
Trails Benefits Library

Data Sources and Methods

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This document describes the data sources and methods used to generate the [Trails Benefits Library](http://headwaterseconomics.org/trail) (<http://headwaterseconomics.org/trail>).

To help community leaders, elected officials, trail users, and others better understand the implications trails can have in their community, Headwaters Economics compiled more than 120 studies related to the benefits of trails in a single library, searchable by type of benefit, type of trail user, year, and region. For each study we summarize the most important findings, the audience that would find the study most useful, any caveats to interpreting the results, the study sponsor, and the methods. We also include a link to the original study.

This library includes studies that analyze benefits from specific trails or user groups. Included studies in this library were published in either the peer-reviewed or grey literature. This library does not include articles from popular press, or overviews of general benefits from trails. All monetary estimates are in real dollar terms for the year the study was published.

Benefits Categories

In this library we include a broad range of benefits, including trail use estimates, business impacts, consumer surplus, property value, public health, and user attitudes about trails. Descriptions of the benefits categories and background on the methods used to estimate them follow.

TRAIL USE ESTIMATES

Trail use estimates are the foundation upon which most trails benefits studies are built. These estimates are often calculated using a combination of data from automatic trail counters and on-site manual counts, which help verify the trail counter data, distinguish between round trips and point-to-point trips, and identify different user types such as walkers and cyclists. The manual counts are often done in conjunction with user surveys that assess attitudes about a trail and can also be used to learn the mix of local and non-local users.

All manual counts are improved when they are conducted during several times of day and days of the week. The most accurate estimates of annual use come from manual counts conducted during a longer time period to cover multiple seasons.

It is important to remember that data from trail counts do not provide information on the proportion of community residents who use a trail. To determine that figure, one must conduct a community-wide survey that can capture the opinions of users and non-users.

BUSINESS IMPACTS

Business impact studies are the most common type of analysis included in this library. They generally measure the total business revenue, jobs, and labor income attributable to a trail or, in the case of state-wide studies, a type of recreation. Some studies also include estimates of additional state and local tax revenue. Most economic impact studies implicitly analyze a change from a baseline condition, such as the difference in business revenue in a community before and after a trail is constructed.

Economic impact occurs when new money is brought into a community, generally by attracting spending by non-locals. Higher quality economic impact studies distinguish between spending by locals versus non-locals, and the definition of what is local depends on the scope of the analysis. For example, for an analysis of a specific trail, “local” may be just the city closest to a trail and “non-local” could be a resident from a different region within the state. But for a state-wide study, “local” would be the entire state.

Many economic impact studies break out the effects of visitor spending into three categories: direct, indirect, and induced. Direct effects refer to the initial spending by a trail user on goods and services in the local economy, such as restaurant meals. Indirect effects refer to the purchases made by business owners to support their businesses, such as wholesale food for the restaurant meals. Induced effects are the additional spending that occurs in the economy when workers in the businesses where trail user money is spent themselves spend their income in the community. This ripple effect that local spending has on the economy is known as a multiplier effect.

In the summaries for each study, we only report the direct effects because estimating indirect and induced effects involves many assumptions and we wanted to make it as easy as possible to compare results across different studies.

In addition to local spending by trail users, some studies look at the economic impact of trail construction and maintenance in terms of revenue, jobs, and labor earnings for local construction businesses. Although trail construction projects can be associated with significant construction costs, this does not necessarily mean new spending and economic impact if these funds simply came from another part of the local budget. However, the portion of funding that came from outside grants or other funding sources would create an economic impact.

Economic impacts are most commonly built on data regarding trail use and spending profiles of trail users, which are input into statistical regional economic models. The most common models used are IMPLAN and REMI, although there are several others.

CONSUMER SURPLUS

To measure how much individuals enjoy a trail, economists have developed a concept called “consumer surplus.” Consumer surplus is a way to measure, in dollar terms, what a day of trail use is worth to a trail user. To estimate consumer surplus, researchers survey trail users to

learn what they had to pay to use a trail, such as gas to drive to a trailhead and access fees, and the maximum they would have been willing to pay. The difference between actual cost and what they were willing to pay is their consumer surplus. The total benefits of a trail are the average consumer surplus for users multiplied by the total number of users.

Although consumer surplus is intangible, it is our best measure of an individual's intrinsic value for something they do not necessarily have to pay for, such as a day of hiking. This method has been studied and tested extensively, and has been considered valid evidence in legal cases.

Because consumer surplus measures the benefits from something people do not actually have to pay for, it cannot be simply added to economic impact estimates. Most studies of benefits from trails estimate one or the other, or they report them both separately.

PROPERTY VALUE

Property owners near proposed trails are sometimes concerned that a new trail near their home could decrease their property value. Researchers have used two approaches to answer this question: homeowner surveys and statistical modeling.

The survey approach involves asking homeowners, and sometimes realtors as well, whether they believe their home value is higher due to its proximity to a trail, whether their home would sell more quickly due to its proximity to a trail, and, in cases where a trail was built after they moved to their home, whether a new trail would increase their property value. Some surveys also ask homeowners to estimate how much more their home is worth due to a trail.

While this method is relatively easy to implement, it likely provides biased results because homeowners' responses reflect their own perception of a trail, not the broader real estate market. Homeowners who like a trail will be more likely to say a trail makes their home more valuable and easy to sell, even if a trail is relatively unpopular in the community. The opposite also holds true.

The statistical modeling approach, called "hedonic price modeling," involves using data on home sales close to and farther from a trail. The model uses statistical methods to compare sale prices of homes that are the same in terms of structural characteristics about the house (e.g., size, age, number of bedrooms) and characteristics about the neighborhood (e.g., school district and proximity to employment centers), but different in terms of proximity to a trail. Because all other characteristics of the house are the same, the difference in sale price between these two homes is a measure of the value of proximity to a trail.

Hedonic models are more reliable than homeowner surveys, but they require statistical expertise and careful analysis. In this library we include examples of both types of approaches, and describe biases that may be present in the findings. The best way to use these types of analyses is to compare findings across several studies and make sure the results are within the range of what other research has found.

PUBLIC HEALTH

One of the biggest benefits from trails is the improved public health associated with increased physical activity for residents. To measure this benefit, several studies have evaluated the change in residents' levels of physical activity after a trail is built. The best examples of these studies are conducted using surveys of a random sample from the local population to determine the proportion of residents who use a trail, rather than relying on trail-side surveys, which only capture the activity levels of those who are already using a trail.

Some researchers monetize the public health gains and compare them to the cost of building and maintaining a trail, calculating a cost-effectiveness ratio. This estimated cost per newly active resident could be a compelling figure for communities that have clear physical activity goals and are comparing the relative cost of different ways to increase residents' physical activity.

Other studies estimate avoided health care costs associated with increased physical activity. These studies use existing research that measures the change in prevalence of diseases for those with a sedentary versus active lifestyle, and assume that physically active residents will have lower disease incidence. Using data on average costs to treat these diseases, the authors estimate avoided health care costs attributable to trail use. Although this is a compelling figure, because these studies assume that physically active residents would not have been active if not for a trail, the estimates are likely higher than actual health cost savings. The most careful studies use only the number of residents who are newly active due to a trail and for whom a trail is their only form of exercise.

USER ATTITUDES

Benefits from trails can also be measured in terms of residents' attitudes about a trail and frequency of use. These are generally obtained via either user surveys conducted on a trail or surveys of the general public conducted via mail, phone, or the Internet. User surveys are often conducted in conjunction with manual user counts along trails. Whether the survey was conducted with trail users or the general public determines whether the findings can be extrapolated to trail users only or to the broader community.

These surveys can be used to learn about trail use, spending associated with a trail, physical activity in general and specifically associated with a trail, and aspects of a trail that could be improved. The studies included in this library provide examples of the types of questions to ask and how to interpret the findings.

Population Context for Study Location

Many studies estimate annual users on a particular trail. Without knowing the population, it is difficult to know whether an estimate represents a large number of users. In the Location section of each study summary, we include a population estimate to provide context for the size of the nearest community.

Data Source: U.S. Department of Commerce. Census Bureau, Population Division, Washington, D.C.; Statistics Canada. 2013. 2011 Census of Population, Ottawa, Ontario.

A Word on Research Quality

Before using study results, it is important to understand how well the research represents the trail users or the community being studied. This can be determined by looking at the sampling method, the sample size, and the response rate. Where provided by the study, we include this information in the study summary.

Sampling can occur several ways: convenience sampling, intercept surveys, and random community sampling.

A convenience sample involves setting out surveys at trailheads and businesses, allowing any interested respondent to fill it out. Because this method usually gets responses only from the most opinionated users, the results can overstate the benefits or popularity of a trail, even among users. The opposite also can hold true, if a trail has been particularly contentious.

For an intercept survey, interviewers ask trail users to complete a survey, and will generally sample every trail user or every third user, depending on how busy the site is. Provided users are surveyed at different sites along a trail (if there are multiple access points) and at different times of day and days of the week, these surveys provide an accurate snapshot of trail user preferences, though they do not provide information about the general public's perception of a trail.

To understand the community's opinion regarding a trail, researchers often conduct a survey of a statistically random sample of the community, implemented via phone, mail, and online. This approach results in data that best represent community-wide opinions.

Larger sample sizes and higher response rates generally mean the survey represents the population more accurately. What constitutes a "large" sample size depends on the study context. If the study is analyzing a trail in a rural community, then 500 responses would be "large." However, if it were a state-wide study, then 500 responses would not be large. There are no hard rules about what constitutes a satisfactory response rate, although in this type of survey research, lower than 20 percent is unusually low, and higher than 70 percent is unusually high. If a study does not have a large sample or high response rate, the reader should be aware that the responses may be biased and the findings should be used with these caveats in mind.

Adding Studies to the Library

Headwaters Economics will continue to expand this library as we learn about new studies. To notify us of a potential study to include, please contact us.

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About Headwaters Economics

Headwaters Economics is an independent, nonprofit research group whose mission is to improve community development and land management decisions in the West.