

2022

# Chattanooga Mountain Biking Impact Report



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2/1/2022

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# Mountain Biking Impact

**\$6.9 Million**

*Impact on Hamilton County economy*

**\$4.3 Million**

*Impact on 30 surrounding counties*

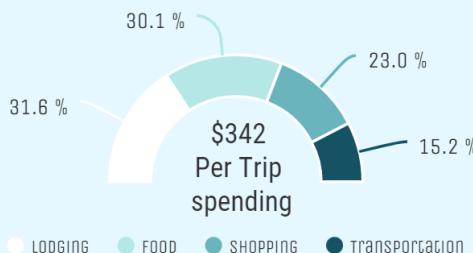
**\$498,225**  
*Federal Taxes*

**\$482,999**  
*State & Local Taxes*



**48,315**  
*Total Visits*

**16,910**  
*Tourist Visits*



   
Visitors travel in groups of 3 and stay an average of 4 days



Protected areas save \$326,015 in air quality and \$2.5 million in water quality mitigation annually

**85.5 miles of trail require roughly \$128,250 in annual maintenance**

## Rider Demographics

 Avg. Income of \$80-100K



80% Male  
20% Female

**40**  
*Years Old*

Surveys were collected in person at five regional trailheads (n = 202) and through an online link shared through the SORBA Chattanooga and city outdoor tourism Facebook and Instagram pages (n = 245). In-person surveys were collected using a randomized collection schedule, including three-hour stints at five popular biking areas. The collection schedule was skewed heavily toward the weekends, though one weekday was included each week. Data were collected from September through November 2021, over a total of 35 time slots. Investigators used a random-intercept method, approaching the first group to arrive at the area, then the very next group encountered after receiving surveys from the previous group. Total per-trip expenditures were solicited for lodging, transportation, food, entertainment, and retail spending while in the county of interest, and impacts were assessed using IMPLAN, to estimate annual direct, indirect, and induced impacts to the local economy. Total visits were estimated with the use of Pyrobox® trail counters at two entrance points to one popular biking area. This number was then used to extrapolate visits to other areas in the region. Survey respondents estimated total biking days in the past year to each site, providing visitor ratios for comparison across locations.

**Research conducted in collaboration with SORBA Chattanooga and the UTC Tourism Center.**

## Executive Summary

- Mountain biking in the Hamilton County region attracts **44,089 annual visits**, including **16,910 from tourists** outside of the county. The more remote areas of Tanasi & Chilhowie bring in another 4300 visits, though not directly impacting Hamilton County.
- 65% of visitors are Hamilton County Residents, 80% were male, with an average age of 39.5, average having a Bachelor's degree or higher, and earning \$80-\$100k a year.
- The most popular forms of lodging were Hotels (23%), home rentals (16%) and "Other- mainly AirBnB" (25%).
- Group size averages 2.75, and they stay 3.8 nights, spending roughly **\$342.33 per individual per trip**.
- Accounting for group size and trips per year, mountain bikers contribute **\$6,892,502** to the local economy. These expenditures generate **\$482,999 in county and state taxes**, and **\$498,225 in federal taxes**.
- **85.5 miles of trail on 3435 acres of protect land** mitigate nearly **\$3 million** in air and water mitigation costs annually, but require over **\$128k for trail maintenance**.

## Recommendations

- Appoint an Executive Director of SORBA Chattanooga, to conduct administrative operations and organize regional initiatives.
- Establish a donation campaign to generate regular revenue, including QR codes and appropriate messaging at trailhead kiosks.
- Promote visits from non-regional tourists, to enhance economic impact and establish a wider support base for initiatives. Focus on current visitor origins, and tourist priorities (i.e. trailhead restrooms).
- Cement partnerships with other non-profit organizations, such as the Southeastern Climber's Coalition, local land trusts, and city/county parks and recreation departments to maximize recreation and conservation assets.
- Prioritize projects that broaden the trail repertoire and appeal of Chattanooga for locals and non-locals. The new downhill system at Walden's Ridge is a prime example that also leverages partnerships.

## Project Overview

In conjunction with the Southern Off Road Bicycle Association (SORBA Chattanooga), the University of Tennessee Chattanooga presents a report showcasing the economic impact and consumer behaviors of visitors mountain biking at popular areas in the region.

Contained in this report is a concise overview of the direct and indirect impact these mountain bikers have on Hamilton County. The direct impact represents actual dollars spent at local restaurants, hotels, gas stations, etc. by non-local visitors to the area. Total impact is calculated by assessing the ripple effects (indirect impact) the direct spending then has on specific industry in Hamilton County, TN.

### METHODS

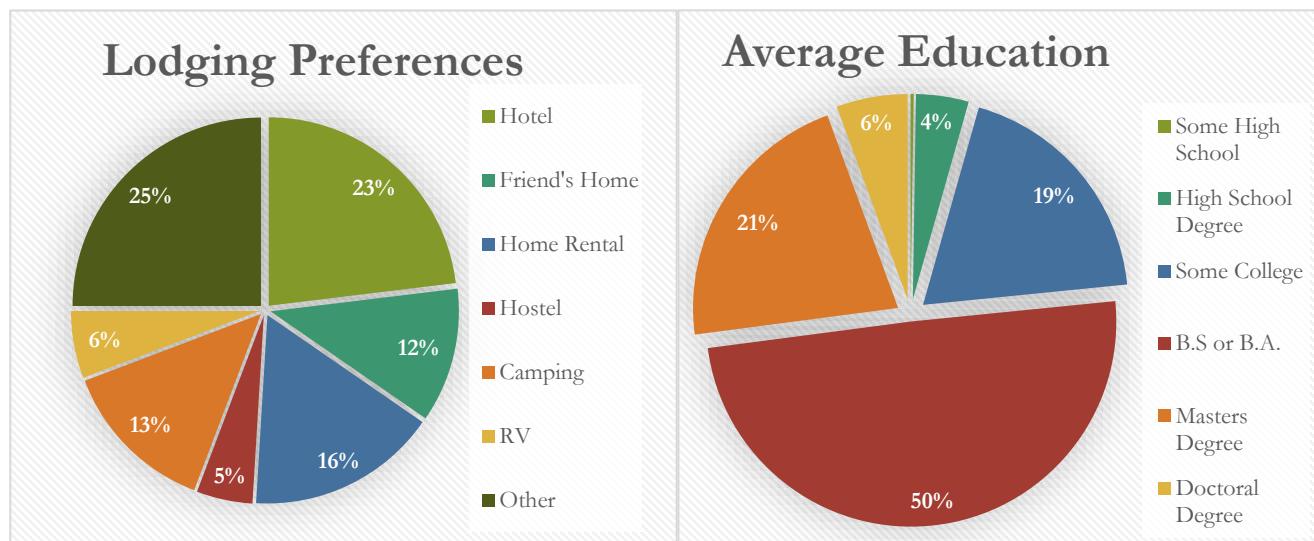
Surveys were collected in person at five regional trailheads (n = 202) and through an online link shared through the SORBA and city outdoor tourism Facebook and Instagram pages (n = 245). In-person surveys were collected using a randomized collection schedule, including three-hour stints at five popular biking areas. The collection schedule was skewed heavily toward the weekends, though one weekday was included each week. Data were collected from September through November 2021, over a total of 35 time slots. Investigators used a random-intercept method, approaching the first group to arrive at the area, then the very next group encountered after receiving surveys from the previous group. Preliminary analysis revealed that online respondents were significantly older (5 years), slightly higher educated and earning slightly higher incomes, so demographic variables were reported using only in-person averages. With a response rate of 70%, in-person survey respondents were 76% male, mostly Caucasian (90%), having an average age of 36.3 and a median household income of \$80k - \$100k. Two-thirds (65%) of those surveyed were local residents. No significant difference was identified in demographics between tourists and locals (i.e. experience level, age, income, education, gender, number of children).

## Descriptives and Travel Information

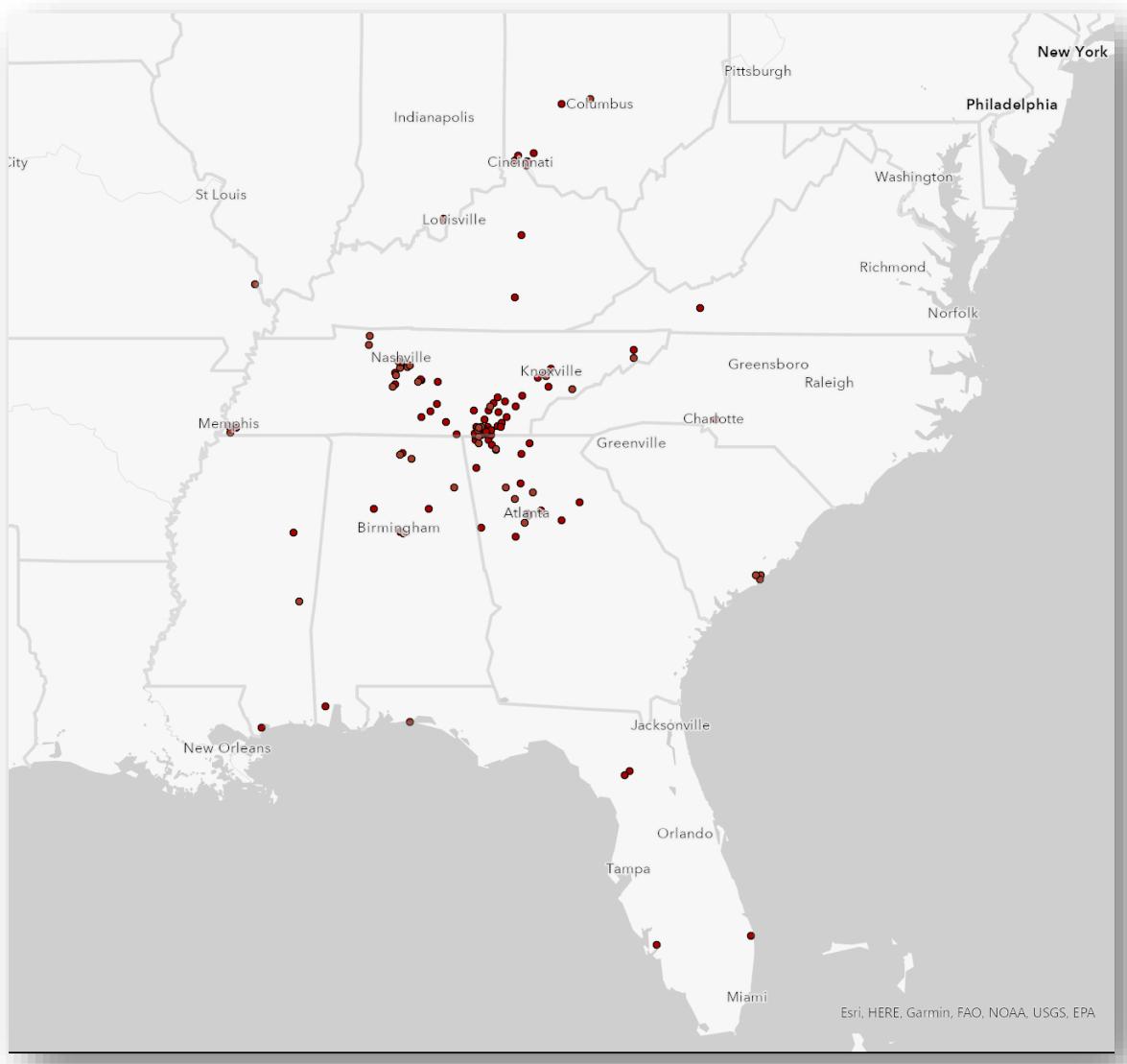
**Table 1. Visitor Demographics**

<b>Female</b>	20%
<b>Male</b>	80%
<b>Number in Party</b>	2.75
<b>Days of Trip</b>	3.81
<b>Nights of Trip</b>	2.61
<b>Average Age</b>	39.9

- *Mountain bikers are, on average, 39.5 years old, predominantly male, educated, and earn an upper-middle class income (\$80-100k).*
- *Visitors stay an average of 4 days. 3 nights, and prefer to stay in hotels, rental homes, and AirBnB rentals when traveling to the region.*



## ORIGIN OF TRAVEL



- *65% of mountain bikers on local trails reside in Hamilton County.*
- *Residents hit the trail an average of 51 days annually, while visitors manage 24 days on trails in our region.*

## Expenditures & Impacts

### EXPENDITURE CATEGORIES

**Table 2. Average Expenditures per Discrete Category**

Spending Categories	Average Spending	Total Spending
<b>Food</b>	\$88.83	<u>\$1,502,217</u>
<b>Lodging</b>	\$85.49	<u>\$1,445,700</u>
<b>Entertainment</b>	\$39.99	<u>\$676,272.10</u>
<b>Shopping</b>	\$64.94	<u>\$1,098,145</u>
<b>Transportation</b>	\$42.86	<u>\$724,778.50</u>
<b>Misc.</b>	\$20.22	<u>\$341,918.60</u>
<b>Total Direct Impact</b>	<b>\$342.33</b>	<b>\$5,789,031.26</b>

- The largest expenditures for visitors to the region are on food and drink, followed by lodging and retail shopping (including gear).
- Visitors spend an average of **\$342.33 per trip**, producing a direct economic impact of **\$5,789.031** for the county.

## DIRECT, INDIRECT & INDUCED IMPACTS

**Table 3. Direct, Indirect, and Induced Impact**

Impact Type	Employment	Labor Income	Total Value Added	Output
<b>Direct Effect</b>	58.0	\$1,612,020	\$2,634,722	\$4,592,094
<b>Indirect Effect</b>	7.5	\$426,113	\$706,254	\$1,177,437
<b>Induced Effect</b>	8.1	\$412,688	\$695,975	\$1,122,971
<b>Total Effect</b>	73.6	\$2,450,821	\$4,036,950	\$6,892,502

- The economic impact of mountain biking supports **73 full time employees** in Hamilton County.

Total Economic Impact is the result of a non-linear ripple effect generated from the direct spending of visitors in Hamilton County. In the table above, the **Direct Effect** represents the marginal (non-leaked) money remaining in the region. **Indirect Effects** are the result of local businesses spending more on employment and materials, as a result of added business. **Induced Effects** include additional spending by local employees as a result of increased hours/income due to the activity. Further, these effects impact the region in various ways: 1) **Employment**: the number of full-year, full-time jobs supported by visitors, 2) **Labor Income**: added income for current employees, 3) **Total Value**: true profits after accounting for employment, taxes, and other everyday business expenses, and 4) **Output**: total overall sales and revenue from mountain bikers.

Given a multiplier of 1.63 for the surrounding 30-county region (Menard et al., 2013), the surrounding counties gain \$0.63 for every \$1 spent by mountain bikers in Hamilton County; or a total of \$4,342,276.

## TOP INDUSTRIES IMPACTED

**Table 4. Top 10 County Industries Impacted.**

<i>Description</i>	<i>Total Employment</i>	<i>Total Labor Income</i>	<i>Total Value Added</i>	<i>Total Output</i>
<b>Food services and drinking places</b>	25.8	\$669,603	\$923,755	\$1,778,464
<b>Hotels and motels, including casino hotels</b>	12.6	\$366,012	\$918,680	\$1,621,568
<b>Other amusement and recreation industries</b>	12.1	\$333,563	\$431,941	\$757,931
<b>Retail Stores - General merchandise</b>	5.6	\$168,859	\$256,732	\$346,804
<b>Retail Stores - Miscellaneous</b>	3.5	\$92,970	\$135,656	\$172,747
<b>Retail Stores - Gasoline stations</b>	1.0	\$53,986	\$70,570	\$94,026
<b>Employment services</b>	0.9	\$32,297	\$34,762	\$42,969
<b>Services to buildings and dwellings</b>	0.8	\$29,288	\$34,679	\$61,007
<b>Real estate establishments</b>	0.5	\$23,763	\$78,045	\$100,848
<b>Offices of physicians, dentists, and other health practitioners</b>	0.5	\$52,913	\$53,629	\$83,779

- Expenditure information was collected for discrete categories, coinciding with industry data in the IMPLAN software. Based on the most recent industry data specific to Hamilton County, TN, direct expenditures were analyzed to determine the specific impact on the local economy.
- Mountain Bikers traveling to Hamilton County have the strongest impact on restaurants and bars, followed by hotels, amusements, and retail.
- This points to key partners for generating political and financial support for mountain biking in the region.

## STATE AND LOCAL TAX IMPLICATIONS

**Table 5. Annual Induced Local and State Impacts**

<i>Description</i>	<i>Employee Compensation</i>	<i>Tax on Production and Imports</i>	<i>Households</i>	<i>Corporations</i>
Dividends				\$248.00
Social Ins Tax- Employee Contribution	\$967.00			
Social Ins Tax- Employer Contribution	\$1,901.00			
Tax on Production and Imports: Sales Tax		\$291,944.00		
Tax on Production and Imports: Property Tax		\$127,183.00		
Tax on Production and Imports: Motor Vehicle Lic		\$4,368.00		
Tax on Production and Imports: Severance Tax		\$240.00		
Tax on Production and Imports: Other Taxes		\$30,915.00		
Tax on Production and Imports: S/L NonTaxes		\$3,086.00		
Corporate Profits Tax				\$8,211.00
Personal Tax: Income Tax			\$1,476.00	
Personal Tax: NonTaxes (Fines-Fees			\$8,798.00	
Personal Tax: Motor Vehicle License			\$2,150.00	
Personal Tax: Property Taxes			\$590.00	
Personal Tax: Other Tax (Fish/Hunt)			\$920.00	
<b>Total State and Local Tax</b>	<b>\$2,868.00</b>	<b>\$457,738.00</b>	<b>\$13,934.00</b>	<b>\$8,459.00</b>
			Grand Total	\$482,999.00

- Mountain Biking in Chattanooga generates **\$482.999 in state and local taxes** annually, including indirect and induced effects from employers and employees who benefit from extra business.

## FEDERAL TAX IMPLICATIONS

**Table 6. Annual Induced Federal Impacts**

<i>Description</i>	<i>Employee Compensation</i>	<i>Proprietor Income</i>	<i>Tax on Production and Imports</i>	<i>Households</i>	<i>Corporations</i>
<b>Social Ins Tax- Employee Contribution</b>	\$97,935	\$11,752			
<b>Social Ins Tax- Employer Contribution</b>	\$127,643				
<b>Tax on Production and Imports: Excise Taxes</b>			\$44,361		
<b>Tax on Production and Imports: Custom Duty</b>			\$17,587		
<b>Tax on Production and Imports: Fed NonTaxes</b>			\$5,040		
<b>Corporate Profits Tax</b>					\$69,843
<b>Personal Tax: Income Tax</b>				\$124,065	
<b>Total Federal Tax</b>	\$225,577	\$11,752	\$66,988	\$124,065	\$69,843

- Mountain biking in Chattanooga generates **\$498,225 in federal taxes** annually. This figure should be of particular interest to federal land managers overseeing mountain biking trails.

## Environmental and Fiscal sustainability

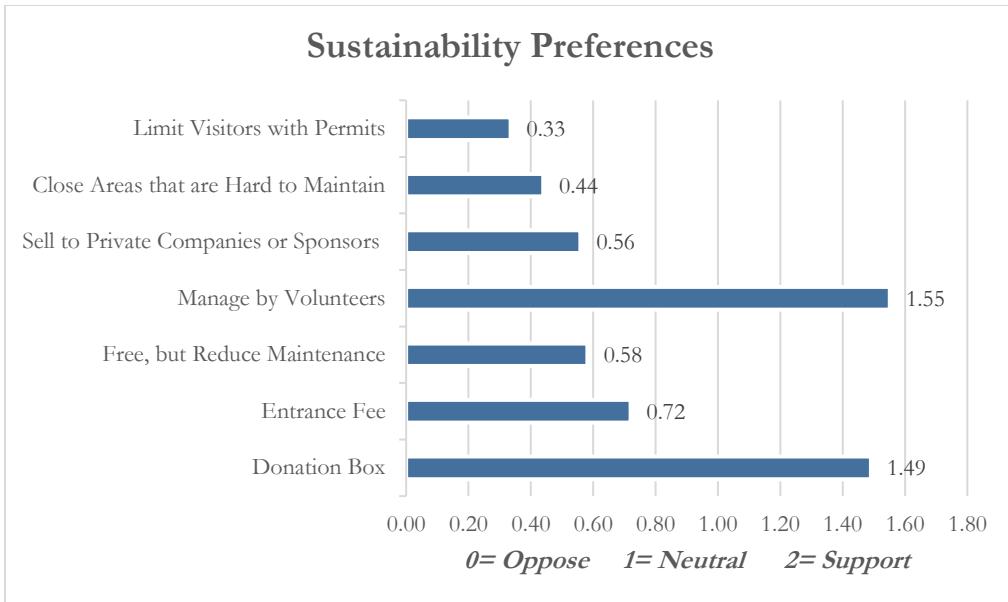
### DIRECT CONSERVATION VALUE

Recreation and conservation often coexist, and the establishment of beloved biking trails on protected land can help ensure the long-term preservation of natural areas. These areas, in turn, serve as buffers that mitigate air and water quality issues associated with adjacent urban environments. Previous studies have established values associated with these natural processes (Bedimo-Rung et al., 2005), which are regularly adjusted for inflation by the National Recreation and Parks Association (NRPA). For every acre of forested land, \$94.91 of negative air quality impacts, and \$747 of negative water quality impacts are prevented.

Recent water quality issues and increasing regional development have necessitated upgrades to Chattanooga's wastewater treatment facilities. Having recently approved a \$19 Million upgrade to the Moccasin Bend facility, natural methods of mitigation should prove valuable to regional planning administrators. A total of 3435 acres are dedicated to mountain biking trails in the region, equating to ***preventive costs of \$326,015 for air and \$2,565,945 for water mitigation*** annually.

### REVENUE GENERATION

Participants were asked about preferences for achieving fiscal sustainability on three-point scale (0= oppose, 1 = neutral, 2 = support). These items were based on common practices in the region, as well as in other mountain biking locations. As seen in the figure below, the only clearly supported initiatives were establishing donation boxes at trailheads and promoting non-profits as arbiters of access and maintenance. Entrance fees were marginally opposed, while all other initiatives generated less overall support. No significant differences were found for methods of fiscal sustainability between tourists and residents.



Significant differences were found regarding the price one would willingly pay for a day use fee ( $F= 5.997$ ,  $p = .015$ ), with residents (25% versus 16%) being more likely to “go elsewhere” and less willing to pay \$5 or more than tourists (57% versus 64%). Understandably, those making the most annual visits were less willing to pay a fee ( $r = .290$ ,  $p < .001$ ). A \$5 day fee would raise \$84,550 annually, or \$29,592.50 if only charged to non-residents. If 16% of non-locals were deterred from coming, though, it could result in a loss of \$1,102,800 in economic impact for the county. However, the revenue from day fees would go directly to mountain biking initiatives, while none of the economic impact goes directly back to mountain biking in the region.

One form of in-kind services is that of volunteerism from local activity advocates. Based on average volunteer hours of local residents (Mean = 15.74), a total of 10,298 volunteer hours are contributed annually in the region. Given an established value of \$28.54 per hour for volunteer work (IndependentSector.org, 2021), this accounts for \$293,913.50 of donated time and effort. However, 29.6% of respondents volunteered zero hours, indicating a potential source of untapped support.

Those who volunteered more hours, were also more advanced riders ( $r = .146$ ,  $p = .021$ ), spent more on biking equipment annually ( $r = .287$ ,  $p < .001$ ), were more willing to pay a higher day use fee ( $r = .166$ ,  $p = .009$ ), and less likely to prioritize free access to bike trails ( $r = .184$ ,  $p = .004$ ). There was no relationship between volunteer hours and education or income. Thus, it's evident that volunteers understand the work that goes into maintaining trails and are willing to support it financially.

## EXPENSES

Managing miles of biking trails requires indirect (administrative) and direct (maintenance) costs. The International Mountain Biking Association (IMBA) recommends an annual maintenance budget of 1/10 the cost of trail construction. Trail construction ranges from \$50-\$70k per mile. With roughly 85.5 miles of trail under the purview of SORBA Chattanooga, that would require a minimum of \$427,500 for annual maintenance costs. A lower bound is provided by a recent Rails to Trails report (2015), indicating land managers spend roughly \$1500 per linear mile on trail maintenance annually. This lower estimate would still require \$128,250 for the SORBA Chattanooga region alone. The most costly tasks include: 10.8% surface debris, 5.4% tree removal, 5.4% drainage, 2.7% parking areas, 2.7% litter, 13% toilets, 6.3% signage. Some of these expenses are covered by land managers, but the rest is left to non-profits and volunteers, often appealing for the support of local foundations. A reliable revenue source would ensure consistent trail conditions and encourage continued income from visitors to the county.

## NON-PROFIT ADMINISTRATION

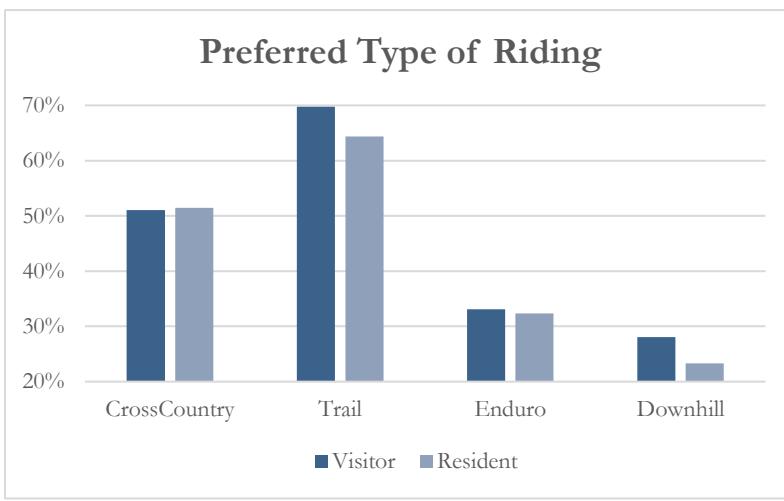
Given that most participants would prefer trail access and maintenance be managed by non-profits dedicated to the sport, administrative costs should be included in the sustainability model. Currently, SORBA Chattanooga consists of a volunteer board with no paid director or staff. This accounts for many of the volunteer hours donated in the region, and externalizes the cost to personal advocates. As such, this model is not scalable or sustainable over time. Similar non-profits, such as the Southeastern Climbers' Coalition, have hired a full-time executive director, allowing them to become more organized, generate substantial volunteer support and donations, and focus on grant acquisitions. A similar model would enhance the reach and impact of SORBA Chattanooga's mission.

## Management & Policy Data

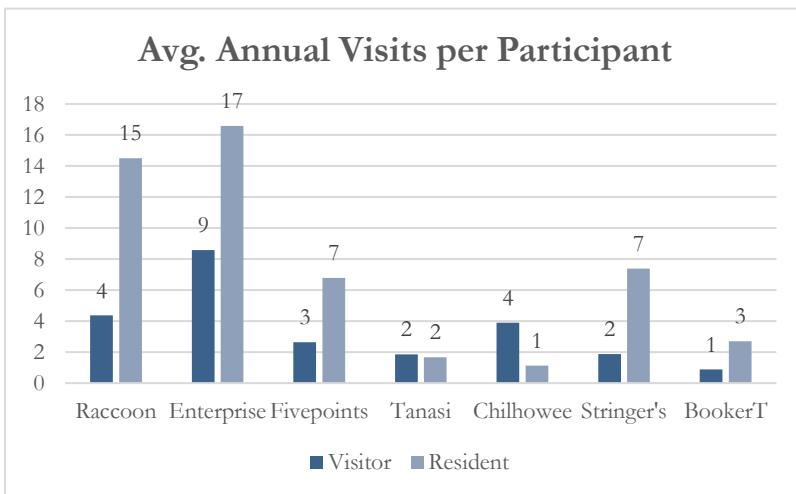


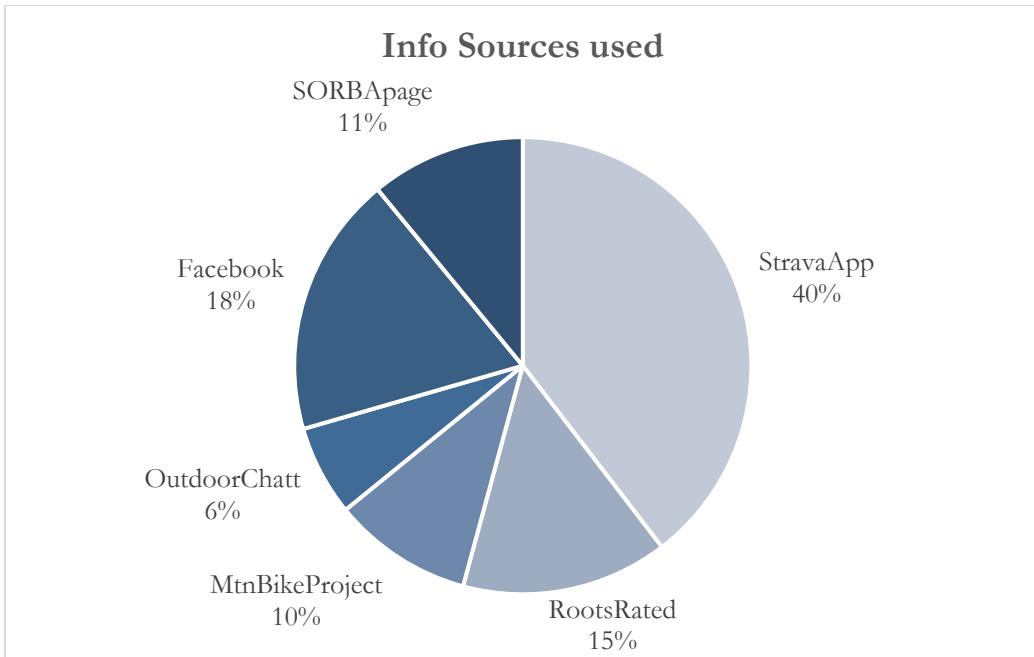
\*Responses were given on a 5-point scale (1=Not at all, 5=Absolutely) and reflect Mean values

- **Overall, visitors care most about well-maintained trails, with a lot of miles and a lot of variety, safe parking areas, and good information (at kiosks and online).**
- **Mountain bikers are not strongly concerned with locating trails in close proximity to cities.**
- **Significant differences were found between residents and tourists on two variables, with tourists preferring restrooms at trailheads and being willing to pay more for a day use fee.**



- *Mountain bikers in our region prefer trail and cross-country riding.*
- *Enterprise South and Raccoon Mountain are the most visited trails in our region, with Tanasi and Booker T Washington State Park seeing the fewest visits.*
- *Predictably, locals make many more visits to regional trails than do visitors. The only exception would be Chilhowee, which is outside of the Hamilton County area.*





- *When planning and implementing visits, 40% of mountain bikers utilize Strava, while another 18% use Facebook to assess current conditions.*
- *Many respondents wrote in the Trailforks App as a useful tool for mountain biking trips.*

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