BRIDGING THE GAP

Economic, Health, and Transportation Impacts from completing a critical link in a 22-mile rail trail

A BEFORE AND AFTER STUDY EXAMINING THE EFFECT OF A CONNECTIVE BRIDGE ON USE OF THE AMERICAN TOBACCO TRAIL IN THE TRIANGLE REGION OF NORTH CAROLINA
The American Tobacco Trail (ATT) extends 22 miles south from Durham, North Carolina in a former railroad corridor, and is part of the larger East Coast Greenway (ECG) network. Prior to the construction of a bicycle and pedestrian bridge over Interstate 40, the ATT consisted of two separate trail segments.

The Northern segment extends nearly seven miles south from downtown Durham to NC 54. The Southern segment continues approximately 14 miles south from Renaissance Parkway to New Hill-Olive Chapel Road in Wake County. Land use and demographic characteristics differ between the Northern and Southern segments of the trail. The Northern segment generally passes through developed areas with commercial and residential uses. The Southern trail segment goes through several residential communities near its northern terminus, before passing through rural areas. The bridge segment now links the Northern and Southern segments.

The completion of this critical link generated economic, health, recreation, and transportation impacts. Before (2013) and after (2014) data were collected and compared to determine changes in trail usage affecting transportation, health, and economic behaviors resulting from the construction of the bridge.
Trail users impact businesses by purchasing a variety of goods and services. An IMPLAN® model was used to estimate economic effects from trips made on the trail.

What is the impact of the bridge on the economy?

There was a widespread increase in trail usage, from 217,900 trips in 2013 to 508,100 trips in 2014. This represents a 133% increase in annual trail users following installation of the bridge segment.

**Direct Expenditures**

Direct annual expenditures on groceries, retail, and restaurants related to trips on the trail rose from approximately $2.4 million pre-bridge to $6.1 million post-bridge - an increase of $3.7 million. The greatest increase in trip-related expenditures was at restaurants, followed by retail stores and grocery stores. Approximately 30% of trail users reported purchasing goods or services related to their trip on the trail, with an average expenditure of approximately $16 both before and after the bridge was completed.

**Economic Impact**

The economic impact of expenditures associated with use of the trail included estimates of direct, indirect, and induced impacts. Direct impacts resulted from expenditures by trail users at businesses, including grocery, retail, and restaurants. The indirect and induced impacts capture multiplier impacts of the direct expenditures. Measures for which impacts were estimated included number of payroll employees (jobs), total payroll costs (employee compensation), and gross revenue (output).

After construction of the bridge, trail users’ annual expenditures supported an additional 43 jobs, $1.3 million in employee compensation, and $4.9 million in gross business revenues.
Everyone who uses the trail engages in physical activity. More than 90% of those surveyed indicated the primary purpose of their trail use that day was for exercise or recreation.

**Caloric Expenditure**

Calories burned were calculated from the estimated number of trips by people using the trail annually in the study area. Two factors from self-reported survey data were used: the average duration of the active portion of a trip and the type of activity on the trail. Overall, an average of 5.5 million calories (the equivalent of about 19,000 cheeseburgers) were burned weekly by travelers on the trail through the study area after the bridge opened.

There was an increase in activity on the trail now that the bridge segment is open. It is estimated that people using the trail now burn 175 million more calories annually, an increase of 163%.

**Increase in Physical Activity**

The amount of physical activity occurring on the trail increased substantially just three months after the opening of the bridge. Now that the trail provides an avenue for travel across I-40, people exercise an average of four minutes longer and travel 27% farther. Both men and women increased the duration of their physical activity. Adults’ use of the trail makes them more likely to meet the national Physical Activity Guidelines now than prior to construction of the bridge segment.

**Average Trip Duration**

<table>
<thead>
<tr>
<th>Gender</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>68</td>
<td>66</td>
</tr>
<tr>
<td>Female</td>
<td>58</td>
<td>56</td>
</tr>
</tbody>
</table>

**After the bridge segment opened, average travel duration for trail users increased to 162 minutes per week.**

The activity level on the trail now meets recommended guidelines for moderate-intensity physical activity.

**Lower Income Trail Users**

Some lower income trail users experienced activity benefits even greater than the average. Generally, the average active trip duration increased as household income increased. However, duration increased by an average of five minutes for households with incomes of less than $15,000 and by an average of seven minutes for those with incomes of $30,000 - $44,999.
The bridge provides a dedicated active transportation facility that links commercial centers with nearby residential neighborhoods.

**WHAT ARE THE CHANGES TO TRANSPORTATION?**

**More Opportunities for Active Transportation**

Before the bridge linked the two trail segments, those using the Northern segment were limited to a trail length of approximately seven miles. With the bridge in place, people from the Northern segment have the option to travel on the Southern part of the trail, allowing longer travel distances. Following construction, the difference in average trip distance narrowed between the two trail segments across all activity types.

Prior to the opening of the bridge, half of those using the trail traveled by car to get to the trail, and half used active transportation (traveling on foot or by bicycle). Following the opening of the bridge, the proportion of people who walked, biked, or jogged to the trail increased by 4%.

**Shift in Non-Recreational Trips**

Most people used the trail for exercise or recreational purposes and exited at the same place where they entered the trail. However, through-trips in the study area increased by 2% after the bridge was completed. The proportion of non-recreational trips increased from 5% in 2013 to 8% in 2014.

**The average trip distance on the trail increased from 7.3 miles to 9.3 miles after the bridge opened, a 27% increase.**
The research team used a ‘before and after’ approach to evaluate the impacts of the bridge. Intercept surveys and manual counts were conducted on two weekdays and two weekend days in May and June 2013 and again one year later in May 2014, three months after the bridge was completed. Data were collected for 13 consecutive hours (7 AM – 8 PM) on each of the four days in the before and after periods. Origin, destination, and round trip data from surveys were analyzed in tandem with information from the counts to develop an estimate of the number of annual visits by people using the trail in the study area. Saturday data collected in 2013 and 2014 were used to calculate an estimate of annual user trips in the study area by using weather data (precipitation and temperature) to create relative ratios of use for each day of the year from May 2013 to May 2014.

Although this study cannot show a causal relationship between changes in behaviors from the before to the after period, it is difficult to attribute the majority of activity increases, or “induced usage,” to any event other than the completion of the bridge and its connections that now provide a continuous 22-mile rail trail. This research adds to the growing body of evidence that shows the built environment can positively influence physical activity for recreation and transportation purposes.
The construction of the American Tobacco Trail bridge over Interstate 40 in Durham, NC provided an opportunity to determine the impacts of an infrastructure improvement following its construction. The study compared data from before the bridge opened in 2013, to data collected after the bridge segment was completed. The findings provide empirical evidence that constructing bicycle and pedestrian facilities, particularly those that complete a critical link in a non-motorized transportation network, result in measureable positive impacts.

An additional $3.7 million is spent annually on goods and services by those using the trail since completion of the bridge.

Three months after the bridge segment opened, the research finds exceptional gains in trail usage, the amount of physical activity, and economic impacts.

A before and after study of the Bridge & Connections linking a community.

Why is this Research Important?

As transportation decision-making processes increasingly rely on data-driven metrics to prioritize projects, it is important to determine if investments in bicycle and pedestrian projects are worth their costs. Many project prioritization processes incorporate metrics beyond those directly related to transportation, such as a project’s impact on public health or economic development.

Key Findings from the Research

- Average distance traveled on the trail increased by an average of nearly three miles for bicyclists and a half mile for pedestrians.
- Average duration of active travel associated with use of the trail increased from an average of 138 to 162 minutes per week.
- An additional $3.7 million is spent on an annual basis on goods and services by those using the trail since completion of the bridge.
- Economic impacts from trail use include the creation of 43 additional jobs, $1.3 million in additional employee compensation, and $4.9 million in additional business gross revenues annually.
This research was funded by the North Carolina Department of Transportation Division of Bicycle and Pedestrian Transportation, the Helen and William Mazer Foundation, and the Blue Cross Blue Shield Foundation, with support from the East Coast Greenway Alliance and the City of Durham. The authors would like to specifically thank Lauren Blackburn, Steven Bercu, Jasmine Smith, Dennis Markatos-Soriano, KoSok Chae, and Dale McKeel from these respective organizations for their guidance throughout this project. Special thanks is also extended to Walter Thomas for his data entry assistance and the 57 students and volunteers who assisted with data collection, without whom we would not have been able to conduct the research.

To download a copy of the report visit:
http://www.itre.ncsu.edu/public/bikeped.html

2500 copies of this document were printed at a cost of $.63 per copy.