the region. The study also estimated that the bicyclists spend approximately \$60 million a year there, supporting local businesses and 1400 jobs (Meletiou, Lawrie, Cook, O'Brien, & Guenther, 2005).

*High Bridge Rail-Trail State Park, Virginia (2004)*

A report evaluating the economic impact of the proposed High Bridge Rail-Trail State Park (Prince Edward County, 2004) concluded that the 33.8-mile trail could attract almost 68,000 visits a year with a total economic impact of close to \$1 million, primarily from visitor spending on food, transportation, lodging, bike rentals and other expenses (2004) with the potential to increase both with added amenities such as historical attractions, trail-based races and local festivals.

## ECONOMIC VALUATION OF TRAILS

### Overview

Public agencies are often interested in documenting the value of a facility, such as a trail, to demonstrate the return on investment,

especially when there are many competing interests for limited public funds. This type of research generally examines the use value of the facility that can be considered a public good or amenity. These studies use methods such as contingent valuation (Lindsey & Knaap, 1999), dichotomous choice contingent valuation (Fix & Loomis, 1997), or individual travel cost methods ((Fix & Loomis, 1997); (Siderelis & Moore, 1995)). Since this review is focusing on the economic impact, or activity, generated by trails in the form of revenue and jobs, it will not summarize the work on trail valuation in these forms.

### Economic Value From Tax Revenue

Amenities, such as trails, are thought to provide economic benefit by increasing the value of nearby properties which in turn raises the amount of tax revenue that accrues to the local public agencies. Models that calculate the impact of amenities such as parks, greenways and trails on nearby real estate values are based on the concept of enhancement valuation – the extent to which the amenity affects the surrounding land market (Platt, 1972). The concept that people are willing to pay more for a home located close to amenities such as parks and open space is known as the “proximate principle” (Crompton, 2001). This principle was initially employed in studies on the economic benefits of parks and open space, but more recently have been extended to examinations of the economic benefits of greenways and trails.

Until recently, studies attempting to document the influence of trails on property values have focused primarily on measuring people’s perceptions of the trail’s impact on their property. Krizek (2006) calls this method of asking about opinions a “stated preference” method. Measuring perceptions of increased valuation is generally done through surveys of home buyers or home owners. While these provide useful insights on opinions, they measure a potential action rather than reality.

More recently, studies have used a “revealed preference” approach which attempts to identify the actual influence of the trail on property values (Krizek, 2006). Typically, these studies use the hedonic method, a statistical analysis of property values. This

method has the benefit of estimating values on real choices – therefore measuring the results of an actual or observed behavior, rather than a hypothetical situation (Freeman, 1995). It rests on the notion that property markets are a good indication of economic value (Ecosystem Valuation, 2004). Both the stated and revealed preference approaches are considered indirect methods because the increased value is a secondary, not a primary, benefit of the amenity (Freeman III, 1993).

Both methods were initially used to document the increase in property values that could be attributed to parks and open space, usually to demonstrate the return on investment (Crompton, 2001). The methods were logically extended to demonstrate similar economic value of greenways and trails. However, one of the problems in the studies published to date is the fact that not all of the greenways include trails. This reduces the ability to infer the benefits of greenways onto trails. In addition, many studies include several greenways, some with and some without trails, further complicating the ability to generalize about the results.

Studies that have focused on or included trails within their scope have found that proximity to trails is an important amenity that homeowners and home buyers value and are willing to pay a premium for. In a 2002 national consumer survey of recent homebuyers, 36% of the respondents ranked trails for biking and walking as a very important amenity. Lindsey et al. (2004) suggest that both recreational and transportation values of trails may be reflected in property values. However, the studies reviewed here either did not differentiate among the two, or assumed mostly recreational benefits, such as the consumer survey described above.

Overall, there still is not much evidence that specifically documents the increase in property values attributable to trail proximity. Hedonic studies of parks and open space have mostly found positive effects on property values (Crompton, 2001) and research on greenways to have either positive or neutral effects (Krizek, 2006); (Lindsey et al., 2004); (Nicholls & Crompton, 2005). Three recent

studies appear to be the only one to employ the hedonic approach to trails. Lindsey et al. (Lindsey et al., 2004) used this method to study the impact of greenways (with and without trails) in the Indianapolis area. While the Lindsey et al. study did find a significant, positive impact on sales price resulting from proximity to one trail (Monon Trail), proximity to the other six greenway trails in the study had no significant or a negative effect on prices.

Nicholls and Crompton (Nicholls & Crompton, 2005) used the hedonic approach to study the impact of a greenbelt in Austin, Texas that included a 1,771-acre natural area and 7.5 miles of multi-use trails located west of the downtown area. The selected three distinct residential neighborhoods bordering the greenbelt for analysis by three variables: location adjacent to the greenbelt, view of the greenbelt, and distance to the nearest greenbelt entrance. In two of the three neighborhoods, adjacency had a significant, positive effect on sales prices, while it had no significant impact on the third. View was insignificant in two neighborhoods and not applicable in the third. Distance to the nearest entrance was significantly associated with a decline in property value in one neighborhood and insignificant in the other two. Since their study did not focus specifically on the trail component of the greenway, it is difficult to generalize about the impact of the trails or bicycling on property values.

Krizek (2006) extended the use of hedonic pricing to specifically examine bicycle facilities in the Minneapolis-St. Paul area. He further differentiated between on- and off-street facilities located in urban and suburban locations. His analysis found that proximity to off-street bicycle facilities in urban areas increased value while on-street facilities had no significant impact on home prices in the city. In the suburbs, he found that proximity to both types of bike facilities reduced home prices, although the negative impact was greater for on-road facilities.

Several conclusions emerge on the state of knowledge about the effects of trails and bicycle facilities on property values. First,

there is a paucity of studies on this topic and much more work is needed to document the relationship between the two. Second, most of the evidence we do have about the impacts of trails on property values comes from studies of greenways, some of which happen to have trails. Studies that focus specifically on trails and/or bicycle facilities, such as Krizek's 2006 work, will provide more definitive data on this relationship.

Another issue, identified Lindsey et al. (2004) is that most of the studies of greenways with trails have been limited to measurements of perception and have not documented their effects on property values. Their 2004 work, along with that of Nicholls and Crompton (2005) and Krizek (2006) were some of the first to begin filling this gap by using the hedonic approach to measure increase in property value due to greenway proximity. In addition, these studies should be designed to isolate variables where possible. The mixed conclusions about the effects of trails on property values indicate that there is more than just the trail itself that affects the value. Trails vary significantly in their use, location, length, features and elements that need to be considered separately to understand how they impact property values, either positively or negatively.

In addition, conclusions from Lindsey et al. (2004) demonstrate that the effects of greenways (and trails) are not the same, leading the authors to caution against generalizing the benefits associated with particular greenways to other locations. In addition, their findings also raise the possibility that the effects of trails in some cases could be negative and that studies need to disaggregate variables to provide more information on the relationship between trails and property values.

## CONCLUSION

As stated at the outset, this paper was intended to address a relatively narrow frame of economic benefits, both impacts and value, associated with bicycle-related activities. Based on the results of this review, it appears that we know more about the direct economic

impacts of bicycling from industry and tourism than we do about the increase in property valuation resulting from trails and other bicycle facilities. However, the number of studies is relatively small in each category and needs to be expanded, both to support the evidence that is already known and to generalize the findings beyond areas studied.

Clearly, bicycling as an industry and tourist attraction has the potential to generate economic return that exceed investments and make it an attractive business sector for some communities. The presence of attractive facilities, such as trails, generates use by local residents and visitors. These cyclists spend money on food, lodging and other goods and services that circulates in the local economy and creates jobs. In addition, bicycle events and races attract both participants and spectators, similar to other sporting events, that also stimulate the local economy and provide revenue. The service and supply industry, including manufacturing and sales, tend to locate in places that have a strong cycling culture and large numbers of riders, such as Wisconsin and Portland, Oregon. These industries have also proven to be strong economic drivers in places where they have a significant presence. However, without work in other locations, we don't know the impact outside of these few study areas.

The economic impact of bicycling facilities in the form of higher property values and increased tax revenues is less clear for several of reasons. First, few hedonic studies have been conducted that focus solely on trails, let alone bicycle facilities, so we don't have much empirical evidence. Second, trails are often not comparable as they vary widely in their characteristics and attractiveness. This makes it difficult to generalize from the results of studying a single trail or a group of trails in a similar geographic area. Finally, the results of studies that have been conducted have reported both positive and negative impacts on property values from trails. Clearly, more work is needed to determine which elements are associated with those values if we are to generalize about those impacts.

In conclusion, we have a small, but growing, base of studies on the economic impacts of

- bicycle-related industry, tourism and facilities on which to build. Additional research on this topic will provide important information to support bicycling activity and industry at the local, regional and state levels by demonstrating the value of bicycling in dollars and cents.
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