

## **ECONOMIC CONTRIBUTION OF THE BICYCLE INDUSTRY IN MINNESOTA**

Total economic contribution is comprised of three parts - direct, indirect, and induced effects. This report explains each of these components and how they were measured to calculate the economic contribution of the bicycle industry in Minnesota for Task 4 of this project.

The bicycle industry in Minnesota has three main components – retailers, wholesalers and manufacturers, and advocacy groups. Retailers, in this study, include businesses selling new or used bicycles, those selling bicycle parts and accessories, businesses providing bicycle repair services, and businesses providing bicycle rentals. Several types of retailers are involved in the bicycle industry, including bicycle specialty retailers, general sporting goods retailers, discount department store retailers, warehouse and supercenter stores, and general merchandise stores. Wholesalers and manufacturers included in this study make or wholesale bicycles, bicycle parts, and accessories related to bicycling (including clothing, trailers, and bike racks). Advocacy groups are organizations that support and promote bicycling in the state.

Of note here is the definition of the bicycling industry. This task is focused on the industry as defined in the above paragraph. Another task of this project will measure the tourism-related impacts of bicycling in Minnesota, specifically those related to bicycling events held in Minnesota.

### **Direct Effect of the Bicycle Industry**

For the bicycle industry, direct effect is equal to bicycle-related operational and capital improvement expenditures by the businesses and organizations in each of the categories. Direct effect is measured in economic output, employment, and labor income. The initial step of an economic contribution analysis is to quantify each of these direct effects for the industry.

### **Data Sources**

Three data sources were accessed to measure the direct effect for this study – a survey of businesses with bicycle-related sales; the Economic Census Product Line data for bicycles, parts, and accessories; and GuideStar, a repository for non-profit financial records.

### **Bicycle Industry Survey**

The main source of primary data for this study was an online survey of the bicycle industry. A survey link was sent to all businesses identified as related to the bicycle industry. The survey directed respondents to a specific subset of questions corresponding to the type of business. Retailers answered one set of questions, wholesalers and manufacturers answered a second set of questions, and advocacy groups answered a third set. The survey instrument gathered data on expenditures, labor income, and employment.

Previous tasks on this grant developed the cornerstone components of the survey. First, under Task 1 of this grant, a list of businesses in the bicycle industry in Minnesota was developed. The list was compiled

from a variety of sources based on physical location. Thus, one single company could appear on the list multiple times if it had more than one location.

When the surveyed was deployed, 25 surveys were returned due to an incorrect address or a business ceasing to operate. The business list was modified based on these return notifications. The final list contained a total of 282 business locations.

The bicycle industry list contained all businesses with links to the bicycle industry. In order to measure economic impact, it is critical to have further detail on the number of businesses by category in the list. Table 1 shows major business categories and the number of business locations on the list. The number of companies represented is also shown in Table 1. For example, there were 35 business locations for bicycle specialty stores with multiple locations; however the locations represent 8 individual companies.

Table 1: Business List by Category

Business Type	Number of Business Locations on List	Number of Individual Companies Represented
Bicycle Specialty Stores –One Location	105	105
Bicycle Specialty Stores –Multiple Locations	35	8
General Sporting Goods Stores, One Location	44	44
General Sporting Goods Stores, Multiple Locations	21	5
Other General Merchandise Stores	3	3
Bicycle Rentals	29	29
Online Bicycle Sales	2	2
Bicycle Advocacy Groups	3	3
Manufacturers and Wholesalers	31	31
Other (cycling studios, antiques, etc.)	9	9
<b>Total</b>	<b>282</b>	<b>239</b>

Second, under Task 2 of this grant, bicycle industry experts were interviewed to learn more about the state of the industry in Minnesota. This information was critical in the development of the survey instrument. Finally, Task 3 was the development of the survey instrument and the sampling plan.

This task (Task 4) started with the deployment of the survey. The bicycle industry survey was distributed between June 16<sup>th</sup> and August 15<sup>th</sup> via mail and email, followed the Task 3 sampling plan, and used the Task 1 bicycle industry contact list.

The survey link was also emailed to those that participated in expert interviews. Several agreed to promote the survey within their networks and did so. Three rounds of reminder postcards were sent. Each round was spaced two weeks after the previous round.

In total, the survey received 52 responses, an overall response rate of 22 percent. However, response rates varied significantly based on the group being surveyed.

Response rates were highest from the bicycle specialty and general sporting goods stores with multiple locations. Of the 13 companies represented, 8 responded, for a response rate of 62 percent. Response rates were also relatively high for the manufacturers and wholesalers. Of the 31 companies represented in the list, 14 responded, for a response rate of 45 percent.

Response rates were lowest among the bicycle specialty, general sporting goods stores, and bicycle rental stores with one location. The survey received 29 responses from this group, a 17 percent response rate. Since response rates were low in this category, the economic census product line data was used to verify the accuracy of responses.

No responses were received from other general merchandise stores, online stores, advocacy groups, and the other category. General merchandise store data was supplemented with economic census product line data, as explained below. Advocacy group data was supplemented with the GuideStar database, as explained below. Online stores and other were not included in the analysis.

All of the survey data was entered into an Excel file and responses were segmented according to business category. The survey data was cleaned and outliers were removed from the responses.<sup>1</sup> Average total expenditures, labor income expenditures, and employment figures were then calculated from the survey responses for both retailers and manufacturers/wholesalers. Average capital improvement expenditures were also calculated for manufacturers/wholesalers.

The responses from retailers were divided into two sub-groups based on the number of locations. Average expenditures (including payroll and labor costs) and employment were calculated for businesses with only one location and for businesses with multiple locations. Average expenditures and employment were then multiplied by the number of businesses on the list to arrive at total expenditures for each category. Since the survey asked about total expenditures at the business location, information from the Economic Census (see below) on the percent of total sales attributable to bicycles was used to adjust for bicycle-related sales.

The responses from manufacturers and wholesalers were also averaged and multiplied by the number of businesses on the list, with one exception. Minnesota is home to one major manufacturer. This manufacturer responded to the survey. The response for this one business was not included in the

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<sup>1</sup> Outliers were defined as data points that were three times plus or minus the standard deviation for the set of data points.

averages, but rather added back at the end of the calculations. This was done to ensure the one response did not overinflate the averages for all other businesses.

### [Economic Census Product Line](#)

The bicycle industry survey provided a wealth of information on the retailers, manufacturers, and wholesalers; however, there were a few gaps in the data, as detailed above. To verify and supplement the industry survey, data from the Economic Census (United States Census Bureau) was incorporated. The Economic Census has sales data, called Product Line data, for retailers selling bicycles, parts, and accessories. The latest available data at this detailed level for Minnesota is for 2012.

Output for the retail categories that did not respond to the survey or were not adequately represented in the survey list (discount department stores, warehouse clubs and supercenters, and other general merchandise) was gathered from the Economic Census Product Line report. All data was converted to 2014 dollars using the Consumer Price Index (CPI) from the United States Bureau of the Labor Statistics.

Output for bicycle rentals was also gathered from the Economic Census Product Line report. The Product Line report contains an estimate of sales for all recreational equipment rentals in 2012. The total figure was adjusted by the number of rental facilities on the the bicycle industry list to reflect bicycle rental figures. The total figure was also adjusted by the percentage of bicycle-related sales.

Employment and labor income associated with the output for these retail sectors was determined using the input-output model IMPLAN, as Product Line data does not contain employment and labor income figures. The model contains a ratio that determines the number of employees and labor income generated per dollar of output. The ratio is specific to the particular industry being analyzed. In this case, the ratio for retail trade – sporting goods stores was used. The ratio is based on the year of the IMPLAN data, which in this analysis is 2013.

The Product Line data was also used to verify the results from the survey. The Economic Census reports 99 speciality bicycle stores; the list in this analysis contains 113. The Census reports 67 general sporting goods stores; the list in this analysis contains 49. Thus, in the analysis, 113 speciality stores was used and 67 general sporting goods stores was used. The Product Line data reports \$82.4 million in sales from specialty bicycle stores and general sporting goods stores. Using the bicycle industry survey, this analysis arrives at total sales of \$79.5 million, or 4 percent lower.

### [GuideStar Database](#)

Non-profit groups in Minnesota can be tracked through GuideStar, an online repository for data on non-profits. Using the keywords, “bike” and “bicycling”, University of Minnesota Extension identified 16 non-profit organizations involved in promoting, advocating for, or supporting bicycling in the state. The organizations are listed in the appendix. GuideStar provides revenues and expenses for each of the organizations in the database. The data provided is derived from the United States Internal Revenue Service (IRS) Form 990 filed by the organization.

### Direct Effect of Bicycle-Related Retailers

In 2014, retailers in Minnesota generated an estimated \$95.9 million of sales derived from bicycles, parts, and accessories, from bicycle repairs, and from bicycle-related rental activity (Table 2). The retailers employed an estimated 1,827 people and paid an estimated \$34.3 million in labor income.

Table 2: Direct Effect of Bicycle-Related Retail Sales in Minnesota: 2014

	Output (millions)	Employment	Labor Income (millions)
<b>Total</b>	<b>\$95.9</b>	<b>1,827</b>	<b>\$34.3</b>
Sporting Goods Stores – Bicycle Specialty	\$66.8	1,481	\$27.2
Sporting Goods Stores - General	\$12.7	279	\$5.2
Department Stores, General Merchandise, and Warehouse/Supercenters	\$15.8	61	\$1.6
Bicycle Rentals	\$0.6	6	\$0.3

Sporting goods stores values derived from an industry survey. Other values derived from the Economic Census and IMPLAN.

### Direct Effect of Bicycle-Related Manufacturers and Wholesalers

In addition to bicycle retailers, Minnesota is also home to several major manufacturers and wholesalers that specialize primarily in producing or wholesaling bicycles, bicycle parts, bicycle accessories, and bicycle-related apparel. In 2014, bicycling-related manufacturers and wholesalers in Minnesota created an estimated \$368.3 million in sales via their operations (Table 3). They also spent \$14.8 million on capital investments (e.g. new buildings, new equipment).

Table 3: Direct Effect of Bicycle Related Manufacturing and Wholesale Activity in Minnesota: 2014

	Output (millions)	Employment	Labor Income (millions)
<b>Total</b>	<b>\$383.1</b>	<b>1,738</b>	<b>\$66.3</b>
Operations	\$368.3	1,684	\$61.6
Capital Investments	\$14.8	54	\$4.7

Values derived from industry survey.

### Direct Effect of Non-Profit and Advocacy Groups Related to Bicycling

Finally, in addition to retailers, wholesalers, and manufacturers involved in the bicycle industry in Minnesota, there are also organizations that support and promote bicycling and healthy living in the state. The operations of these organizations also generate economic activity.

In total, the 16 organizations identified spent an estimated \$7.0 million on operations in 2014.<sup>2</sup> Based on the input-output model, IMPLAN, \$7.0 million in operational expenditures by non-profit and advocacy groups translates into an estimated 85 direct jobs and an estimated \$4.5 million of labor income paid to employees of the organizations (Table 4).

<sup>2</sup> Based on the most recently reported fiscal year's data, which could be different from organization to organization. Only organizations with financials reported between 2013 and 2015 were included in the analysis.

Table 4: Direct Effect of Bicycle-Related Non-Profit and Advocacy Groups in Minnesota: 2014

	Output (millions)	Employment	Labor Income (millions)
Non-Profits and Advocacy Groups	\$7.0	85	\$4.5

Values derived from GuideStar database and IMPLAN.

Fifteen of the organizations were categorized as social advocacy industries for analysis in the model. One organization, Nice Ride, was categorized as a general consumer rental business in the model, due to its bicycle-rental function. This function means Nice Ride has a different expenditure pattern than the other non-profit and advocacy groups.

### Total Direct Effect of the Bicycle Industry

In 2014, the bicycling industry in Minnesota directly created \$486.0 million of economic activity in the state (Table 5). This includes \$105.1 million worth of income paid to those involved in the industry. Retailers, manufacturers, wholesalers, and advocacy groups involved in the industry employed an estimated 3,650 workers.

Table 5: Direct Effect of the Bicycle Industry in Minnesota: 2014

	Output (millions)	Employment	Labor Income (millions)
<b>Total</b>	<b>\$486.0</b>	<b>3,650</b>	<b>\$105.1</b>
Retail	\$95.9	1,827	\$34.3
Manufacturing and Wholesale	\$383.1	1,738	\$66.3
Non-Profits and Advocacy Groups	\$7.0	85	\$4.5

Values derived from industry survey, United States Economic Census, GuideStar, and IMPLAN.

### Indirect and Induced Effects

Using estimated direct effects, the data was entered into an input-output model.<sup>3</sup> Input-output models trace the flow of dollars throughout a local economy and can capture the indirect and induced, or ripple, effects of an economic activity. The input-output model IMPLAN was used in this analysis.<sup>4</sup>

Indirect effects are those associated with a change in economic activity due to spending for goods and services directly tied to the industry. In this case, these are the changes in the local economy occurring because bicycle manufacturers, for example, purchase goods (e.g. steel and aluminum) and related services (e.g. engineering and accounting). The bicycle manufacturers' purchases create an increase in purchases across the supply chain. Indirect effects are the sum of these changes across an economy.

<sup>3</sup> The retail sales data were margined when entered into the IMPLAN model. Margining is performed on retail sales data since all output in the IMPLAN model is in producer prices and retail sales are in purchaser prices. Margining appropriates a retail sale into the components of the sale. It measures the value of the sale minus the cost of the good sold, commonly known as the retail mark-up. The retail mark-up is the direct local impact used by the model to calculate the economic contribution.

<sup>4</sup> The analysis was conducted with the IMPLAN model version 3.0 and data from 2013. The type SAM multipliers were used. There are several types of multipliers – type I, type II, and type SAM. SAM multipliers are often preferred because they use the social accounting matrix (SAM) to calculate the indirect and induced effects. The social accounting matrix provides detailed data on household income expenditures, allowing for a more accurate measurement of induced effects. Type I multipliers do not include any household impacts. Type II multipliers assume all labor income payments are to local residents. The SAM multiplier allows for social insurance and in-commuters, thus more accurately reflecting complex economies.

Induced effects are those associated with a change in economic activity due to spending by the employees of businesses (labor) and by households. Primarily, in this study, these are economic changes related to spending by bicycle industry employees. It also includes household spending related to indirect effects. As employees of the bicycle manufacturers make purchases locally, this triggers increases in purchases on that supply chain.

The indirect and induced effects of the bicycle industry are shown in the following tables, along with a discussion of the total impact. For more on the definitions of terms, please see appendix 1.

### Total Economic Contribution of the Bicycle Industry in Minnesota

In 2014, the bicycle industry in Minnesota supported an estimated \$779.9 million of economic activity in the state (Table 6). This includes an estimated \$208.8 million of wages, salaries, and benefits paid to Minnesota workers. In 2014, the industry further supported an estimated 5,519 employees.

Table 6: Total Economic Contribution of the Bicycling Industry in Minnesota: 2014  
Sum of Tables 7 through 9

	Direct	Indirect	Induced	Total
Output	\$486.0	\$152.3	\$141.6	\$779.9
Employment	3,650	829	1,040	5,519
Labor Income	\$105.1	\$55.8	\$47.9	\$208.8

Estimates by University of Minnesota Extension

Of the total activity supported by the bicycling industry, \$149.2 million was derived from the activity of bicycle-related retailers (Table 7). Retailers further supported the generation of \$52.2 million in labor income and employment for an estimated 2,189 workers.

Table 7: Total Economic Contribution of Bicycle-Related Retail Sales in Minnesota: 2014

	Direct	Indirect	Induced	Total
Output	\$95.9	\$17.8	\$35.5	\$149.2
Employment	1,827	105	257	2,189
Labor Income	\$34.3	\$5.9	\$12.0	\$52.2

Estimates by University of Minnesota Extension

Manufacturers and wholesalers of bicycles, parts, and related-accessories also contributed to the industry's impact. In 2014, manufactures and wholesalers generated \$616.6 million in economic activity (Table 8). Of this, \$149.6 million was labor income. Manufacturers and wholesalers also helped create 3,198 jobs in the state.

Table 8: Total Economic Contribution of Bicycle-Related Manufacturing and Wholesale Activity in Minnesota: 2014

	Direct	Indirect	Induced	Total
Output	\$383.1	\$132.1	\$101.4	\$616.6
Employment	1,738	708	748	3,194
Labor Income	\$66.3	\$49.0	\$34.3	\$149.6

Estimates by University of Minnesota Extension

Finally, bicycling non-profits and advocacy groups contributed to the state’s economy. In 2014, these organizations supported \$14.1 million of economic activity, including \$7.1 million of labor income. The organizations also helped generate 135 jobs (Table 9).

Table 9: Total Economic Contribution of Bicycle-Related Non-Profits and Advocacy Groups in Minnesota: 2014

	Direct	Indirect	Induced	Total
Output	\$7.0	\$2.4	\$4.7	\$14.1
Employment	85	15	34	134
Labor Income	\$4.5	\$1.0	\$1.6	\$7.1

Estimates by University of Minnesota Extension

## APPENDIX ONE: METHODOLOGY

Special models, called input-output models, exist to conduct economic impact analysis. There are several input-output models available. IMPLAN (IMpact Analysis for PLANning, Minnesota IMPLAN Group)<sup>5</sup> is one such model. Many economists use IMPLAN for economic contribution analysis because it can measure output and employment impacts, is available on a county-by-county basis, and is flexible for the user. IMPLAN has some limitations and qualifications, but it is one of the best tools available to economists for input-output modeling. Understanding the IMPLAN tool, its capabilities, and its limitations will help ensure the best results from the model.

One of the most critical aspects of understanding economic impact analysis is the distinction between the “local” and “non-local” economy. The local economy is identified as part of the model-building process. Either the group requesting the study or the analyst defines the local area. Typically, the local economy studied is a county or a group of counties that share economic linkages. In this analysis, the local economy is Minnesota.

The local economy is an important designation as it sets the parameter for imports. Imports are critical in input-output analysis because imports represent a leakage from the economy and do not generate additional economic activity. If a bicycle manufacturer purchases a component from another business in the local area, this will trigger additional economy activity in the economy. If the bicycle manufacturer purchases a component from a business located outside the local economy, this represents a leakage, and no additional activity will be generated locally. Typically, a smaller the local economy will result in a higher level of leakage.

A few definitions are essential in order to properly read the results of an IMPLAN analysis. The terms and their definitions are provided below.

### Output

Output is measured in dollars and is equivalent to total sales. The output measure can include significant “double counting”, particularly when examining an industry and its supply chain. In this bicycling analysis, for example, when a bicycle is sold, the sale price of the bicycle includes the mark-up to the

<sup>5</sup> IMPLAN Version 3.0 was used in this analysis. The trade flows model with SAM multipliers was implemented.



retailer, but also the value of the bicycle itself from the manufacturer and the value of all the component parts. If a bicycle component was manufactured in Minnesota and then sold to another Minnesota company, which in turn used the component to build a bicycle, the value of the component would be measured twice. First, it would be measured as a sale for the component manufacturer and second, it would be measured in the value of the sale by the company selling the bicycling. The sale could potentially be measured again if the bicycle was then sold by a Minnesota retailer.

Efforts were taken in this study to avoid double counting. First, as explained in the body of this report, retail sales were margined. Therefore, only the mark-up to the bicycle retailers were included in the economic contribution of the retailing.

### Employment

Employment includes full- and part-time workers and is measured in annual average jobs, not full-time equivalents (FTE's). IMPLAN includes total wage and salaried employees, as well as the self-employed, in employment estimates. Because employment is measured in jobs and not in dollar values, it tends to be a very stable metric.

### Labor Income

Labor income measures the value added to the product by the labor component. So, in the bicycle industry example above when the bicycle is sold from a Minnesota retailer, a certain percentage of the sale goes to the retailer for his/her labor. When the retailer buys the assembled bicycle, it includes some markup for labor costs from the manufacturer in the price. When the component manufacturer sells to bicycle manufacturer, they include a value for their labor. These individual value increments for labor can be measured, which amounts to labor income. Labor income does *not* include double counting.

### Direct Impact

Direct impact is equivalent to the initial activity in the economy.

### Indirect Impact

The indirect impact is the summation of changes in the local economy that occur due to **spending for inputs** (goods and services) by the industry or industries directly impacted. For instance, if employment in a bicycle manufacturing plant increases by 100 jobs, this implies a corresponding increase in output by the plant. As the plant increases output, it must also purchase more inputs, such as electricity, steel, and equipment. As the plant increases purchases of these items, its suppliers must also increase production, and so forth. As these ripples move through the economy, they can be captured and measured. Ripples related to the purchase of goods and services are indirect impacts. As mentioned above, only expenditures within the local economy will create indirect impacts.

### Induced Impact

The induced impact is the summation of changes in the local economy that occur due to **spending by labor**. For instance, if employment in a bicycle manufacturing plant increases by 100 jobs, the new

employees will have more money to spend to purchase housing, buy groceries, and go out to dinner. As they spend their new income, more activity occurs in the local economy. Induced impacts also include spending by labor generated by indirect impacts. As with indirect impacts, only local spending will trigger induced impacts.

### Total Impact

The total impact is the summation of the direct, indirect, and induced impacts.

### Input-Output, Supply and Demand, and Size of Market

Care must be taken when using regional input-output models to ensure they are being used in the appropriate type of analysis. If input-output models are used to examine the impact or the contribution of an industry that is so large that its expansion or contraction results in such major shifts in supply and demand that prices of inputs and labor change, input-output can overstate the impacts or contributions. While the bicycling industry is an important component of the Minnesota economy, it is not likely that its existence has an impact on national prices. Hence, the model should estimate the contributions reliably.

## APPENDIX 2: LIST OF BICYCLE-RELATED NON-PROFITS AND ADVOCACY GROUPS IN MINNESOTA

Using the GuideStar database and the keywords “bicycle” and “bicycling” the following non-profits and advocacy groups were identified in Minnesota (Table A1).

Table A1: Bicycle-Related Non-Profits and Advocacy Groups in Minnesota

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Bicycle Alliance of Minnesota  
Cuyuna Lakes Trail Association  
Cycle Health  
Cycles for Change  
Midtown Greenway Coalition  
Minneapolis Bicycle Coalition  
Minnesota Bicycle Festivals Inc  
Minnesota Fighting Aids on Bikes  
Minnesota Off Road Cyclists  
Mountain Bike Minnesota  
Nice Ride MN  
St Cloud Pineview Park BMX  
St Paul Transportation Management Organization  
Twin Cities Bicycling Club  
ULLR Ski Bike Social Club

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List Generated from GuideStar