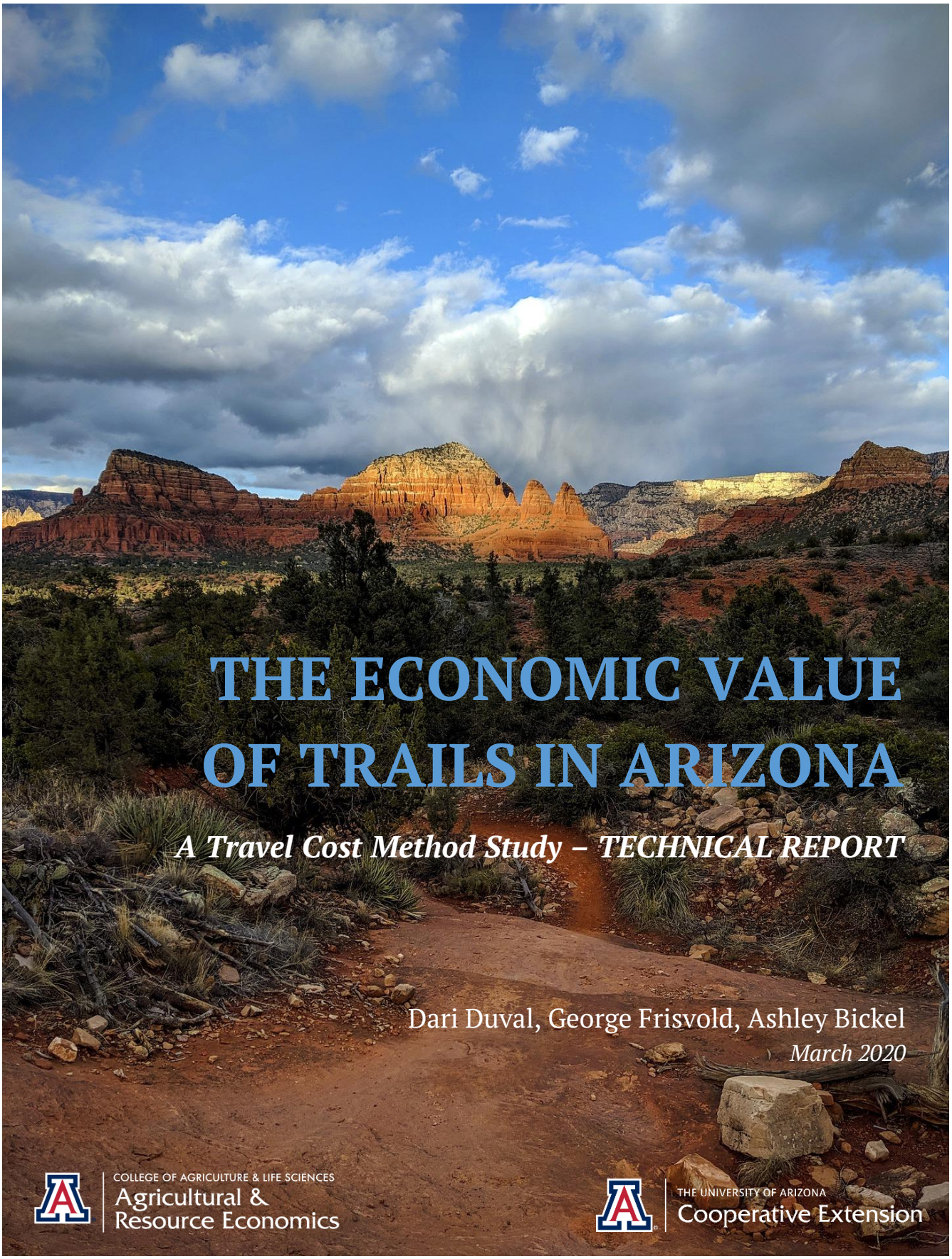

THE ECONOMIC VALUE OF TRAILS IN ARIZONA

A Travel Cost Method Study – TECHNICAL REPORT

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Contents

Table of Figures

Table of Tables

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Executive Summary

What's the issue?

Outdoor recreation supports the quality of life and health of individuals, communities, and local economies. Trail access for non-motorized and motorized recreation enriches the lives of community residents and visitors, providing an outlet for exercise, outdoor recreation, and transportation. The inherent value and enjoyment derived from outdoor recreation is not directly monetized, for example, through consumer spending or property values, yet it is the driver behind the outdoor recreation economy. The economic value that individuals place on amenities like trails can be measured in terms of *consumer surplus*. Consumer surplus is a monetary measure of how well-off individuals are as a result of consuming or using a particular good, service, or resource. In other words, it estimates the value of a good based on the benefits that individuals derive from using the good, service, or resource. For goods that are not bought and sold in markets, such as natural amenities, the value of a particular resource can be estimated indirectly using what is known as the *travel cost method*. In this method, benefits of an amenity are estimated based on how much individuals spend in time and money to travel to enjoy a particular amenity.

Estimating the economic value associated with use of natural resources and amenities is important in understanding how society is impacted by changes in the quality of or access to those resources. It can help to guide public policy and investments by informing our understanding of the benefits and costs of different actions affecting natural resources and amenities valued by the public.

As a complement to the Arizona State Parks 2020 Trails Plan, this study estimates the economic value of non-motorized and motorized trail use to Arizona residents using the travel cost method. Trail use includes use of trails managed by Arizona State Parks, the National Park Service, the U.S. Forest Service, the Bureau of Land Management, and other land management agencies for both non-motorized and motorized uses. Non-motorized uses include walking, hiking, mountain biking, and horseback riding/equestrian use, among others. Motorized trail uses include dirt biking, ATV, UTV, side-by-side, and four wheeling, among others. In addition to the economic value of trail use in Arizona to in-state residents, we also estimate total annual trail use for both non-motorized and motorized recreation, presenting the results in an origin-destination matrix that captures the estimated flow of in-state travel between counties for non-motorized and motorized trail recreation. Finally, we examine the importance of trail amenities to Arizona residents in their decisions of where to live and where to travel for leisure, both with important implications for community development.

What did the study find?

Total trail use

- In the past year, Arizonans used trails in the state for **non-motorized** recreation an estimated **83,110,000** times, and for **motorized** recreation an estimated **20,117,000** times.
- An estimated 59.2% of Arizona's adult population (or 3,073,100 Arizonans) engaged in non-motorized trail use in the past year, and an estimated 24.4% of the adult population (1,263,600

Arizonans) engaged in motorized trail use in the past year. Some trail users participate in both non-motorized and motorized trail recreation.
- Non-motorized trail users averaged **27.0** trail visits in the past year, and motorized trail users averaged **15.9** trail visits.

Economic value of trails in Arizona

- The economic value (consumer surplus) derived from non-motorized trail use in Arizona by in-state residents, based on a midpoint estimate, is **$8.3 billion** per year, with model estimates ranging between $6.2 billion and $10.6 billion. The economic value (consumer surplus) derived from motorized trail use in Arizona by in-state residents is an estimated **$5.2 billion** per year.
- Per visit consumer surplus for non-motorized trail use ranged between **$90.32** and **$128.03**, depending on travel cost model assumptions, with a midpoint estimate of **$100.06**.
- Per visit consumer surplus for motorized trail use was an estimated **$259.17**.

Importance of trails in Arizonans' decision of where to live and visit

- When asked the importance of having trails nearby in deciding where to ***live***:
    - More than 77% of respondents that participated in non-motorized trail recreation in Arizona report trail proximity as somewhat or very important. This remains true whether the respondent has participated in the past year or has ever participated in non-motorized trail recreation at some point in the past.
    - Roughly 80% of respondents that have ever used motorized trails or have used motorized trails in the past year report that trail proximity is somewhat or very important.
- When asked the importance of having trails nearby in their decision of where to ***visit***:
    - Roughly 83% of respondents who have ever used non-motorized trails or who have used them in the past year consider trails somewhat or very important in their decision of where to visit. For individuals that have never used trails for non-motorized recreation or that haven't used them in the past year, these percentages are slightly lower, ranging between 67% and 71%.
    - Close to 85% of respondents that have ever used motorized trails or have used motorized trails in the past year report that trail proximity is somewhat or very important. For those respondents that have never participated in motorized trail use or that haven't in the past year, these figures ranged between 75% and 80%.

Top non-motorized and motorized trail destinations

- Based on survey responses, top non-motorized trail use destinations include Phoenix, Tucson, Sedona, Apache Junction, Scottsdale, and Flagstaff. These top destinations are heavily reflective of popular trail use areas near major metro areas with large populations.
- Top motorized trail use destinations, though still influenced by major metro areas, are more reflective of areas of the state that attract motorized trail users. Top motorized trail use areas include Apache Junction, Yuma, Buckeye, Black Canyon City, and Carefree.

How was the study conducted?

This study relies on data from a stratified random sample survey of Arizona residents eighteen years of age and older collected as part of Arizona's 2020 Trails Plan. The survey collected information on respondents' non-motorized and motorized trail use in the past year, the location of their favorite, most frequently-used, and furthest traveled to trails, as well as individuals' demographics, including their home zip code. The analysis uses the travel cost method to estimate per-visit consumer surplus associated with non-motorized and motorized trail use. Trail use demand is modeled using a zero-inflated Poisson distribution, controlling for respondent socioeconomic and demographic characteristics. The estimates of consumer surplus from non-motorized trail use vary based on assumptions about trail use of high-frequency trail users. This is why a midpoint, low, and high range of estimates are reported. For motorized trail use, data from secondary sources were used to develop a single, central estimate of consumer surplus. In addition, the analysis developed a trail user origin-destination matrix, capturing where trail users from around the state travel to for non-motorized and motorized trail recreation. The origin-destination results were used to develop profiles for each county in Arizona, examining the most popular non-motorized and motorized trail use destinations, and where users travel from to each county for trail-based recreation (see Appendix B).

Introduction

Outdoor recreation supports the quality of life and health of individuals, communities, and local economies. As part of the Arizona State Parks 2020 Trails Plan, this study estimates the economic value of non-motorized and motorized trail use to Arizona residents, as well as statewide demand for in-state trail use. Trail use includes use of trails managed by Arizona State Parks, the National Park Service, the U.S. Forest Service, the Bureau of Land Management, and other land management agencies for non-motorized and motorized uses. Non-motorized uses include walking, hiking, mountain biking, and horseback riding/equestrian use, among others, and motorized uses include dirt biking, ATV, UTV, side-by-side, and four wheeling, among others. Economic value, also known as consumer surplus, measures how well-off individuals are made by consuming (or in this case, using) a particular good, service, or resource. For goods that are not bought and sold in markets, such as natural amenities, the value of a particular resource can be estimated indirectly. This can be done based upon how much an individual would be willing to spend in order to travel to a particular location, using what is known as the travel cost method (Parsons, 2003). This type of analysis is different from measures of consumer spending, and is well-suited to valuation of amenities like trails where individuals do not necessarily have to spend significant amounts of their income to engage in recreation.

Non-Motorized Trail Use

- Trail hiking
- Jogging
- Running
- Backpacking
- Mountain biking
- Horseback riding
- Canoeing
- Kayaking
- Stand-up paddle boarding
- Viewing wildlife, including bird-watching
- Other non-motorized recreational activity

Motorized Trail Use

- Riding a dirt bike
- Riding an e-bike –
- Driving a quad
- Driving a side-by-side
- Driving an all-terrain vehicle (ATV)
- Driving a utility terrain vehicle (UTV)
- Driving a 4x4
- Other motorized recreation activities

This study relies on a statewide survey of Arizona residents eighteen years of age and older to estimate non-motorized and motorized trail use demand, willingness to pay for travel to trail destinations, and aggregate consumer surplus. The analysis covers trail user attitudes regarding the importance of trail infrastructure in their decisions of where to live and travel – questions with important implications for community development and policy. Additionally, the analysis includes development of a trail user origin-destination matrix, capturing where trail users from around the state travel to for non-motorized and motorized trail recreation.

The study begins with a summary of different strategies for valuation of natural resource-based amenities, followed by a specific description of the study's data and methods, including the travel cost analysis and origin-destination matrix. Consumer surplus and origin-destination matrix results are presented separately for non-motorized and motorized trail users. We conclude with a discussion of the results and potential extensions of the research to inform state and community-level planning and policy.

Background

Trails are a critical component of outdoor recreation infrastructure in and around cities, towns, rural areas, and public lands. Trail access for non-motorized and motorized recreation enriches the lives of community residents and visitors, providing an outlet for exercise, outdoor recreation, and transportation. A variety of studies have shown that individuals with more trail access report higher levels of physical activity (Brownson et al., 2000; Librett, Yore, & Schmid, 2006; Fitzhugh, Bassett Jr, & Evans, 2010; Grunseit et al., 2019), although this is not a universal finding (see for example, Burbidge and Goulias (2009) and Starnes, et al. (2011)). Trail access is reported as an important factor for many individuals in their choice of where to live (Librett, Yore, & Schmid, 2006; Plantinga and Bernell, 2007). Outdoor recreation is increasingly of strategic interest to rural areas seeking to encourage economic development through increased outdoor recreation-linked tourism (EPA, 2019; White, et al., 2016). Recreational activity, whether at home or while traveling, generates spending and economic activity in local communities. According to the Bureau of Economic Analysis, as of 2016 the outdoor recreation economy accounted for 2.2 percent of U.S. gross domestic product, or $412 billion in GDP (BEA, 2018). A study for the Outdoor Retailers Association found that in the Mountain West, outdoor recreation contributed to $104.5 billion in spending, 925,000 jobs, $7.7 billion in federal tax revenues, and $7.2 billion in state and local tax revenues (OIA, 2017). While there are many indirect benefits of trail access, including promoting public health and overall quality of life, supporting economic development, and enhancing property values, this report focuses on the direct economic value of Arizona's trails to its residents.

The inherent value and enjoyment derived from outdoor recreation is not directly monetized, for example, through consumer spending or property values, yet it is the driver behind the outdoor recreation economy. The value that individuals place on amenities like trails can be measured in terms of *consumer surplus*, also referred to as economic value. This study estimates economic value or consumer surplus. This is distinct from an economic impact or economic contribution study which measures the circulation of money through the economy. (For examples of such studies applied to Arizona recreation, see ADOT (2013), Southwick Associates (2019), and Chhabra, et al. (2018)). While outdoor recreation can generate consumer spending, outdoor recreation is often attractive because it doesn't require people to spend much money to participate. That doesn't mean, however, that the public doesn't value it. We present a short description of both types of analyses to inform interpretation of the results and provide context for comparison to other types of studies.

Economic Value

Estimating economic value or consumer surplus associated with non-market goods, such as use of natural amenities, dates back to the early development of the travel cost method, in part by Harold Hotelling who in 1947 suggested that willingness to travel could serve as a proxy for estimating economic value of use of natural resources to consumers (Bowker, et al, 2005). Non-market goods are goods or services that cannot be traded in a market system and therefore do not have directly measurable market prices. This might include, for example, public goods such as access to clean air or water, or proximity of housing to desirable open spaces. To estimate the economic value of non-market goods, it is possible to estimate their "shadow prices" by measuring the effects of these non-market goods on related market goods. For example, the price of homes near environmental amenities, such as parks or rivers, may

be higher than the price of similar homes farther away from these amenities (known as the hedonic method).

Non-market valuation methods can be used to estimate the economic value of activities, such as trail use, that do not have a directly measurable market value. The value that trail users derive from using trails can be indirectly measured using individuals' willingness to travel, in terms of both time and money invested in traveling, which could otherwise be spent on other activities or goods. This economic value is also known as 'consumer surplus.' Consumer surplus is a measure of individual or collective 'well-being' that results from consuming a good or basket of goods. It is measured as the difference between willingness to pay for a good or service and the actual amount paid based on the prevailing market price (Varian, 2006). For those individuals who are willing to pay more than the prevailing market price, they derive a 'surplus' from consuming the good or service. Aggregated across all consumers in a geographic area, an estimate of the economic value of a good or service in that area is obtained. Another way of interpreting consumer surplus is that it measures the amount an individual or a group would have to be compensated in order to give up consuming the good (Varian, 2006). Though not measured in this analysis, one final type of economic value is non-use value or the value that someone derives just from knowing something exists. We can observe evidence of existence value when people donate money to conservation of endangered species, despite the fact that they will likely never see or otherwise experience the plant or animal in person.

Different strategies exist for estimating consumer surplus associated with non-market goods. The travel cost method is one type of analysis used to measure the willingness to pay for access to a particular site or natural amenity, and it is generally broken into two forms: a single-site model or a multi-site model. A basic premise of travel cost models is that the value that people place on an amenity is related to the amount of time and money they are willing to spend to travel to experience that amenity. For example, the resources (time and money) that an individual expends to access a particular natural amenity should be less than or equal to the value that they derive from using it. If it were costlier to access the amenity than the value they derive from it, they would not choose to travel there. Similarly, as the cost of travel increases for an individual to a particular site, we expect they would visit the site less frequently. The single-site model is well-suited to estimating demand and consumer surplus resulting from access to a single recreation site (Parsons, 2003). Bowker, Bergstrom, & Gill (2007) use a single-site model to estimate the economic value of the Virginia Creeper Rail Trail, and additionally estimate the economic impact of non-local visits to the area using visitor intercept survey data on overnight stays and spending profiles. They estimate consumer surplus per visit of $22.78[1] per person, not accounting for the opportunity cost of time, and $38.90 per person accounting for the opportunity cost of time. Siderelis & Moore (1995) also estimate net benefits of rail to trail projects, using visitor intercept surveys for three rail-to-trail projects, and testing a variety of specifications of an individual travel cost model. They found per-trip consumer surplus values ranging from $4.81 per trip to $49.78 per trip, depending on the location and type of trail.

Multi-site travel cost models are versatile and can be applied to estimate the total use value or impacts to consumer surplus due to changes in access or quality of sites. By accounting for alternative sites or recreation options, they are better equipped to address bias from excluding alternatives, as is common in single site models (Parsons, 2003). Multi-site travel cost methods commonly rely on the Random Utility

[1] Unless explicitly noted, previous estimates of consumer surplus values are reported as published in the literature and are not adjusted for inflation to current dollars.

Maximization (RUM) model, pioneered by McFadden (1974) who was awarded the Nobel Prize in economics for his work in this area. Some examples of application of RUM models for multi-site travel cost analysis include Morey, Shaw, & Rowe (1991) who apply a RUM model to evaluate consumer surplus impacts of changes in fish species availability for Oregon's coastal fisheries, composed of seven coastal counties, deriving a range of reduced consumer surplus associated with elimination of specific fisheries. Similarly, Brown & Mendelsohn (1984) evaluate the consumer surplus effects of qualitative changes to fisheries in the state of Washington and find that a 20% reduction in fish density results in an average consumer surplus loss of $99 per fisherman per season. Lew & Larson (2008) apply a RUM model to estimate consumer surplus associated with recreational use of beaches in Southern California, with a choice set of 31 beaches. They find an estimated economic value of beach access between $21 and $23 per day.

In addition to estimating economic value through modeling site choice using RUM models, if data is available on the frequency of trail use, that additional data can be used to further inform economic value estimates. A number of past studies have looked at the economic value of trail use using count models. Count models model the frequency of a particular event, in this case, how often an individual uses a trail. The frequency, or "count", of their trail use is a function of the individual's characteristics, the trail area's characteristics, and the individual's travel cost. Hellerstein and Mendelsohn (1993) establish the basis for use of count models for welfare analysis (estimating consumer surplus). Hesseln, Loomis, Gonzalez-Caban, and Alexander (2003) use a count model to estimate net benefits of two types of trail-based recreation in New Mexico and assess the impacts of nearby wildland fire and prescribed fire treatments on mountain biking and hiking demand. They estimate net benefits of $150 per trip for mountain bikers and $130 per trip for hikers. In a similar study, Chakroborty and Keith (2000) apply a count model to estimate consumer surplus from mountain biking visits to the Moab, Utah area. They estimate per trip consumer surplus between $585 and $587. In yet another study of mountain biking in Moab, Fix and Loomis (1997) estimate a per trip consumer surplus of between $197 and $205 using a count model.

Simões, Barata, and Cruz (2013) estimate both count models and ordered models (Poisson, negative binomial, ordered probit, and ordered logit) to estimate consumer surplus associated with national forest visitation in Portugal. They find that ordered models can be used to overcome convergence problems common to count models for estimating consumer surplus. Blaine, et al (2015) present a comparative analysis of Poisson and negative binomial models applied to valuation of coastal fisheries to examine sources of sensitivity in consumer surplus estimates. They find that truncation of count data to exclude outliers for purposes of achieving model convergence lead to lower consumer surplus estimates. They also examine the influence of income as a dependent variable in frequency of site visits and find that even when statistically significant, including or excluding an interaction of travel cost and income did not have a large influence on consumer surplus estimates. Count models, and travel cost models in general, can generate a wide range of results depending on model specification. Englin, Holmes, and Niell (2006) provide an example of this, obtaining individual site per-visit welfare estimates ranging between $25 and $1,000, depending upon the site and model specification. Chakraborty and Keith (2000) also test a series of count models and obtain per-trip consumer surplus estimates ranging between $585 and $925 depending on model specification.

Count models have also been used to evaluate the consumer surplus associated with Off-Highway Vehicle (OHV) use. Englin, Holmes, and Niell (2006) estimate per-trip consumer surplus for four OHV sites in North Carolina, with estimates of their preferred model ranging from around $25 to over $130 per

visit. In a contingent valuation study of OHV recreation in Arizona, Silberman and Andereck (2006) estimate average willingness to pay for OHV recreation at $67.83 per trip in a pooled sample, ranging from $54.48 to $96.46 dependent on the style of vehicle used.

Finally, a method known as *benefits transfer* can be used to estimate consumer surplus (Johnston, Rolfe, Rosenberger, & Brouwer, 2015). Benefits transfer uses existing estimates of consumer surplus from one or many studies and applies those benefits to a different but similar scenario. The US Forest Service maintains its Recreation Use Value Database (RUVD) which is a compendium of studies that estimate recreation use value. The database can be used to compare or apply use values for recreation based upon geographic regions and recreation activity type. For Forest Service Region 3 (which includes Arizona and New Mexico), the estimated average economic use value for recreation, or average consumer surplus per person per primary activity day, had a weighted average of $76.20, just below the national average of $79.96 (Table 1) (Rosenberger, et al., 2017). For specific activities, backpacking represented a value of $40.89, biking $90.48, hiking $92.20, and off-highway vehicle use or snowmobiling $58.19. Over the entire sample of studies used for the RUVD database, consumer surplus per person per primary activity day varies considerably.

Table 1. Selected RUVD Use Values of National Forest Land (Average Consumer Surplus per Person per Primary Activity Day)

Primary Activity	FS Region 3 (AZ & NM)	National Average
Backpacking	$40.89	$44.00
Biking	$94.48	$97.60
Hiking	$92.20	$95.31
Off-highway vehicle use	$58.19	$61.30
Weighted Average	$76.20	$79.96

Adapted from Rosenberger, et al (2017). All figures are in 2016 USD

These estimates can serve as a benchmark for comparison, understanding that the context and timing of each study may differ from the average. For example, these estimates are presented on a per-person per-primary activity day basis, therefore estimates of per-person per-trip value may differ when trips average more than one day in length. Other studies have undertaken a more detailed analysis using benefits transfer. The state of Oregon's Parks and Recreation Department, as part of their 2019-2023 Oregon Statewide Comprehensive Outdoor Recreation Plan, performed a benefit transfer study for outdoor recreation in the state of Oregon using a meta-regression analysis of RUVD data coupled with a statewide random sample survey of Oregonians on their outdoor recreation participation (Rosenberger, 2018). Survey data were used to calculate population-weighted estimates of participation in all outdoor recreation activities and total 'user occasions'. RUVD estimates were categorized to focus on the Pacific Northwest region, as well as only those estimates that applied to resident population since their survey focused on residents of Oregon. The meta-regression analysis yielded estimates of per person, per activity day consumer surplus for each category of outdoor recreation activity, which were in turn applied to estimate statewide aggregate consumer surplus across all locations and activities. Their study yielded estimates of $20.2 billion in statewide consumer surplus per year for non-motorized trail activities and $1.4 billion for motorized activities. On a per activity day basis, a few examples of their meta-regression estimates include $87.66 per day for hiking on non-local trails and paths, $14.47 for walking on local trails and paths, $131.03 for mountain biking on unpaved trails, $69.29 for jogging or running on trails and paths, and $50.38 for use of off-road vehicles.

This study evaluates the consumer surplus that Arizona residents derive from in-state trail use over the course of one year. Again, the study focuses only on trail use, either non-motorized or motorized, therefore other forms of outdoor recreation that are not trail-related are not included in the analysis (for example, playing sports, hunting, fishing, etc.). Furthermore, the study is limited to estimating the "use value" of trails, that is, the value residents derive from visiting and using trails in the state. This excludes such non-use values as existence value (the value of knowing that something exists) as well as excluding values of non-residents. Travel costs are defined by respondent home zip code and nearest town or city to each reported trail. Twenty-five trail use areas are defined, encompassing the entire state, and trail area characteristics are computed using geographic information systems (GIS) software. While this study analyzes data for all trail areas in Arizona, the data are aggregated and run as a single-site, individual travel cost model. We use a Poisson model which is designed for working with data on the count or frequency of events.

Economic Impact & Economic Contribution Studies

Economic contribution and economic impact studies are a popular type of study used to quantify economic activity supported by a net change in demand for a particular good or service (economic impact study) or by an existing industry, program, business, etcetera (economic contribution study). They measure not only the direct spending associated with a particular industry or economic shock, but also the ripple of multiplier effects experienced in businesses supplying inputs to production and household goods and services to the labor force. While these sorts of studies can be applied to existing economic activity to measure economic contributions of outdoor recreation spending within the state, they are best suited to measuring net-new economic activity generated within a region by exogenous (outside) demand (for example, the economic impact of tourist spending by out-of-state visitors, or attraction of non-local visitors to rural areas of the state). For that reason, this study does not use this method, however, we present an explanation to inform interpretation and comparison of the results.

A few recent examples of economic contribution studies of outdoor recreation in Arizona exist. A 2013 study of the economic impact of bicycling in Arizona uses a combination of methods to estimate out-of-state visitors to Arizona for cycling related activities and events and their spending impacts to the state economy (ADOT, 2013). Most recently, a 2019 study by Southwick Associates estimates the economic contribution of water-based outdoor recreation in Arizona (Southwick Associates, 2019). The study relied on previous survey data of water-based recreation in Colorado River basin states which found that water-linked non-motorized trail-based recreation in Arizona enjoys a participation rate of 12.5% of the adult population, corresponding to 9.9 million Arizona resident participation days. Consumer spending linked to this activity was estimated at $2.3 billion in 2018, including both Arizona residents and non-Arizona residents. Chhabra, et al. (2018) estimate the economic contribution of OHV recreation-related spending in Arizona for 2017 at $2.64 billion in sales, or $1.60 billion in gross state product. Again, economic contributions that include spending by in-state residents represent recirculation of money within the state economy that may occur regardless of that activity were it not to be available.

A number of studies outside of Arizona provide good examples of distinguishing between spending on outdoor recreation by in-state and out-of-state residents or local and non-local residents. A 2014 study (Anderson & Taylor, 2014) examines the economic importance of OHV recreation in the state of Idaho, including analysis capturing the spending within and between individual counties. The study highlights the complexity for local areas of capturing visitor spending from out-of-county visitors. They found that

roughly 87% of expenditures for OHV recreation, whether the destination was in the respondents' home county or in other counties, were made in respondents' home counties, implying that a large majority of spending will occur in population centers. A number of studies estimate economic impacts of outdoor recreation in the strict sense, limiting the scope of the analysis to spending by non-local visitors. Sage & Nickerson (2018) estimate the economic impact of mountain bike and pedestrian trail users in Helena, Montana. Based on the results of visitor intercept surveys, the study distinguishes between local and non-local users to isolate net new spending attracted to the community and its resulting multiplier effects. Another 2018 study specific to Montana examined economic impacts of outdoor recreation in Whitefish, Montana (Headwaters Economics, 2018). They too use a visitor intercept survey, enabling an estimate of non-local visitors and the impacts of visitor spending to the local economy.

Considerations

There are two important considerations in selecting between an analysis of consumer spending (economic contribution or economic impact) and consumer surplus (economic value). First, some forms of trail-based recreation require little or no spending on equipment or supplies, and this is part of their attractiveness. While the activity may or may not drive consumer spending, it contributes to the quality of life of residents, and may be a major influence on their decisions of where to visit and where to live. This too has implications for regional economies and workforces, though impacts may not necessarily show up in the form of high levels of consumer spending. Second, this analysis considers the value of trail use in Arizona to Arizona residents. Consumer spending by Arizonans within the state essentially measures recirculation of money within the economy. Were Arizonans not to use trails and spend their income on trail-based recreation, they would instead spend their income on other activities. Analyzing the impacts of economic activity due to consumer spending (economic impact analysis) is most useful for analysis of the impacts of out-of-state visitors on the state economy, something not covered by the 2020 State Trail Plan survey.

Data & Methods

This study uses the travel cost method to estimate per-person, per-visit consumer surplus for non-motorized and motorized trail use in Arizona by Arizona residents. Then, using statewide participation rates and population, the study estimates an aggregate measure of consumer surplus at the state level. Travel costs incurred by Arizona residents for motorized and non-motorized trail use across the state are estimated using data from the 2020 Motorized and Non-Motorized Trail Plan survey conducted by Arizona State Parks and Trails (report forthcoming). The analysis also includes development of an "origin-destination" matrix that captures the estimated frequency of travel of non-motorized and motorized trail users from their area of residence to destinations around the state.

Survey Data

This study relies on a statewide survey of Arizona residents as part of the 2020 Arizona Trails Plan. The stratified random-sample survey (Appendix E) was pre-tested and administered by a third-party market research firm between July 31, 2019 and August 17, 2019. The survey was administered to Arizona residents 18 years of age and older in either English or Spanish using a combination of methods. Half of

respondents were contacted via telephone (one-quarter by landline and one-quarter by cellular phone), and half were contacted via online invitation. This multi-modal strategy was used in order to obtain a representative sample of the population, particularly in terms of respondent age, considering that landline telephonic surveys are likely to skew much older than the population on average (Blumberg & Luke, 2018). Sample stratification was based on county population to ensure sufficient sample size for individual counties or county groups. Survey data were weighted by gender and Hispanic origin using custom Census data tabulations (PIB, 2019) for population 18 years of age and older to account for under-representation of males and individuals of Hispanic origin in the sample. Past studies have found that, on average, rates of participation in outdoor recreation vary by race, sex, age, education, and income (White, et al, 2016; Cordell, 2012). Accordingly, these are included as demographic variables in our model.

Descriptive Statistics

The following sections present descriptive statistics for both non-motorized and motorized trail users in Arizona. The data presented include both raw, unweighted frequencies, and weighted frequencies, which are adjusted to be representative of the state's population.

Non-Motorized Trail Users

A total of 77.1% of survey respondents reported having ever used trails for non-motorized trail-based recreation in Arizona. Non-motorized trail use includes walking, hiking, backpacking, trail running, mountain biking, equestrian use, and any other modes of travel not using motorized vehicles. Of this group, 76.8% reported having done so in the past year. Applying these two frequencies calculated based upon weighted data to represent Arizona's statewide adult population, this equates to an overall participation rate of 59.2% for non-motorized trail use in the past year among Arizona's population aged 18 years and older. This is considerably higher than the participation rate reported in the 2015 Arizona Trails Plan, estimated at 34.8% for non-motorized users (Budruk, Andereck, Prateek, & Steffey, 2014). Comparing individuals having used non-motorized trails in the past year (participants) and those that had not in the past year (non-participants) within each age group, we see that younger age groups have higher participation rates compared with older age groups (Table 2).

Table 2. Breakdown of Non-Motorized Participants and Non-Participants by Age Range

	Non-Motorized Participant			Non-Motorized Non-Participant		
Category	**Freq.**	**Weighted Freq.**	**%**	**Freq.**	**Weighted Freq.**	**%**
18-24	377	404.2	60.5%	236	263.6	39.5%
25-34	625	662.1	66.5%	317	333.1	33.5%
35-44	527	534.8	68.5%	251	245.6	31.5%
45-54	490	488.1	64.8%	274	265.4	35.2%
55-64	492	465.4	54.3%	422	391.3	45.7%
65-74	362	346.6	46.1%	433	405.2	53.9%
>75	56	60.6	31.2%	141	133.4	68.8%
Total	2,929	2,962.0	59.2%	2,074	2,038.0	40.8%

Among survey respondents, males had a slightly higher participation rate compared with females, and people reporting their gender as 'other' had the highest non-motorized participation rate, though based on a small number of respondents (Table 3).

Table 3. Breakdown of Non-Motorized Participants and Non-Participants by Gender

	Non-Motorized Participant			Non-Motorized Non-Participant		
Category	**Freq.**	**Weighted Freq.**	**%**	**Freq.**	**Weighted Freq.**	**%**
Male	1,173	1,490.0	60.9%	766	957.3	39.1%
Female	1,734	1,450.0	57.5%	1,298	1,070.0	42.5%
Other	14	14.1	79.2%	4	3.7	20.8%
Prefer not to answer	8	7.8	52.5%	6	7.0	47.5%
Total	2,929	2,962.0	59.2%	2,074	2,038.0	40.8%

Individuals of Hispanic origin reported a higher participation rate than those not of Hispanic origin (Table 4).

Table 4. Breakdown of Non-Motorized Participant and Non-Participant by Hispanic Origin

	Non-Motorized Participant			Non-Motorized Non-Participant		
Category	**Freq.**	**Weighted Freq.**	**%**	**Freq.**	**Weighted Freq.**	**%**
Hispanic	612	835.7	63.0%	364	491.2	37.0%
Non-Hispanic	2,285	2,095.0	57.9%	1,686	1,524.0	42.1%
Prefer not to answer	32	30.6	57.3%	24	22.9	42.7%
Total	2,929	2,962.0	59.2%	2,074	2,038.0	40.8%

Within racial categories, the highest participation rates were among individuals of Asian descent and whites. Black or African American individuals and Native Hawaiian / Pacific Islanders participated at frequencies lower than the overall population average (Table 5).

Table 5. Breakdown of Non-Motorized Participants and Non-Participants by Race

	Non-Motorized Participant			Non-Motorized Non-Participant		
Category	**Freq.**	**Weighted Freq.**	**%**	**Freq.**	**Weighted Freq.**	**%**
White	2,415	2,398.0	60.2%	1,651	1,588.0	39.8%
Black/African American	143	149.6	53.6%	134	129.6	46.4%
American Indian/Alaska Native	124	127.6	57.4%	96	94.9	42.6%
Asian	85	85.2	62.5%	54	51.0	37.5%
Native Hawaiian/Other Pacific Islander	23	28.7	53.6%	22	24.8	46.4%
Prefer Not to Answer	139	172.5	53.7%	117	148.9	46.3%
Total	2,929	2,962.0	59.2%	2,074	2,038.0	40.8%

Comparing within educational attainment categories, the highest participation rate was seen by individuals with graduate or professional degrees, and the lowest participation rate was among individuals having completed some high school (Table 6).

Table 6. Breakdown of Non-Motorized Participants and Non-Participants by Educational Attainment

	Non-Motorized Participant			Non-Motorized Non-Participant		
Category	**Freq.**	**Weighted Freq.**	**%**	**Freq.**	**Weighted Freq.**	**%**
Less than 9th grade	13	11.4	47.6%	12	12.6	52.4%
Some high school	64	66.1	33.7%	120	130.1	66.3%
High school graduate	469	491.7	50.2%	489	487.0	49.8%
Some college	860	861.4	62.0%	555	527.3	38.0%
Associate's degree or technical/vocational	462	467.1	58.7%	339	328.6	41.3%
Bachelor's degree	652	656.2	63.6%	373	375.9	36.4%
Graduate or professional degree	395	393.5	69.7%	180	170.9	30.3%
Prefer not to answer	14	14.5	73.2%	6	5.3	26.8%
Total	2,929	2,962.0	59.2%	2,074	2,038.0	40.8%

Comparing across employment status categories, the highest participation rates were among those individuals who were employed, students, and those serving in the armed forces (Table 7).

Table 7. Breakdown of Non-Motorized Participants and Non-Participants by Employment Status

	Non-Motorized Participant			Non-Motorized Non-Participant		
Category	**Freq.**	**Weighted Freq.**	**%**	**Freq.**	**Weighted Freq.**	**%**
Employed	1,533	1,597.0	66.3%	792	813.5	33.7%
Unemployed	202	218.6	51.2%	201	208.2	48.8%
U.S. Armed Forces	18	21.4	64.2%	11	12.0	35.8%
Student	154	156.6	66.8%	77	77.9	33.2%
Retired	536	522.8	46.8%	625	593.5	53.2%
Homemaker, Parent, or Caregiver	297	258.0	62.1%	181	157.7	37.9%
Disabled, Not Working	149	146.4	48.2%	167	157.4	51.8%
Prefer not to answer	40	41.0	70.1%	20	17.5	29.9%
Total	2,929	2,962.0	59.2%	2,074	2,038.0	40.8%

Within income categories, the highest level of participation was seen by individuals with annual household incomes of $200,000 or more and the lowest participation rate was by individuals with annual household incomes below $10,000 (Table 8).

Table 8. Breakdown of Non-Motorized Participants and Non-Participants by Annual Household Income

	Non-Motorized Participant			Non-Motorized Non-Participant		
Category	**Freq.**	**Weighted Freq.**	**%**	**Freq.**	**Weighted Freq.**	**%**
Less than $10,000	212	212.2	45.6%	259	253.4	54.4%
$10,000 to $14,999	147	155.6	56.0%	120	122.1	44.0%
$15,000 to $24,999	261	262.7	52.0%	253	242.6	48.0%
$25,000 to $34,999	360	366.7	59.8%	255	246.9	40.2%
$35,000 to $49,999	409	412.5	57.6%	309	304.2	42.4%
$50,000 to $74,999	601	600.1	64.3%	337	333.2	35.7%
$75,000 to $99,999	362	367.1	67.0%	182	180.8	33.0%
$100,000 to $149,999	302	307.0	66.9%	152	152.2	33.1%
$150,000 to $199,999	68	71.7	63.4%	42	41.4	36.6%
$200,000 or more	70	72.8	82.9%	15	15.0	17.1%
Prefer not to answer	137	133.1	47.7%	150	145.8	52.3%
Total	2,929	2,962.0	59.2%	2,074	2,038.0	40.8%

Table 9 presents the frequency of participation in non-motorized trail recreation within the past year by those respondents reporting having participated. Over half of participants reported having done so between 1 to 3 times or between 4 to 8 times in the past year. 7.2% of participants reported using trails for non-motorized recreation more than once a week.

Table 9. Frequency of Participation by Non-Motorized Trail Users in Past Year

Range	**Percent**
Once or a few times (approximately 1-3 times)	27.5%
Every couple of months (approximately 4-8 times)	29.0%
Once a month (approximately 9-14 times)	13.5%
Every few weeks (approximately 15-35 times)	14.5%
Once a week (approximately 36-52 times)	8.3%
More than once a week (approximately 52+ times)	7.2%

Survey respondents were asked to report the approximate location and frequency of use of their favorite, most frequently used, and furthest away (to access) non-motorized trails. The most frequently used trail generally shows the most common rates of use ‘once a month’, ‘every few weeks’, ‘once a week’, and ‘more than once a week’. The furthest trail has the highest percent of use ‘once during the year’ or ‘not at all’ in the previous year (Table 10).

Table 10. Non-Motorized Trail Users Frequency of Use for Favorite, Most Frequently Used, and Furthest Trails

Frequency of Use	**Favorite**	**Most Frequent**	**Furthest**
Not at all	2.7%	1.3%	8.3%
Once during the year	15.3%	11.1%	39.0%
Every couple of months	31.5%	28.4%	27.0%
Once a month	17.6%	19.0%	12.1%
Every few weeks	9.1%	10.2%	4.6%
Once a week	11.5%	13.1%	4.6%
More than once a week	6.1%	8.9%	2.6%

Motorized Trail Users

A total of 36.7% of survey respondents reported having ever used trails for motorized trail-based recreation in Arizona, of whom 66.3% reported having done so in the past year. This equates to an overall participation rate of 24.4% in motorized trail-based activities in the past year among Arizona's population aged 18 years and over. This falls within the estimated confidence interval from an earlier study (Cordell, Betz, Green, & Stephens, 2008), near Silberman and Andereck's 2006 estimate of 28.8% of Arizona's population, and represents a considerably higher participation rate than estimated in Arizona's 2015 Trails Plan (Budruk, Andereck, Prateek, & Steffey, 2014), at 13.1% of the state's population. The 2015 trails plan utilized a landline telephone random household survey, which overrepresented the state's older population. By contacting respondents via cell phone and the internet in addition to landlines, the current survey likely has more representative coverage of younger segments of Arizona's population.

Comparing participation rates across age groups, we see participation peaks at 33.6% for individuals between the ages of 25 and 34, and then declines as age increases (Table 11).

Table 11. Breakdown of Motorized Participants and Non-Participants by Age

	Motorized Participant			Motorized Non-Participant		
Category	**Freq.**	**Weighted Freq.**	**%**	**Freq.**	**Weighted Freq.**	**%**
18-24	162	182.5	27.3%	451	485.3	72.7%
25-34	302	334.8	33.6%	640	660.4	66.4%
35-44	239	250.3	32.1%	539	530.2	67.9%
45-54	172	181.2	24.0%	592	572.3	76.0%
55-64	182	169.3	19.8%	732	687.4	80.2%
65-74	87	82.5	11.0%	708	669.3	89.0%
>75	16	17.3	8.9%	181	176.7	91.1%
Total	1,160	1,218.0	24.4%	3,843	3,782.0	75.6%

By gender, the highest participation rate is among males with 26.9%, followed by females with 22.1%(Table 12).

Table 12. Breakdown of Motorized Participants and Non-Participants by Gender

	Motorized Participant			Motorized Non-Participant		
Category	**Freq.**	**Weighted Freq.**	**%**	**Freq.**	**Weighted Freq.**	**%**
Male	503	658.2	26.9%	1,436	1,789.0	73.1%
Female	654	556.8	22.1%	2,378	1,963.0	77.9%
Other	2	1.9	10.8%	16	15.9	89.2%
Prefer not to answer	1	1.0	6.7%	13	13.8	93.3%
Total	1,160	1,218.0	24.4%	3,843	3,782.0	75.6%

An estimated 32% of individuals of Hispanic origin were motorized participants, versus 22% of individuals not of Hispanic origin (Table 13).

Table 13. Breakdown of Motorized Participants and Non-Participants by Hispanic Origin

	Motorized Participant			Motorized Non-Participant		
Category	**Freq.**	**Weighted Freq.**	**%**	**Freq.**	**Weighted Freq.**	**%**
Hispanic	300	419.0	31.6%	676	908.0	68.4%
Non-Hispanic	849	788.1	21.8%	3,122	2,831.0	78.2%
Prefer not to answer	11	10.8	20.1%	45	42.7	79.9%
Total	1,160	1,218.0	24.4%	3,843	3,782.0	75.6%

Within race categories, we see higher than average participation rates among most groups, with the exception of individuals of Asian heritage, and whites whose participation rate was near the overall average of 24.4% (Table 14).

Table 14. Breakdown of Motorized Participants and Non-Participants by Race

	Motorized Participant			Motorized Non-Participant		
Category	**Freq.**	**Weighted Freq.**	**%**	**Freq.**	**Weighted Freq.**	**%**
White	935	956.4	24.0%	3,131	3,030.0	76.0%
Black/African American	75	82.5	29.5%	202	196.8	70.5%
American Indian/Alaska Native	58	62.4	28.0%	162	160.1	72.0%
Asian	25	26.0	19.1%	114	110.2	80.9%
Native Hawaiian/Other Pacific Islander	12	16.4	30.6%	33	37.2	69.4%
Prefer Not to Answer	55	74.2	23.1%	201	247.1	76.9%
Total	1,160	1,218.0	24.4%	3,843	3,782.0	75.6%

Within educational attainment categories, we see higher than average participation rates among individuals with high school degrees, some college, and associate's or technical and vocational degrees (Table 15).

Table 15. Breakdown of Motorized Participants and Non-Participants by Educational Attainment

	Motorized Participant			Motorized Non-Participant		
Category	**Freq.**	**Weighted Freq.**	**%**	**Freq.**	**Weighted Freq.**	**%**
Less than 9th grade	4	3.7	15.3%	21	20.3	84.7%
Some high school	30	31.7	16.2%	154	164.5	83.8%
High school graduate	247	270.2	27.6%	711	708.5	72.4%
Some college	364	375.6	27.1%	1,051	1,013.0	72.9%
Associate's degree or technical/vocational	200	211.1	26.5%	601	584.5	73.5%
Bachelor's degree	219	225.6	21.9%	806	806.5	78.1%
Graduate or professional degree	92	95.9	17.0%	483	468.6	83.0%
Prefer not to answer	4	4.0	20.1%	16	15.8	79.9%
Total	1,160	1,218.0	24.4%	3,843	3,782.0	75.6%

Within employment categories, employed individuals had higher than average participation rates, and retired individuals had lower than average participation rates (Table 16).

Table 16. Breakdown of Motorized Participants and Non-Participants by Employment Status

	Motorized Participant			Motorized Non-Participant		
Category	**Freq.**	**Weighted Freq.**	**%**	**Freq.**	**Weighted Freq.**	**%**
Employed	649	700.7	29.1%	1,676	1,710.0	70.9%
Unemployed	82	100.7	23.6%	321	326.2	76.4%
U.S. Armed Forces	8	8.2	24.7%	21	25.1	75.3%
Student	53	57.7	24.6%	178	176.9	75.4%
Retired	164	161.4	14.5%	997	954.9	85.5%
Homemaker, Parent, or Caregiver	122	109.1	26.2%	356	306.6	73.8%
Disabled, Not Working	69	68.5	22.6%	247	235.3	77.4%
Prefer not to answer	13	11.5	19.6%	47	47.1	80.4%
Total	1,160	1,218.0	24.4%	3,843	3,782.0	75.6%

Individuals making between $25,000 and $99,999 had higher than average participation rates, and those outside that range had lower than average participation rates (Table 17).

Table 17. Breakdown of Motorized Participants and Non-Participants by Median Household Income

	Motorized Participant			Motorized Non-Participant		
Category	**Freq.**	**Weighted Freq.**	**%**	**Freq.**	**Weighted Freq.**	**%**
Less than $10,000	97	104.4	22.4%	374	361.2	77.6%
$10,000 to $14,999	58	63.0	22.7%	209	214.8	77.3%
$15,000 to $24,999	90	95.7	18.9%	424	409.6	81.1%
$25,000 to $34,999	164	173.4	28.3%	451	440.2	71.7%
$35,000 to $49,999	176	180.8	25.2%	542	535.9	74.8%
$50,000 to $74,999	238	248.2	26.6%	700	685.1	73.4%
$75,000 to $99,999	139	140.6	25.7%	405	407.4	74.3%
$100,000 to $149,999	104	113.2	24.7%	350	346.0	75.3%
$150,000 to $199,999	24	27.9	24.6%	86	85.3	75.4%
$200,000 or more	20	19.7	22.4%	65	68.1	77.6%
Prefer not to answer	50	50.9	18.3%	237	228.0	81.7%
Total	1,160	1,218.0	24.4%	3,843	3,782.0	75.6%

Of those respondents who reported having participated in motorized trail recreation in the past year, roughly 60% reported participating between 1 and 3 times or between 4 and 8 times in the past year. Only 3.6% of participants reported doing so more than once a week (Table 18).

Table 18. Frequency of Participation by Motorized Trail Users in Past Year

Range	**Percent**
Once or a few times (approximately 1-3 times)	28.2%
Every couple of months (approximately 4-8 times)	31.9%
Once a month (approximately 9-14 times)	13.8%
Every few weeks (approximately 15-35 times)	14.9%
Once a week (approximately 36-52 times)	7.6%
More than once a week (approximately 52+ times)	3.6%

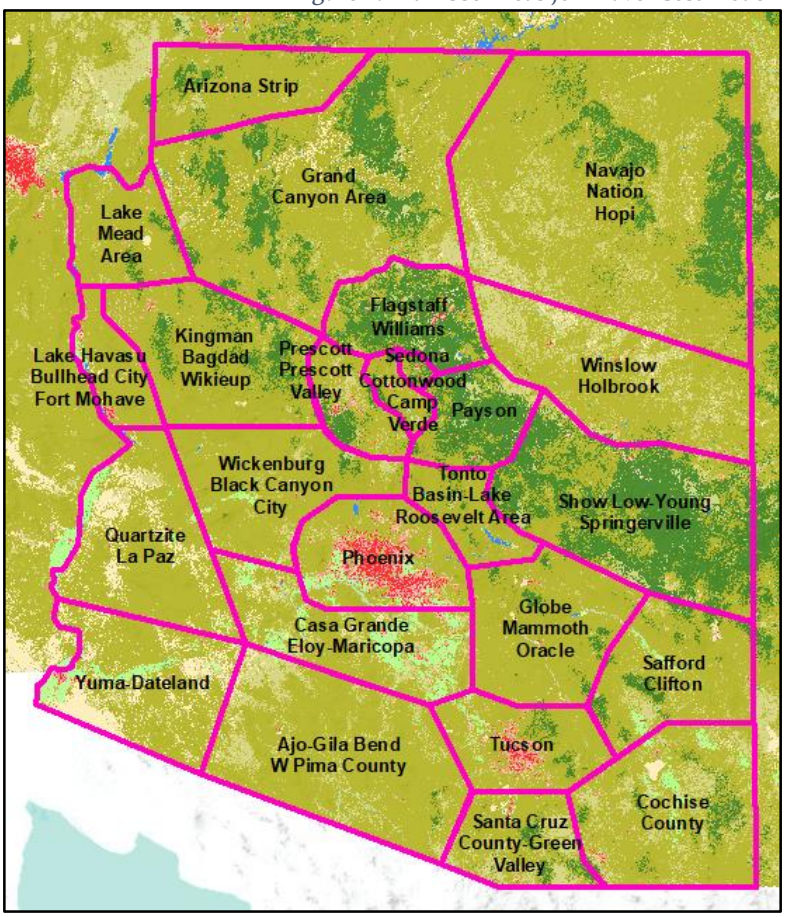
Survey respondents were asked to report the approximate location and frequency of use of their favorite, most frequently used, and furthest away (to access) motorized trails. The most common frequency of use for all three trails is 'Every couple of months'. As might be expected, the most frequently used trail is the trail most often used 'Once a week', and the furthest trail is the most commonly used trail either 'Once during the year' or 'Not at all' (Table 19).

Table 19. Motorized Trail Users Frequency of Use for Favorite, Most Frequently Used, and Furthest Trails

Frequency of Use	Favorite	Most Frequent	Furthest
Not at all	2.9%	1.4%	5.3%
Once during the year	14.7%	11.3%	25.0%
Every couple of months	28.1%	26.1%	29.6%
Once a month	22.2%	21.5%	17.8%
Every few weeks	7.9%	11.4%	8.1%
Once a week	12.9%	15.4%	7.5%
More than once a week	7.2%	7.9%	4.6%

Definition of the Site Choice Set

Figure 1. Trail Use Areas for Travel Cost Model



Survey respondents were asked to provide the city or town nearest to their favorite, most frequently visited, and furthest visited trails in the past year. A dropdown list of 472 sites was provided to survey administrators to auto-populate online survey responses. The locations were based upon official Census Designated Places and frequently selected locations from survey pretesting. A detailed description of the trail use areas is presented in subsequent sections.

For purposes of model estimation, the trail use site choice set was consolidated into 25 trail use areas of the state. These areas were constructed as polygons using GIS and, combined, cover the entirety of the state. They were defined such that major metro areas, towns, and top trail destinations had their own areas, and each trail use area was relatively homogenous in terms of land cover (desert, forest, etc.). Figure 1 presents the 25 trail use areas used for the travel cost analysis.

Trail Use Area Characteristics

Trail destination characteristics data were compiled using ArcGIS. Due to the large geographical area covered in this analysis and the significant number of trails throughout the state, GIS was optimal to systematically characterize the various trail use destination areas of the state (Englin, Holmes, & Sills, 2003). Previous literature characterizing trail user preferences typically includes measures of topography, trail length, and vegetation. Englin & Shonkwiler (1995), for example, include the elevation gain of each trail, its highest point, presence of views, trail length, time required to hike the trail, trail location, presence of alpine meadows, and presence of grass meadows. In a study examining site choice among mountain bikers, Morey, Buchanan, & Waldman (2002) use trail length, total feet of elevation gain, number of mountain peaks, mixed-use trail status, percent of trail that is single track, and required entrance fee as trail characteristics in a choice experiment. Snyder, et al (2008) present an application of GIS to optimizing trail design. Through focus group interviews of motorized trail users in Minnesota, they identified key preferences of off-road vehicle users for specific trail attributes and found that riders preferred trails with scenic views and overlooks. In terms of land cover, they preferred forests over meadows (deciduous hardwood trees preferred over spruce or pine) and meadows over agricultural land. They also preferred loop trails over out-and-back trails. Lindsey, et al (2008) apply GIS and remote sensing to an urban greenway trail context to characterize and quantify the attributes of Indianapolis's urban trail system and to identify those characteristics associated with higher levels of use. They estimated the extent of the paths' viewsheds, quantified vegetation greenness using NDVI, and characterized trails, including average slope, surface type, and sinuosity. They find higher NDVI (compared with surroundings) has a positive and statistically significant correlation with trail use.
We use overlay analysis (zonal statistics) to quantify the physical characteristics of each trail use area that we expect to be correlated with demand for trail use (Table 20). This includes regional measures of topography (average slope and standard deviation of slope), vegetation (land cover type), temperature (average minimum and average maximum temperatures), and miles of non-motorized and motorized trails.

Table 20. Trail Use Area Characteristic Variables and Data Sources

Measure	Details	Source
Slope	Average slope of each trail use area and standard deviation of average slope	30 meter Digital Elevation Model, U.S. Geological Survey (USGS, 2019)
Land Cover	General vegetation type (forest, shrub, barren, etc.), used to calculate percent of area in forested land cover (deciduous, evergreen, and mixed)	National Land Cover Database (NLCD), (U.S. Geological Survey, 2019)
Temperature	Average minimum & maximum temperature (1981-2010)	USDA/NRCS National Geospatial Center of Excellence (USDA, 2012a; USDA, 2012b)
Trail Miles	Linear miles of non-motorized and motorized trails in each trail use area	Statewide Trail Database, Arizona State Parks & Trails (ASPT, 2019)

Table 21 presents individual trail use area characteristics. Percent of area forested is calculated as the percent of the area's land cover comprised of deciduous forest, evergreen forest, and mixed forest, combined. Slope standard deviation measures the variability of the land's topography, that is, how much the area's slope differs from its average.

Table 21. Trail Use Area Characteristics

Trail Use Area	% Forest	Avg. Slope (Deg.)	Slope Std. Dev. (Deg.)	Avg. Max. Temp (°F)	Avg. Min. Temp (°F)	Non-Motorized Trail Miles	Motorized Trail Miles
Ajo-Gila Bend-W Pima County	0.3%	3.7	6.7	84.5	54.5	43.2	737.4
Arizona Strip	6.4%	6.4	7.5	70.5	43.1	61.5	4,320.0
Casa Grande-Eloy-Maricopa	0.0%	2.7	5.8	86.0	55.9	113.6	1,941.6
Cochise County	5.8%	5.4	8.1	76.1	45.4	398.6	1,380.6
Cottonwood-Camp Verde	13.8%	9.4	8.0	74.6	44.5	225.3	671.9
Flagstaff-Williams	58.8%	5.9	6.6	63.9	33.4	670.3	3,342.5
Globe-Mammoth-Oracle	4.7%	9.7	8.3	77.7	49.8	370.8	3,714.6
Grand Canyon Area	18.5%	8.8	11.7	68.1	39.7	787.7	5,412.5
Kingman-Bagdad-Wikieup	15.2%	8.6	8.0	73.9	44.8	91.3	3,500.5
Lake Havasu-Bullhead City-Fort Mohave	0.0%	5.8	7.1	82.6	56.4	140.5	1,656.6
Lake Mead Area	5.4%	7.3	8.2	77.1	51.7	63.0	1,627.4
Navajo Nation-Hopi	13.0%	4.5	6.5	66.5	37.5	40.4	17.4
Payson	60.7%	8.6	8.3	66.0	37.4	456.9	2,759.8
Phoenix	0.0%	3.8	6.7	84.3	57.0	1,975.6	1,234.7
Prescott-Prescott Valley	18.9%	7.6	6.9	71.0	41.2	373.8	1,590.4
Quartzite-La Paz	0.0%	4.6	7.0	85.3	55.7	21.4	6,093.3
Safford-Clifton	9.5%	8.9	9.2	75.4	45.5	370.7	2,477.2
Santa Cruz County-Green Valley	7.9%	7.9	7.7	77.1	47.3	384.2	1,435.3
Sedona	38.8%	12.3	11.1	72.0	42.6	249.6	175.0
Show Low-Young-Springerville	58.7%	10.3	8.3	65.8	35.4	1,164.5	4,262.3
Tonto Basin-Lake Roosevelt Area	5.6%	14.2	9.5	77.3	49.7	397.8	1,358.0
Tucson	4.1%	6.4	8.4	80.5	52.1	1,250.8	692.6
Wickenburg-Black Canyon City	1.8%	7.4	8.3	80.1	51.6	153.7	5,220.7
Winslow-Holbrook	1.4%	2.0	2.8	68.9	37.2	49.9	269.7
Yuma-Dateland	0.0%	3.4	7.0	87.2	57.4	57.2	1,240.4

Table 22 presents the average characteristics of respondents' selected favorite, most frequently used, and furthest trail use areas, for non-motorized and motorized trail use. Generally, the results suggest that both non-motorized and motorized trail users choose to travel the furthest to access areas that are more heavily forested, have cooler average maximum and minimum temperatures, and have steeper and more varied slopes. Non-motorized and motorized trail users are generally drawn to areas with a greater number of trail miles for their respective activity. These results may be circumstantial in that most of the state's population lives in lower-elevation river valleys (Phoenix and Tucson) and therefore, on average, must travel longer distances to access higher elevation forested areas.

Table 22. Average Characteristics of Respondent Favorite, Most Frequent, and Furthest Trail Use Areas

	Non-Motorized			Motorized		
Variable	***Favorite***	***Frequent***	***Furthest***	***Favorite***	***Frequent***	***Furthest***
Percent Forested	16.0%	13.7%	19.2%	13.5%	12.7%	16.7%
Avg. Slope	6.3	5.9	6.7	6.1	6.1	6.3
St. Dev. Slope	7.6	7.5	8.0	7.5	7.4	7.5
Avg. Max Temp	77.2	77.9	75.3	78.2	78.2	76.9
Avg. Min Temp	48.2	49.0	46.2	49.3	49.3	47.8
Non-Motorized Trail Miles	890.6	920.0	800.5	714.1	648.3	643.2
Motorized Trail Miles	1,832.1	1,771.7	2,196.3	2,156.0	2,114.0	2,315.1
Distance Traveled to Site (Miles)	59.6	45.8	121.5	78.6	77.3	113.7

Finally, we see that for both non-motorized and motorized trail users, the distance traveled to access a trail is shortest (on average) for respondents' most frequently used trail, and longest (on average) for respondents' furthest trail. Additionally, we see that for both favorite and most frequently used trails, motorized trail users travel further to access trails, though non-motorized trail users travel further on average to access their furthest trail.

Travel Cost & Opportunity Cost of Time

Central to the travel cost method is estimating travel costs of individuals. The cost of travel includes not only the cost of transportation from point A to point B, but also the *opportunity cost* of time spent in travel. Opportunity cost is the idea that in deciding whether to engage in a particular activity, there are other, foregone alternatives that we pass up. It's customary to model the opportunity cost of time spent in recreation or leisure in terms of time that otherwise could have been spent working. This implies some strong assumptions around the fungibility between work versus leisure time (for example, some jobs are limited to 40 hours per week) and the utility of travel time per se. In most travel cost studies, estimates of the opportunity cost of time range from around one-third of an individual's market wage rate to their full market wage rate (Phaneuf and Smith, 2005). In their analysis of economic value of mountain biking in New Mexico, Hesseln, et al. (2003) use the approach of US federal agencies (US Water Resources Council, 1983), which is to apply gas cost plus a fraction of the wage rate to value travel time, with an example of one-third the market wage rate provided by the survey respondents. This study uses this same convention of one-third the market wage rate, calculated using the midpoint of respondent reported household income ranges, converted to a proxy hourly wage rate by dividing by 2,080 (the number of working hours in a year based on a 40-hour work week). Because range midpoints are a relatively crude measure, we assess their strength as a proxy for income by regressing them on respondent demographic variables and find that they behave according to expectations (Appendix D). For example, income was increasing with education level and increased, then decreased with age (Appendix D). Vehicle operation related cost components of travel cost were calculated based upon an average per mile vehicle operating cost of $0.2054 per mile (AAA, 2019). This assumes that trail users travel to trail destinations using a personal vehicle.

To estimate travel time and distance, we use the Network Analyst tool in ArcGIS 10.6.1 (ESRI, 2018). This method calculates the least-distance route from each respondent home zip code to each trail use destination using area road networks (per Lew & Larson (2008)). We rely on the USGS National Transportation Dataset to build a road network database for the state of Arizona (USGS, 2014). To account for the lack of respondent home addresses and specific trail use destinations (respondents report nearest city or town), we calculate home zip code and trail use destination area polygon centroids, and the centroids are snapped to the closest road network polyline to define the origins and destinations. Solving the origin-destination matrix problem results in a matrix of travel distances, which are then assigned accordingly to matching respondent-reported origin-destination pairs. Plotting the distribution of distance to respondents' favorite, most frequent, and furthest trail destinations, we see that respondents most commonly report traveling 0 to 20 miles for favorite, most frequent, and furthest accessed trail destination for both non-motorized and motorized trail users, and the proportion of respondents reporting further distances declines as distance increases (Figures 2 and 3).

Figure 2. Histogram of Distance to Favorite, Most Frequent, and Furthest Non-Motorized Trails

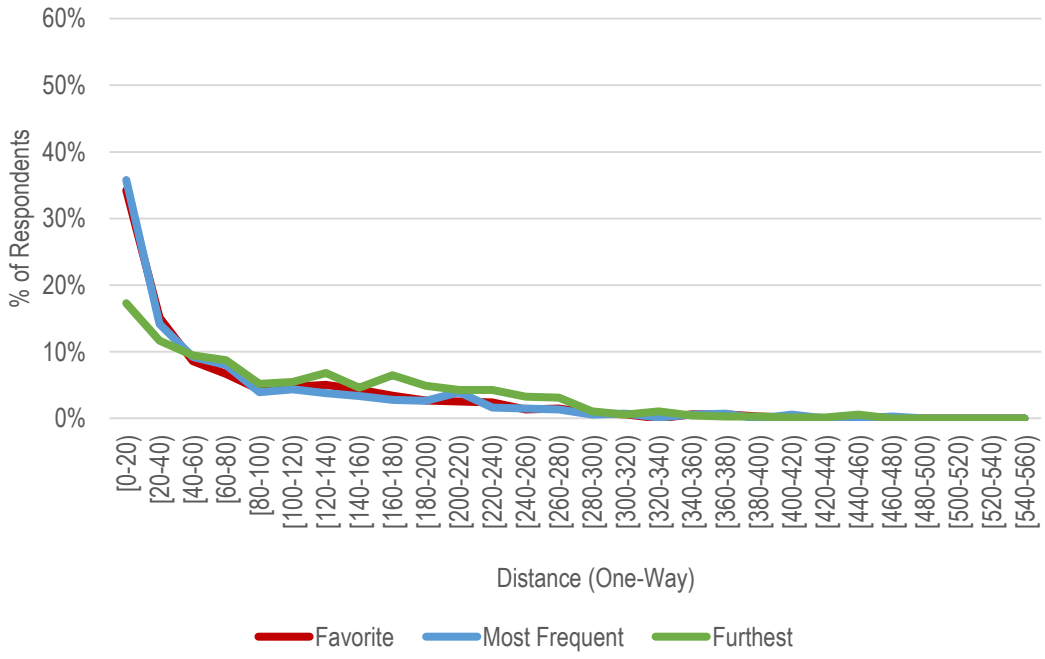
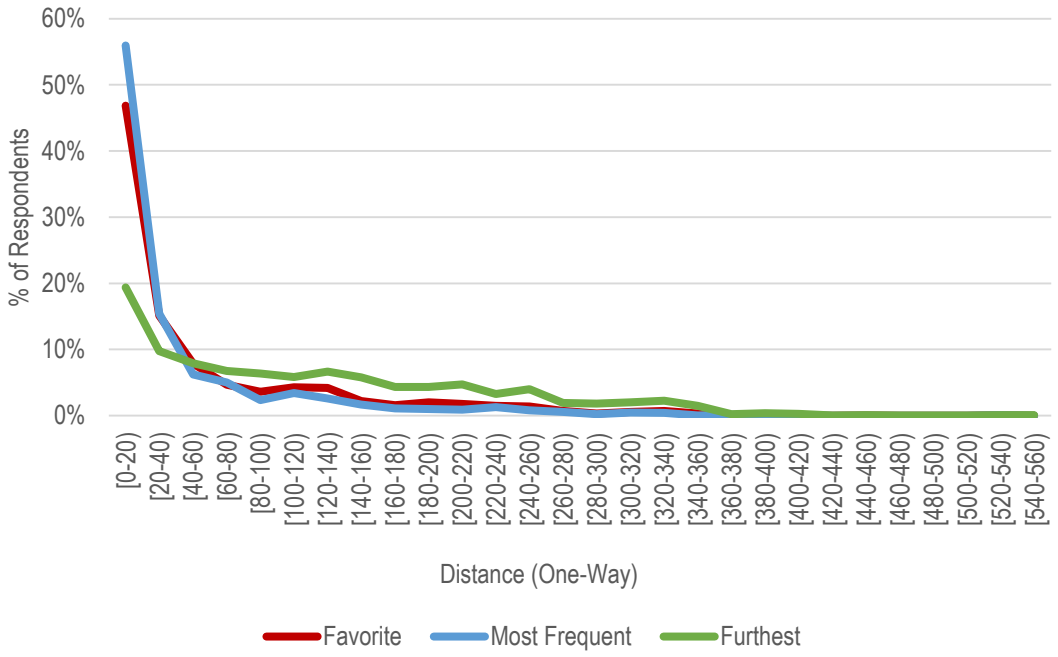


Figure 3. Overlay Histograms of Distances to Favorite, Most Frequent, and Furthest Motorized Trails



Some respondents report that one or more of their favorite, most frequent, or furthest used trails are near the same city or town, therefore there is some overlap in favorite, most frequent, and furthest trail use areas. While impossible to detect if the respondent is using the same trail in the same location, we identify those respondents that selected the same trail use area and the same frequency of use for two or three reported trail use areas. Duplicates are removed for purposes of estimating trail demand. The number of detected duplicates are reported in Table 23.

Table 23. Duplications of Respondent Favorite, Most Frequent, and Furthest Trail Areas

Duplicate Type	Count
Motorized	
Most frequently used trail area same as favorite trail area	310
Furthest trail area same as favorite trail area	197
Furthest trail area same as most frequently used trail area	182
Non-Motorized	
Most frequently used trail area same as favorite trail area	1,304
Furthest trail area same as favorite trail area	565
Furthest trail area same as most frequently used trail area	530

Travel cost is calculated as estimated round-trip mileage multiplied by estimated average vehicle operating costs per mile (AAA, 2019) plus one third the proxy hourly wage rate (calculated from annual household income, see Appendix D) multiplied by round trip mileage divided by 60 miles per hour. A speed of 60 mph was chosen as the midpoint between the prevailing maximum interstate highway speed limit in Arizona of 75 miles per hour and the most common speed limit for non-interstate urban principal arterials in Arizona, 45 miles per hour (Skszek, 2004).

A complicating factor in travel cost analyses is the treatment of multiple purpose or multiple destination trips. When travel costs go towards fulfilling multiple objectives, the full cost cannot be attributed to trail use alone (Phaneuf & Smith, 2005). The random sample survey data used in this analysis does not include information regarding which reported trips were for the sole purpose of trail-based recreation and which were not. The survey does, however, ask respondents to consider their favorite, most frequently used, and furthest accessed trails for trail-based recreation. As such, respondents are primed to recall trail-based recreation versus other activities. Regardless, lack of information on any possible multi-purpose trips represents the potential for some bias in study estimates. Similarly, survey data do not distinguish between single-day and multi-day trips, therefore results are presented on a per-visit basis and may reflect a combination of single- and multi-day trips. Finally, some trail areas require entrance fees, such as state and national parks. Because the study evaluates all trail use statewide by in-state residents, and data are not differentiated by specific trail, entrance or access fees are excluded from our analysis.

Methods

The following section provides an overview of the principle methods used in this analysis: a travel cost analysis and an origin-destination matrix.

Travel Cost Analysis

This analysis uses the travel cost method to estimate consumer surplus derived by Arizona residents from in-state non-motorized and motorized trail use in the past year (survey administered July – August of 2019). Random sample survey data on respondents' favorite, most frequently visited, and furthest visited trail area, distance, and frequency of visits are pooled, removing assumed duplications between trail areas. The data are analyzed in STATA Version 16 (StataCorp, 2019) accounting for complex survey design, using data weights and defining the primary sampling unit as each individual respondent, in consideration of the fact that some individual respondents will have more than one observation within the data.

A standard Poisson model was tested for both non-motorized and motorized data sets and evaluated for zero-inflation using a Vuong test. In both cases, we reject the null hypothesis, indicating that a zero-inflated model is most appropriate for the data. In light of recent work by Wilson (2015) who finds that the Vuong test is not appropriate to test for zero-inflation, we also compare Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) scores between standard Poisson models and zero-inflated Poisson models and find that the zero-inflated models out-perform the standard Poisson models for both datasets (Bozdogan, 1987).

Zero-inflated Poisson models assume a two-step data generating process. The first step models whether or not an individual participates in trail-based recreation, and the second step models (given that someone does participate) how many times they choose to participate. Because we are using a random sample survey of the entire population, including participants and non-participants, our data do not present the same issues of zero truncation and endogenous stratification that on-site survey data do. Following the count model example of Englin, Holmes, & Sills (2003), an individual's expected demand for trail use is defined within a count model as λ_i:

(1) $$\lambda_i = E[Q_i] = e^{X_i\beta}$$

where X_i is a vector of site-specific characteristics, individual characteristics, and travel cost for individual i. Individual i chooses to take no trips ($q_i = 0$) with a probability of p_i and a positive number of trips ($q_i = k$) with probability $(1 - p_i)$. The choice to participate (or not) is modeled as a binary logit distribution, and the choice of number of trips for participants is modeled using a Poisson distribution, such that

$$q_i = 0 \sim p_i + (1 - p_i)e^{-\lambda_i} \tag{2}$$

$$q_i = k \sim (1 - p_i)\frac{e^{-\lambda_i}\lambda_i^k}{k!} \tag{3}$$

where k are positive integers. This means that a value of zero can be achieved either through belonging to the non-participation group, or to the participant group and choosing zero visits. The participation decision is modeled as a binomial logit

$$\ln\left(\frac{1-p_i}{p_i}\right) = Z_i\gamma \tag{4}$$

where Z_i is a vector of individual characteristics, which may overlap with variables included in the vector X_i. Englin, Holmes, & Sills (2003) derive the per-visit estimated consumer surplus (CS) as

$$Average\ per\ visit\ CS = \frac{-1}{\beta_{TC}} \tag{5}$$

where β_{TC} is the estimated coefficient for travel cost in the model. To estimate statewide consumer surplus associated with non-motorized and motorized trail use in the state, we estimate the zero-inflated Poisson models for non-motorized and motorized trail users and then extrapolate to the state level using the estimated travel cost coefficients (Equation 5) from model results.

Origin-Destination Matrix

Origin-destination matrices are tools commonly used in transportation modelling and planning that capture the movement of travelers from one location to another (Abareshi, Zaferanieh, & Reza Safi, 2019). While individual origin and destination pairs are used as inputs to calculate distance traveled for the travel cost model, the information contained therein is inherently useful and interesting, particularly in relation to community- or regional-level planning and tourism efforts. Knowing where people from around the state travel to for trail-based recreation can offer important insight for communities looking to develop or expand their own trail systems, or to inform tourism marketing for communities hoping to attract visitors.

Our trail-based recreation origin-destination matrix aggregates traveler origin to the county level based on home zip codes and examines trail use destinations by county. Zip code population estimates are used to expand survey responses to population-level estimates of number of trail use occasions by destination. It is important to note that the random sample survey only asks respondents to provide up to three trail use destinations for non-motorized or motorized recreation, or both, depending upon the respondent. Therefore, some level of detail is lost as not all respondent trail use destinations will be captured by the survey. Nonetheless, the matrix can illuminate certain use and travel patterns and inform opportunities for future research.

Results

Travel Cost Analysis

The travel cost analysis estimates the economic value of in-state trail use to Arizona residents. It bears mentioning that this analysis does not include other economic values, such as the value of trail use in Arizona to out-of-state residents, nor does it include non-use values. The economic values of non-motorized and motorized trail use were modeled by pooling favorite, most frequently-used, and furthest trails, with duplicates eliminated, to estimate average per-visit consumer surplus values for non-motorized and motorized trail use using estimated travel cost coefficients. Travel cost coefficients were estimated using a zero-inflated Poisson count model. Because respondents reported frequency of trail use as ranges, we tested the sensitivity of models to the assigned maximum value for the category "More than once a week". We found that the motorized travel cost coefficient was more sensitive to changes in the assigned value. Therefore, we rely on a past study estimate of frequency of OHV recreation for Arizona residents, with an average between 15.85 and 15.95 trips per year (Silberman and Andereck, 2006). Using the distribution of frequency of use by category, the top range would then be equal to 110 visits per year, roughly twice a week. For non-motorized trail use, we assign a range of frequencies to the highest category, from the minimum number possible for more than once a week (53) to the maximum number (365, equivalent to every day of the year). While an estimate of frequency of non-motorized trail use is not available for Arizona residents, average annual visits per participant range from just under 16 to over 38 as modeled. For comparison, a 2018 Outdoor Industry Association report finds that hikers average 14 outings per year (Outdoor Industry Association, 2018), which could serve as a lower bound since it is not inclusive of other non-motorized trail uses beyond hiking such as trail running and mountain biking. Meanwhile, a recent study found that Washington state residents participated in non-motorized trail-based activities an average of 42 days per person per year (Washington Recreation and Conservation Office, 2019), and a study of New York state residents found that, on average, residents used in-state trails 26 days in the last year (New York State Parks, Recreation and Historic Preservation, 2015). Assigned frequency values for the models are presented in Table 24.

Table 24. Assigned Values by Model for Frequency of Use Ranges from Random Sample Survey Data

Frequency of Visits	**Non-Motorized**					**Motorized**
	Minimum	25th Percentile	Midpoint	75th Percentile	Maximum	
Not at all	0	0	0	0	0	0
Once during the year	1	1	1	1	1	1
A few times during the year	3	3	3	3	3	3
Every couple of months	6	6	6	6	6	6
Once a month	12	12	12	12	12	12
Every few weeks	26	26	26	26	26	26
Once a week	52	52	52	52	52	52
More than once a week	53	131	209	287	365	110
Average Annual Visits	*15.8*	*21.4*	*27.0*	*32.7*	*38.3*	*15.9*

To address issues of multicollinearity in the data, education attainment categories were collapsed into a single dummy variable to indicate respondents having received a two-year college degree, bachelor's degree, or graduate degree. Base categories were assigned for each set of demographic dummy variables to avoid perfect multicollinearity in the models, with gender = 'male', age = '18 to 24', race = 'white', Hispanic origin = 'non-Hispanic', employment = 'employed', and income = '< $10,000'.

Non-Motorized Trail Use

To estimate the total demand for non-motorized trail use by Arizonans in the state, we use trail use frequency range midpoints, and a series of values for the 'more than once a week' category to calculate total use. We derived a midpoint estimate of **83,110,000** non-motorized trail visits in the past year, with estimates ranging from **48,592,500 to 117,627,500**. This corresponds to an average of **27.0** visits per participant (ranging from **15.8 to 38.3**) (Table 24). These visits were made by an estimated 3,073,100 adult users.

The results of the travel cost model regression for non-motorized trail use are presented in Tables 25 and 26. Results of the zero-inflation portion of the model (Table 25) correlate respondent characteristics and demographics with the likelihood that they never participate in non-motorized trail use. Coefficients presented in that portion of the table represent log-odds of belonging to the non-participant group, therefore negative coefficients represent being less likely to belong to the non-participant group, and positive coefficients represent a higher likelihood of belonging to the non-participant group. Though few coefficients are statistically significant, the coefficients are consistent with descriptive statistics comparing participants with non-participants, for example, likelihood of participation decreases with age, and increases with income and education. Results from the non-motorized model were relatively robust to model specification and frequency assigned for respondents using trails more than once a week. Detailed regression results are presented in Appendix F.

Results for frequency of non-motorized trail use for participants (Table 26) show travel cost to be negatively correlated with the frequency of trail use and highly statistically significant, as anticipated. This result is consistent with demand for normal goods where, as price increases, demand decreases. Estimated per-visit consumer surplus (the negative reciprocal of the travel cost coefficient) ranges between **$90.32** and **$128.03** (estimates are presented in the last row of Table 26). Surprisingly, percent of the trail use area in forested land cover is negative, meaning that trail use decreases with an increase in forest cover, however, the result is not statistically significant. This result could be reflective, again, of the volume of trail use around the state's most heavily populated areas which are in lower-elevation deserts. Standard deviation of slope is negative and statistically significant in two of five models, suggesting that the variability of the land's slope has a negative effect on trail use demand. Average maximum temperature is negative in all five models, statistically significant in two, and marginally significant in two more, suggesting that trail use demand is lower in areas with higher average maximum temperatures. Miles of non-motorized trails was positive and statistically significant in two of five models, indicating there may be a positive relationship between frequency of trail use and available trail miles in the region. Average slope of the land was not statistically significant in any model.

Respondent age shows up as positive and statistically significant in most models up to age 65. Respondent age over 75 is negative in three of five models, indicating that individuals in the highest age category participate less frequently. The dummy for female respondents is negative and statistically

significant in three of five models, indicating that females are participating less frequently compared with men. Results by race are inconsistent between the models, with statistically significant results of different signs across models. By income, we see a consistent strong pattern that frequency of participation is negatively correlated with the lowest income categories and positively correlated with the highest income categories.

Table 25. Non-Motorized Zero-Inflation Stage Regression Results

Model →	***Min*** **> Once A Week = 53**		***25th Percentile*** **> Once A Week = 131**		***Midpoint*** **> Once A Week = 209**		***75th Percentile*** **> Once A Week = 287**		***Max*** **> Once A Week = 365**	
	Est.	***P>|t|***	***Est.***	***P>|t|***	***Est.***	***P>|t|***	***Est.***	***P>|t|***	***Est.***	***P>|t|***
Age – 25 to 34	-0.1170	0.725	-0.1031	0.757	-0.0965	0.771	-0.0927	0.779	-0.0899	0.784
Age – 35 to 44	0.0479	0.895	0.0871	0.808	0.1069	0.763	0.1185	0.735	0.1259	0.717
Age – 45 to 54	0.2724	0.450	0.3176	0.373	0.3408	0.333	0.3537	0.309	0.3609	0.293
Age – 55 to 64	-0.1733	0.659	-0.0905	0.813	-0.0454	0.903	-0.0202	0.956	-0.0066	0.985
Age – 65 to 74	0.3691	0.477	0.5118	0.280	0.5636	0.218	0.5899	0.187	0.6052	0.170
Age – Over 75	0.3634	0.653	0.5894	0.431	0.7239	0.305	0.8052	0.233	0.8551	0.188
Gender – Female	-0.3387	0.078	-0.3090	0.093	-0.2909	0.105	-0.2775	0.114	-0.2666	0.123
Gender – Other	0.7118	0.388	0.6952	0.396	0.6884	0.400	0.6822	0.404	0.6760	0.408
Hispanic	-0.1520	0.528	-0.1751	0.459	-0.1895	0.416	-0.1995	0.386	-0.2070	0.363
Black / Af. American	-0.2458	0.609	-0.2860	0.557	-0.3071	0.528	-0.3191	0.510	-0.3265	0.497
American Indian	-0.3598	0.496	-0.3560	0.493	-0.3490	0.493	-0.3419	0.492	-0.3362	0.490
Asian American	0.1568	0.757	0.1932	0.681	0.2011	0.658	0.2040	0.645	0.2053	0.637
Native Hawaiian/P.I.	-0.6439	0.523	-0.6651	0.509	-0.6747	0.502	-0.6779	0.500	-0.6756	0.503
College Graduate	-0.2579	0.236	-0.2336	0.266	-0.2146	0.295	-0.1999	0.319	-0.1887	0.337
Unemployed	0.2039	0.594	0.2425	0.504	0.2625	0.454	0.2742	0.423	0.2820	0.400
Student	0.4485	0.314	0.4417	0.322	0.4364	0.325	0.4323	0.326	0.4294	0.326
Retired	-0.4755	0.224	-0.4906	0.164	-0.4971	0.139	-0.5022	0.126	-0.5051	0.118
Income – 10k-14k	0.7757	**0.044**	0.7469	**0.048**	0.7251	0.052	0.7099	0.055	0.6996	0.057
Income – 15k-24k	-0.3785	0.353	-0.4313	0.285	-0.4638	0.246	-0.4839	0.223	-0.4958	0.209
Income – 25k-34k	-0.0282	0.934	-0.0624	0.849	-0.0783	0.807	-0.0841	0.790	-0.0842	0.787
Income – 35k-49k	-0.4977	0.175	-0.5039	0.153	-0.4979	0.146	-0.4883	0.144	-0.4775	0.146
Income – 50k-74k	-0.4008	0.240	-0.3788	0.246	-0.3604	0.254	-0.3454	0.262	-0.3318	0.272
Income – 75k-99k	-0.2560	0.544	-0.2766	0.494	-0.2799	0.474	-0.2771	0.468	-0.2709	0.470
Income – 100k-149k	-0.8760	0.088	-0.8530	0.069	-0.8461	0.060	-0.8355	0.056	-0.8202	0.056
Income – 150k-199k	0.1051	0.866	0.0654	0.913	0.0414	0.943	0.0270	0.962	0.0192	0.973
Income – Over 200k	-1.5415	0.448	-1.0033	0.302	-0.8872	0.269	-0.8371	0.260	-0.8038	0.264
Constant	-2.6957	**0.000**	-2.7033	**0.000**	-2.7035	**0.000**	-2.7023	**0.000**	-2.7013	**0.000**

*** Bolded** values are statistically significant at 95% confidence level.

Table 26. Non-Motorized Participation Frequency Stage Regression Results

Model →	***Min*** **> Once A Week = 53**		***25th Percentile*** **> Once A Week = 131**		***Midpoint*** **> Once A Week = 209**		***75th Percentile*** **> Once A Week = 287**		***Max*** **> Once A Week = 365**	
	Est.	***P>|t|***	***Est.***	***P>|t|***	***Est.***	***P>|t|***	***Est.***	***P>|t|***	***Est.***	***P>|t|***
Number of Visits										
Travel Cost	-0.0078	**0.000**	-0.0091	**0.000**	-0.0100	**0.000**	-0.0106	**0.000**	-0.0111	**0.000**
% Forested	-0.1065	0.628	-0.1922	0.514	-0.2349	0.508	-0.2599	0.514	-0.2760	0.520
Ave. Slope	0.0101	0.574	-0.0073	0.774	-0.0180	0.567	-0.0253	0.481	-0.0305	0.435
Std. Dev. Slope	-0.0984	**0.001**	-0.0836	**0.039**	-0.0737	0.139	-0.0667	0.237	-0.0615	0.316
Ave. Max. Temp.	-0.0084	0.220	-0.0170	0.067	-0.0219	0.051	-0.0251	**0.047**	-0.0273	**0.045**
Non-Mot. Trail Miles	0.0000	0.757	0.0000	0.703	0.0000	0.708	0.0000	0.716	0.0000	0.723
Age – 25 to 34	0.0955	0.323	0.2141	0.072	0.3007	**0.035**	0.3668	**0.025**	0.4192	**0.021**
Age – 35 to 44	0.1337	0.196	0.3076	**0.015**	0.4310	**0.004**	0.5236	**0.002**	0.5957	**0.002**
Age – 45 to 54	0.3312	**0.001**	0.5789	**0.000**	0.7469	**0.000**	0.8695	**0.000**	0.9633	**0.000**
Age – 55 to 64	0.2537	**0.024**	0.4914	**0.001**	0.6540	**0.000**	0.7732	**0.000**	0.8646	**0.000**
Age – 65 to 74	0.0380	0.779	0.2329	0.180	0.3709	0.072	0.4740	**0.040**	0.5541	**0.027**
Age – Over 75	-0.1518	0.489	0.1553	0.589	0.3471	0.293	0.4818	0.180	0.5826	0.126
Gender – Female	-0.1271	**0.008**	-0.1474	**0.020**	-0.1599	**0.036**	-0.1685	**0.050**	-0.1746	0.061
Gender – Other	0.3247	0.133	0.3196	0.309	0.3223	0.432	0.3270	0.499	0.3318	0.539
Hispanic	0.0794	0.200	0.0452	0.578	0.0225	0.820	0.0063	0.956	-0.0059	0.962
Black / Af. American	0.0653	0.569	0.0902	0.529	0.1062	0.536	0.1172	0.545	0.1253	0.552
American Indian	0.4826	**0.000**	0.5668	**0.000**	0.6186	**0.000**	0.6537	**0.000**	0.6792	**0.000**
Asian American	-0.2415	0.093	-0.3590	**0.045**	-0.4408	**0.042**	-0.5014	**0.045**	-0.5482	**0.050**
Native Hawaiian/P.I.	0.2924	0.212	0.5161	0.060	0.6439	**0.034**	0.7269	**0.025**	0.7853	**0.020**
College Graduate	0.0992	0.070	0.0851	0.269	0.0751	0.427	0.0677	0.527	0.0621	0.593
Unemployed	-0.0789	0.469	0.0101	0.950	0.0637	0.746	0.0996	0.652	0.1254	0.597
Student	-0.0356	0.772	-0.0371	0.803	-0.0389	0.828	-0.0406	0.844	-0.0421	0.854
Retired	0.1056	0.227	0.2088	0.071	0.2656	0.052	0.3017	**0.045**	0.3268	**0.042**
Income – 10k-14k	-0.0034	0.981	-0.0350	0.856	-0.0532	0.820	-0.0652	0.804	-0.0738	0.795
Income – 15k-24k	0.0744	0.475	0.0129	0.927	-0.0241	0.887	-0.0489	0.796	-0.0667	0.742
Income – 25k-34k	-0.1234	0.231	-0.2598	0.058	-0.3437	**0.037**	-0.4008	**0.030**	-0.4421	**0.027**
Income – 35k-49k	-0.0993	0.312	-0.2424	0.061	-0.3318	**0.034**	-0.3932	**0.025**	-0.4381	**0.022**
Income – 50k-74k	0.1209	0.183	0.0487	0.692	0.0061	0.967	-0.0220	0.893	-0.0420	0.812
Income – 75k-99k	0.1075	0.292	0.0463	0.740	0.0099	0.953	-0.0143	0.939	-0.0317	0.876
Income – 100k-149k	0.2126	**0.044**	0.1647	0.258	0.1360	0.440	0.1169	0.554	0.1032	0.627
Income – 150k-199k	0.5251	**0.001**	0.5943	**0.003**	0.6294	**0.006**	0.6505	**0.010**	0.6647	**0.013**
Income – Over 200k	0.3356	**0.029**	0.4408	**0.030**	0.4912	**0.037**	0.5206	**0.042**	0.5399	**0.046**
Constant	3.8493	**0.000**	4.7323	**0.000**	5.2649	**0.000**	5.6323	**0.000**	5.9075	**0.000**
Estimated Consumer Surplus per Trip:										
$-1/\beta_{TC}$	**$128.03**		**$109.55**		**$100.06**		**$94.25**		**$90.32**	

*** Bolded** values are statistically significant at 95% confidence level.

Motorized Trail Use

To estimate the total demand for motorized trail use by Arizonans in the state, we use trail use frequency range midpoints (with the exception of the category for 'more than once a week'), the distribution of total motorized trail use frequency by survey respondents, and a previous estimate of average annual motorized trail recreation trips per participant. In a random sample survey of Arizona OHV users, Silberman and Andereck (2006) found that respondents made an average of between 15.85 and 15.95 OHV recreation visits per year. Using this information, we are able to derive an estimate for the appropriate value to assign to 'more than once a week'. Assigning a value of 110 times per year (just over twice a week), in conjunction with all other range midpoints and the distribution of survey respondents by range, we arrive at an average number of visits of **15.9** for all participants. Applying the overall motorized participation rate for the Arizona population over age 18 (24.4%) and Arizona population over 18, we derive an estimate of total trail use of **20,117,100** visits in the past year by an estimated 1,263,600 adult users.

Results for motorized trail use model are presented in Tables 27 and 28. Results of the zero-inflation portion of the model (Table 27) correlate respondent characteristics and demographics with the likelihood that they never participate in motorized trail use. Coefficients represent log-odds of belonging to the non-participant group, therefore negative coefficients represent being less likely to belong to the non-participant group, and positive coefficients represent a higher likelihood of belonging to the non-participant group. Within this portion of the model, there was not a strong pattern predicting likelihood of being a non-participant.

For the participation frequency step of the model (Table 28), results again show travel cost to be negatively correlated with frequency of trail use and highly statistically significant. Consumer surplus, calculated as the negative reciprocal of the travel cost coefficient, is estimated at $259.17 per-visit (presented in the last row of Table 28). This estimate is larger than the average consumer surplus per person per primary activity day of $58.19 reported in US Forest Service Recreation Use Value Database (RUVD) for the Forest Service Region 3 (which includes Arizona and New Mexico). Yet, the estimate is well within the range of consumer surplus estimates for OHV recreation. In a survey of recreation studies conducted from 1958 to 2015, Rosenberger et al. (2017) report that consumer surplus estimates for OHV use (including snowmobiling) ranged between $9 and $462 per person per primary activity day. For motorized trail use, Englin, Holmes, and Niell (2006) estimate per-visit consumer surplus ranging between $25 and $1,000, depending upon the site and model specification. A number of studies have reported lower estimates for OHV use (see, for example, Jakus, et al. 2010; Holmes and Englin, 2010; Bowker et al., 2005; Silberman and Andereck, 2006). Even so, the estimate of this study is in line with a number other studies of OHV use. In a study of OHV demand for Tennessee, Sims et al. (2003), estimated consumer surplus per trip ranging from $170 to $200, depending on type of vehicle used. Their survey was conducted in 2001, so these figures are equivalent to roughly $239-$282 per trip in 2019 dollars (based on the GDP price deflator). Holmes and Englin (2005) report consumer surplus values for OHV recreation ranging from their preferred statistical specification of $27 to $333 per trip depending on site visited. Prescott's study of OHV use in Alberta, Canada reports a consumer surplus of $258 per trip (Prescott, 2017).

In the case of motorized trail use, percent of the area in forested land cover is positive, though again not statistically significant. Standard deviation of slope is again negative and statistically significant. Average maximum temperature is positive, though not statistically significant. This may be a result of the popularity of off road vehicle destinations in Western Arizona characterized by high summer

temperatures, though peak use does not occur in summer. Average slope of the land was marginally significant, and miles of motorized trails was not statistically significant. Belonging to an age category under age 55 was associated with higher frequency of participation in motorized trail use. Generally, there was not a clear pattern in the relationship between income and frequency of participation, though the highest income category was associated with higher frequency of participation. The motorized model exhibited greater sensitivity to the assigned value for the highest frequency category. However, with a previously published estimate of frequency of motorized trail use available, the model that corresponded to that average annual frequency of trail use was selected as the preferred model and the results are not presented as a range. Detailed results of the motorized regression are presented in Appendix F.

Table 27. Motorized Zero-Inflation Stage Regression Results

> Once A Week = 110	***Est.***	***P>|t|***
Zero-Inflation		
Age – 25 to 34	-0.4182	0.415
Age – 35 to 44	0.0542	0.911
Age – 45 to 54	-0.2811	0.651
Age – 55 to 64	-1.6168	0.073
Age – 65 to 74	-1.6159	0.099
Age – Over 75	0.3291	0.773
Gender – Female	0.0628	0.851
Gender – Other	-28.5403	**0.000**
Hispanic	0.1637	0.676
Black / Af. American	0.1763	0.775
American Indian	0.1353	0.857
Asian American	-27.6084	**0.000**
Native Hawaiian/P.I.	-10.2663	**0.000**
College Graduate	-0.1158	0.734
Unemployed	-1.4343	0.057
Student	-0.5455	0.476
Retired	0.8441	0.254
Income – 10k-14k	0.0306	0.966
Income – 15k-24k	-1.5178	0.139
Income – 25k-34k	-0.6888	0.185
Income – 35k-49k	-0.8946	0.115
Income – 50k-74k	-0.0640	0.888
Income – 75k-99k	-1.0020	0.140
Income – 100k-149k	-1.4436	0.071
Income – 150k-199k	0.3951	0.643
Income – Over 200k	-27.9858	**0.000**
Constant	-2.5550	**0.000**

*** Bolded** values are statistically significant at 95% confidence level.

Table 28. Non-Motorized Participation Frequency Stage Regression Results

> Once A Week = 110	***Est.***	***P>|t|***
Number of Visits		
Travel Cost	-0.0039	**0.000**
% Forested	0.1650	0.711
Ave. Slope	0.0575	0.075
Std. Dev. Slope	-0.1146	**0.030**
Ave. Max. Temp.	0.0091	0.516
Mot. Trail Miles	0.0000	0.820
Age – 25 to 34	0.4232	**0.011**
Age – 35 to 44	0.5346	**0.003**
Age – 45 to 54	0.4306	**0.030**
Age – 55 to 64	0.4065	0.079
Age – 65 to 74	0.4755	0.093
Age – Over 75	0.0917	0.892
Gender – Female	0.0271	0.782
Gender – Other	-1.4037	**0.000**
Hispanic	-0.0548	0.616
Black / Af. American	0.0365	0.802
American Indian	-0.1056	0.622
Asian American	0.3373	0.140
Native Hawaiian/P.I.	-1.5777	**0.000**
College Graduate	-0.0180	0.860
Unemployed	0.0791	0.670
Student	0.5384	**0.015**
Retired	-0.3035	0.158
Income – 10k-14k	0.1646	0.532
Income – 15k-24k	-0.2513	0.220
Income – 25k-34k	-0.2558	0.194
Income – 35k-49k	-0.2681	0.151
Income – 50k-74k	0.2528	0.162
Income – 75k-99k	-0.0599	0.754
Income – 100k-149k	-0.0285	0.888
Income – 150k-199k	0.1537	0.651
Income – Over 200k	0.5988	**0.021**
Constant	2.2737	0.068
Estimated Consumer Surplus per Trip:		
$-1/\beta_{TC}$	**$259.17**	

***** **Bolded** values are statistically significant at 95% confidence level.

Statewide Consumer Surplus Estimates

Having derived per-visit average consumer surplus estimates for both non-motorized and motorized trail recreation in Arizona, those estimates can be applied to estimates of total trail use per year to arrive at estimates of total statewide consumer surplus.

For non-motorized trail use, total estimated visits per year range between 48,592,500 and 117,627,500, with a midpoint estimate of 83,110,000 visits. Estimated per-visit consumer surplus from the travel cost model ranges between **$90.32** and **$128.03**, with a midpoint estimate of **$100.06** (Table 26). We arrive at a midpoint estimate of **$8.3 billion** in consumer surplus from **non-motorized** trail recreation in the past year, with estimates ranging between **$6.2 billion** and **$10.6 billion**.

For motorized trail use, there were an estimated 20,117,100 trail visits in the past year, based upon an average annual OHV trail use estimate from Silberman & Andereck (2006). Estimated per-visit consumer surplus from the travel cost model is **$259.17**. This leads to a statewide total consumer surplus of **$5.2 billion** annually from **motorized** trail use in the state.

This study's travel cost model estimates of consumer surplus are on a per-visit basis and therefore include both single-day and multiple-day trips. Additionally, the estimates are not site-specific, but rather represent an average across all locations throughout the state. While travel cost models can generate wide ranges of estimates for per-day or per-trip consumer surplus, this study's estimates fall within the typical range of estimates. In particular, estimates for non-motorized trail use were comparatively robust and close to most estimates, including US Forest Service Recreation Use Value Database (RUVD) values. Hesseln, Loomis, Gonzalez-Caban, and Alexander (2003) obtain per-trip estimates of $150 per trip for mountain bikers and $130 per trip for hikers in New Mexico. Rosenberger, et al (2017), in their analysis of RUVD data, estimated a per-day value of $40.89 for backpacking, $90.48 for biking, and $92.20 for hiking. The motorized estimate was not as robust to model specification as the non-motorized estimates, which could be in part due to the smaller sample of participants in the survey data. The motorized estimate was high compared with most RUVD estimates, though it fell within ranges found in past studies. In general, studies of consumer surplus from OHV use show much wider variation than for non-motorized trail use.

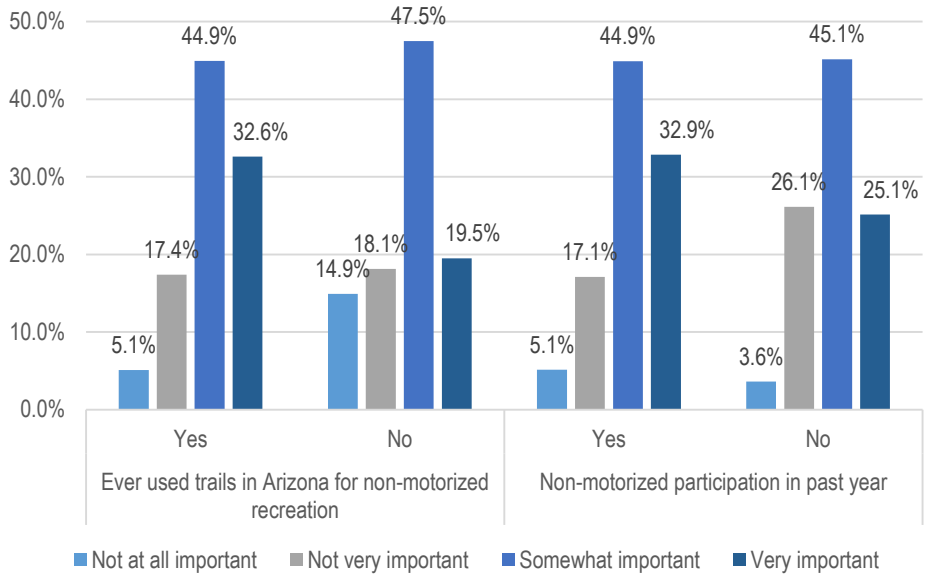
Importance of Trails for Community Development

Outdoor recreation-based amenities play an important role in many individuals' decisions of where to live and where to travel. Librett, Yore, & Schmid (2006) found that 48% of frequent trail users and 20% of non-trail users considered trail and green space access as an important factor in deciding where to live. Sage and Nickerson (2018) found that a majority of Helena, Montana residents considered Helena's trail system as very important to life in their community, and roughly 20% of residents reported that the community's trail system had a high or very high influence on their decision to live in or near Helena. Recent analysis supports that rural areas that are recreation-dependent have been economically outperforming those that are not (Headwaters Economics, 2019). The following sections present the results of two attitudinal questions regarding the importance of trail amenities to survey respondents in their decisions of where to live and where to travel for leisure or vacation.

Non-Motorized Users

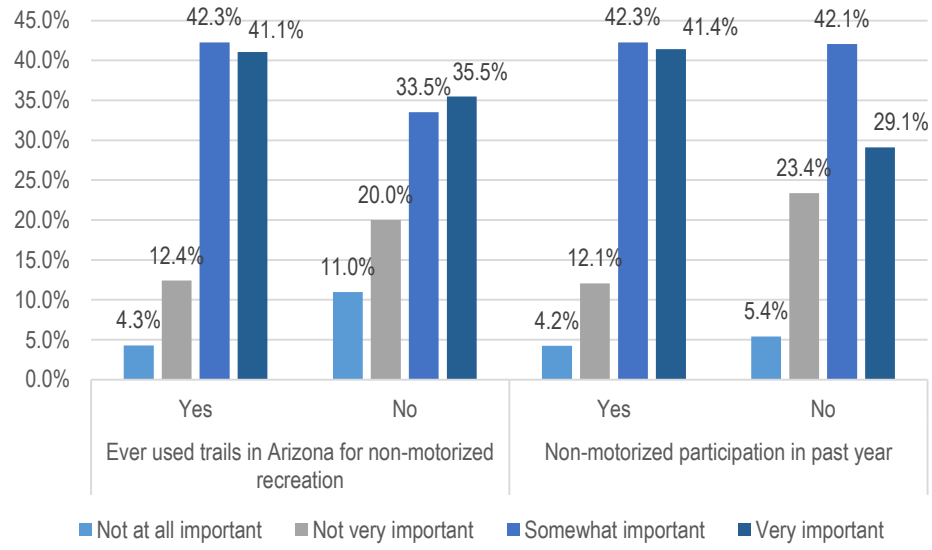
For those respondents that reported having ever participated in non-motorized trail recreation in Arizona, as well as those having participated in the past year, having trails nearby was rated as somewhat important or very important for more than 77% of respondents (Figure 4). Fewer respondents who have never used trails or who have not used them in the past year report access to trails as very important in their decision of where to live. That said, between 67% and 70% report trail access being somewhat or very important, slightly lower than those that use trails more regularly.

Figure 4. Importance of Having Trails Nearby in Decision of Where to Live in Arizona – By Non-Motorized Trail Use Participation Status



In deciding where to visit for vacation or leisure travel, having trails nearby is even more important, particularly for respondents who have ever used trails for non-motorized recreation or those that have used them in the past year. Roughly 83% of these respondents consider trails somewhat or very important in their decision of where to visit (Figure 5). In contrast, when considering respondents who have never used trails for non-motorized recreation in the state or those who have not used them in the past year, between 69% and 71% consider trail access somewhat important or very important when deciding on vacation destinations.

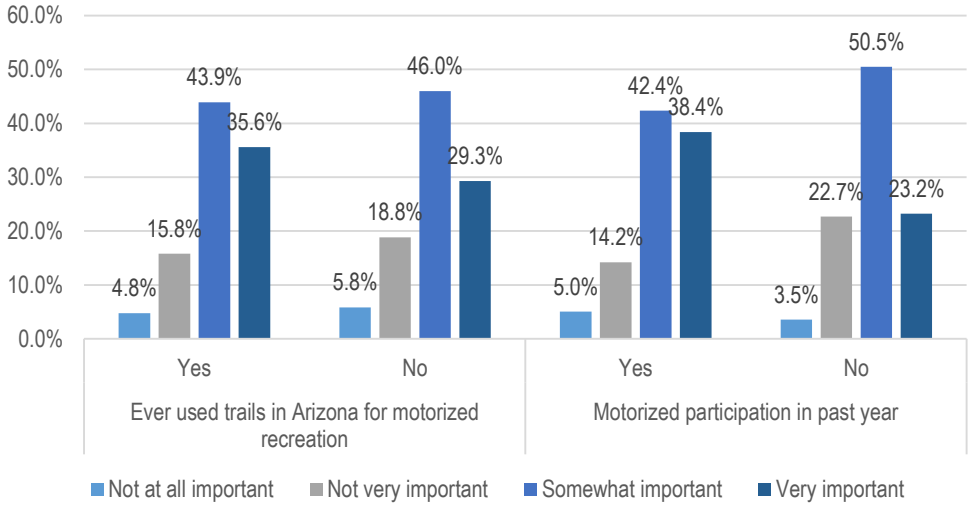
Figure 5. Importance of Having Trails Nearby in Decision of Where to Vacation or Leisure Travel – By Non-Motorized Trail Use Participation Status



Motorized Users

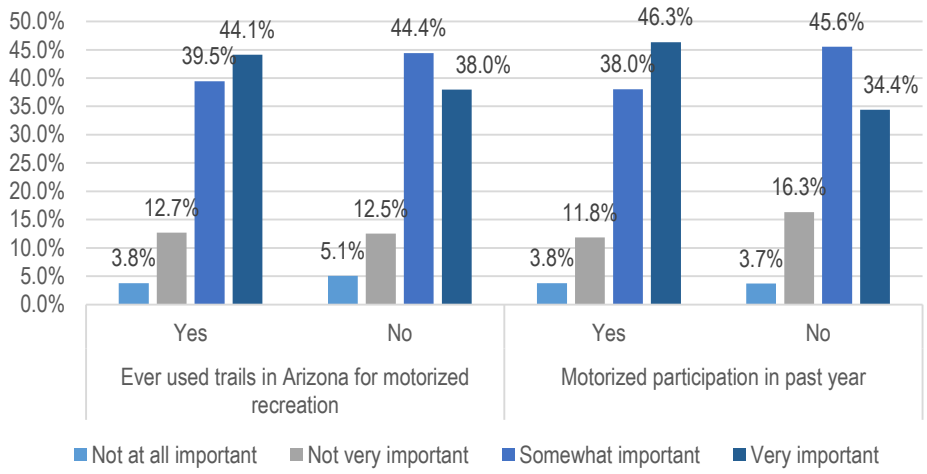
Respondents having ever participated in motorized trail recreation and those having participated in the past year consider having trails nearby as an important factor in deciding where to live, with roughly 80% reporting that it is somewhat or very important in their decision (Figure 6). Approximately 75% of respondents that have never participated or that haven't participated in the last year reported trail access as somewhat or very important.

Figure 6. Importance of Having Trails Nearby in Decision of Where to Live in Arizona – By Motorized Trail Use Participation Status



Even more important is having trails nearby in deciding where to visit. Close to 85% of those having ever participated in motorized trail recreation or having participated in the last year report that having trails nearby is somewhat or very important in their decision of where to visit (Figure 7). This is only slightly lower, closer to 80%, for those who have never participated, or those not having participated in the past year.

Figure 7. Importance of Having Trails Nearby in Decision of Where to Vacation or Leisure Travel – By Motorized Trail Use Participation Status



Origin-Destination Matrix

An origin-destination matrix provides a framework for estimating existing in-state trail use demand at the local and regional level, including where demand originates. The following sections present the results of the origin-destination matrix analysis overall for both non-motorized and motorized trail use. County-by county results are presented in Appendix B.

To derive estimates representative of the population across the state for the origin-destination matrix, random sample survey responses on favorite, most frequent, and furthest trail use are assigned expansion factors according to respondent home zip code. Weights are calculated for each Arizona zip code i and activity j where $j = \{motorized,\ non-motorized\}$, such that

$$w_{ij} = \frac{population\ over\ 18_i * participation\ rate_j}{participant\ respondents_{ij}}$$

The participation rate for activity j is equal to the statewide participation rate for the last year based upon weighted survey data. Zip code level data are then aggregated to the county level for both respondent origin and destination.

The origin-destination results reflect respondents' favorite, most frequent, and furthest used trails in the past year only. For some respondents, other trails in other areas may have been visited in the past year, but are not reflected in the results. **Zero entries in the matrices should <u>not</u> be interpreted as lack of in-state trail activity, but rather due to non-coverage as a favorite, most frequent, or furthest trail use area, or due to non-coverage in the survey sample**.

The following matrices present the origin and destination of total non-motorized and motorized trail use in the state, excluding duplicate responses. Matrices presenting percent of visits by visitor county of origin represent the breakdown of trail destinations by individuals residing within a particular county, that is to say, rows sum to 100%. Matrices presenting the percent of visits by destination county represent the breakdown of trail user origin by each destination county, in other words, columns sum to 100%. Individual matrices for non-motorized and motorized favorite, most frequently used, and furthest trails are presented in Appendix A.

Non-Motorized Users

Table 29 presents the percent of total estimated non-motorized trail visits from a given county of origin to all counties in the state (rows sum to 100%). For example, of trail visits by trail users from Apache County, 74% of trail visits are occurring within Apache County, 4% within Coconino County, 2% within Greenlee County, and so on. Again, it's important to emphasize that the survey does not collect information on all trail visits, but rather only on favorite, most frequent, and furthest trails.

Table 29. Total Estimated Non-Motorized Trail Visits, Shares by County of Origin

< Origin \ Destination >	Apache	Cochise	Coconino	Gila	Graham	Greenlee	La Paz	Maricopa	Mohave	Navajo	Pima	Pinal	Santa Cruz	Yavapai	Yuma
Apache	74%	0%	4%	0%	0%	2%	0%	3%	0%	1%	1%	2%	0%	15%	0%
Cochise	1%	74%	6%	0%	0%	0%	0%	2%	0%	0%	2%	0%	5%	10%	0%
Coconino	3%	0%	87%	0%	0%	0%	0%	1%	0%	1%	0%	0%	0%	8%	0%
Gila	0%	0%	0%	85%	0%	0%	0%	0%	0%	0%	0%	8%	0%	7%	0%
Graham	30%	3%	0%	5%	53%	0%	0%	0%	0%	0%	7%	2%	0%	0%	0%
Greenlee	62%	0%	0%	0%	0%	38%	0%	0%	0%	0%	0%	0%	0%	0%	0%
La Paz	0%	0%	1%	0%	0%	0%	99%	0%	0%	0%	0%	0%	0%	0%	0%
Maricopa	0%	0%	3%	3%	0%	0%	0%	64%	0%	3%	1%	11%	0%	13%	0%
Mohave	0%	0%	8%	0%	0%	0%	0%	0%	87%	0%	0%	0%	0%	4%	0%
Navajo	5%	1%	11%	0%	0%	0%	0%	3%	0%	72%	0%	6%	0%	3%	0%
Pima	2%	1%	6%	1%	2%	0%	0%	0%	0%	3%	78%	5%	1%	1%	0%
Pinal	0%	0%	1%	2%	0%	0%	0%	7%	0%	1%	3%	83%	0%	3%	0%
Santa Cruz	0%	1%	0%	1%	0%	0%	0%	0%	7%	0%	37%	3%	52%	0%	0%
Yavapai	2%	0%	10%	1%	0%	0%	0%	3%	2%	0%	0%	0%	0%	81%	0%
Yuma	0%	3%	6%	0%	0%	0%	3%	8%	0%	0%	2%	13%	0%	9%	55%

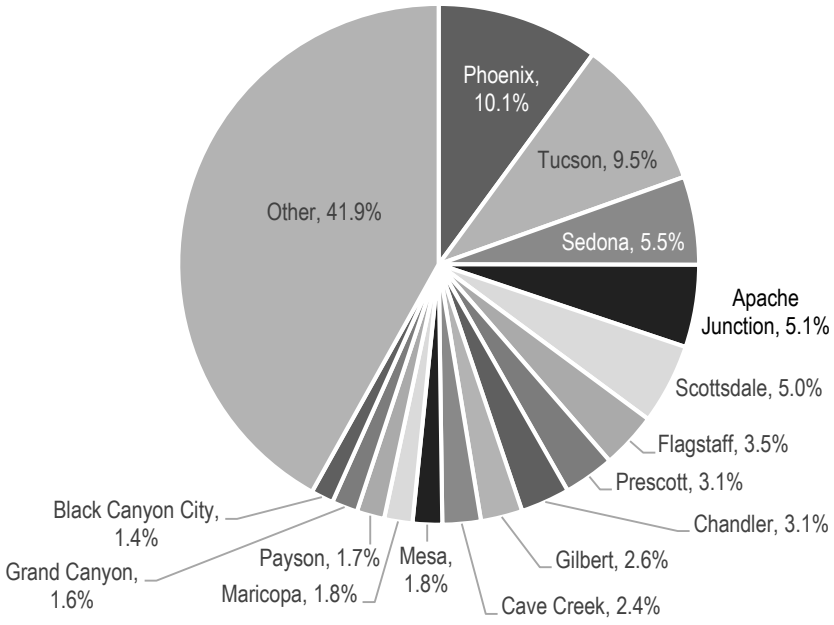
Table 30 presents the percent of non-motorized trail visits to a particular destination county from all counties in the state (columns sum to 100%). For example, in Cochise County, 71% of trail visits are made by people from Cochise County, 9% by people from Maricopa County, 12% from people in Pima County, and so on. The values along the diagonal show us "intra-county" share of trail use. Lower numbers along the diagonal indicate a particular county is attracting more outside visitors relative to in-county users. This is particularly the case in such counties as Coconino and Yavapai Counties which are popular outdoor recreation destinations. We can also see the influence of Maricopa County, the state's most populous county, on trail use in many areas of the state, for example, Gila and Yavapai Counties.

Table 30. Total Estimated Non-Motorized Trail Visits, Shares by Destination County

< Origin > Destination	Apache	Cochise	Coconino	Gila	Graham	Greenlee	La Paz	Maricopa	Mohave	Navajo	Pima	Pinal	Santa Cruz	Yavapai	Yuma
Apache	54%	0%	1%	0%	0%	39%	0%	0%	0%	0%	0%	0%	0%	2%	0%
Cochise	1%	71%	1%	0%	0%	4%	0%	0%	0%	0%	0%	0%	11%	1%	0%
Coconino	3%	1%	31%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	1%	0%
Gila	0%	0%	0%	17%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Graham	8%	1%	0%	1%	49%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Greenlee	0%	0%	0%	0%	0%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%
La Paz	0%	0%	0%	0%	0%	0%	79%	0%	0%	0%	0%	0%	0%	0%	0%
Maricopa	11%	9%	31%	70%	6%	51%	4%	98%	7%	52%	2%	49%	6%	61%	0%
Mohave	1%	0%	5%	0%	0%	0%	0%	0%	89%	0%	0%	0%	0%	1%	0%
Navajo	4%	0%	3%	0%	1%	0%	0%	0%	0%	31%	0%	1%	0%	0%	0%
Pima	15%	12%	18%	5%	45%	0%	0%	0%	1%	14%	94%	7%	36%	2%	2%
Pinal	0%	1%	1%	5%	0%	0%	5%	1%	0%	1%	1%	41%	0%	1%	0%
Santa Cruz	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	1%	0%	46%	0%	0%
Yavapai	4%	0%	7%	1%	0%	0%	0%	0%	2%	1%	0%	0%	0%	29%	0%
Yuma	0%	4%	2%	0%	0%	0%	11%	0%	0%	0%	0%	2%	1%	1%	98%

The top 15 non-motorized trail use destinations in the state in the past year are presented in Figure 8. These results are population-weighted, accounting for zip code level population and statewide participation rates. As such, top destinations are most heavily reflective of popular trail use areas near major metro areas with large populations. Top non-motorized trail use destinations include Phoenix, Tucson, Sedona, Apache Junction, Scottsdale, and Flagstaff. Again, these results reflect common trail use areas near the state's major urban areas.

Figure 8. Top Non-Motorized Trail Use Areas by Number of Estimated Visits in Last Year (Weighted)



Motorized Users

Table 31 presents the percent of total estimated motorized trail visits from a given county of origin to all counties in the state (rows sum to 100%). For example, of motorized trail visits by trail users from Apache County, 64% are made within Apache County, 4% are made in Cochise County, 4% in Coconino County, and so on. Compared with the corresponding non-motorized version of this matrix, motorized trail users appear to travel out of their home counties more often for motorized trail recreation.

Table 31. Total Estimated Motorized Trail Visits, Shares by County of Origin

< Origin > Destination	Apache	Cochise	Coconino	Gila	Graham	Greenlee	La Paz	Maricopa	Mohave	Navajo	Pima	Pinal	Santa Cruz	Yavapai	Yuma
Apache	64%	4%	4%	0%	0%	1%	0%	0%	6%	15%	1%	4%	0%	2%	0%
Cochise	3%	49%	0%	0%	0%	0%	0%	1%	2%	0%	17%	6%	17%	4%	0%
Coconino	0%	0%	49%	0%	0%	0%	0%	20%	1%	0%	0%	9%	3%	17%	0%
Gila	5%	28%	6%	55%	0%	0%	0%	0%	0%	0%	3%	2%	0%	2%	0%
Graham	11%	2%	0%	0%	68%	2%	0%	5%	0%	4%	2%	5%	0%	1%	0%
Greenlee	34%	0%	0%	0%	0%	56%	0%	0%	0%	0%	0%	3%	0%	7%	0%
La Paz	1%	0%	0%	2%	0%	0%	88%	1%	2%	0%	1%	2%	1%	1%	0%
Maricopa	3%	1%	6%	2%	0%	4%	0%	38%	1%	0%	2%	24%	4%	15%	0%
Mohave	2%	0%	2%	0%	0%	0%	1%	2%	83%	0%	0%	7%	1%	1%	0%
Navajo	5%	0%	8%	1%	0%	0%	0%	1%	0%	58%	0%	20%	0%	6%	0%
Pima	3%	6%	2%	0%	4%	0%	4%	3%	0%	9%	36%	6%	4%	4%	19%
Pinal	11%	0%	2%	0%	0%	0%	0%	15%	0%	1%	4%	55%	3%	8%	1%
Santa Cruz	13%	0%	0%	0%	0%	0%	6%	21%	11%	0%	20%	7%	21%	1%	0%
Yavapai	0%	0%	1%	0%	0%	0%	0%	11%	5%	1%	0%	5%	0%	77%	0%
Yuma	2%	0%	3%	0%	0%	0%	3%	2%	2%	1%	1%	4%	0%	2%	82%

Table 32 presents the percent of motorized trail visits to particular destination county from all counties in the state (columns sum to 100%). For example, of all motorized trail visits to Coconino County, 31% are made by residents of Coconino County, 1% by residents of Gila County, 57% by residents of Maricopa County, and so on. Similar to non-motorized trail use, motorized trail users from Maricopa County represent a large share of trail users in most counties around the state.

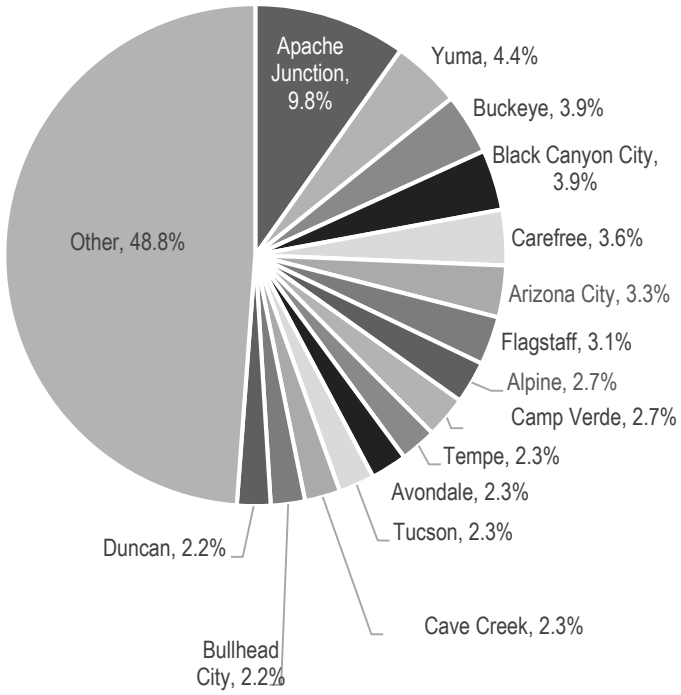
Table 32. Total Estimated Motorized Trail Visits, Shares by Destination County

< Origin \ Destination >	Apache	Cochise	Coconino	Gila	Graham	Greenlee	La Paz	Maricopa	Mohave	Navajo	Pima	Pinal	Santa Cruz	Yavapai	Yuma
Apache	4%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%
Cochise	1%	39%	0%	0%	0%	0%	0%	0%	1%	0%	4%	1%	8%	0%	0%
Coconino	0%	0%	31%	0%	0%	0%	1%	3%	1%	0%	0%	2%	3%	5%	0%
Gila	1%	11%	1%	28%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Graham	1%	0%	0%	0%	29%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Greenlee	2%	0%	0%	0%	0%	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%
La Paz	0%	0%	0%	1%	0%	0%	41%	0%	0%	0%	0%	0%	0%	0%	0%
Maricopa	50%	16%	57%	69%	3%	95%	14%	87%	12%	10%	16%	71%	59%	57%	2%
Mohave	3%	0%	2%	0%	0%	0%	2%	0%	77%	0%	0%	2%	2%	0%	0%
Navajo	3%	0%	2%	1%	0%	0%	0%	0%	0%	39%	0%	2%	0%	1%	0%
Pima	10%	33%	3%	0%	67%	1%	31%	1%	0%	44%	70%	4%	13%	3%	46%
Pinal	17%	0%	1%	1%	0%	0%	0%	3%	0%	3%	3%	16%	5%	3%	1%
Santa Cruz	6%	0%	0%	0%	0%	0%	6%	1%	3%	0%	5%	1%	9%	0%	0%
Yavapai	1%	0%	1%	0%	0%	0%	0%	3%	5%	1%	0%	2%	0%	30%	0%
Yuma	2%	0%	1%	0%	0%	0%	5%	0%	1%	1%	0%	1%	0%	0%	50%

The top 15 motorized trail use destinations in the state in the past year are presented in Figure 9. These results are population-weighted, accounting for zip code level population and statewide participation rates. As such, top destinations are most heavily reflective of popular trail use areas near major metro areas with large populations. Results are presented as reported by survey respondents, therefore inclusion of such destinations as Tempe where there are few or no motorized trails could be reflective of group rendezvous points, or what respondents consider to be the closest city or town to their destination.

Top motorized destinations, though still influenced by major metro areas, are more reflective of areas of the state that attract motorized trail users. Top areas include Apache Junction, Yuma, Buckeye, Black Canyon City, and Carefree.

Figure 9. Top Motorized Trail Use Destinations by Estimated Number of Visits in Past Year (Weighted)



Discussion & Conclusions

This study presents an in-depth analysis of the demand for non-motorized and motorized trail recreation in Arizona by in-state residents and estimates the economic value of trails to trail users using the travel cost method. Results show non-motorized trail users visit trails between 48,592,500 and 117,627,500 times per year, with a midpoint estimate of 83,110,000 visits. Estimated per-visit consumer surplus ranges between $90.32 and $128.03, with a midpoint estimate of $100.06, and total statewide consumer surplus is estimated at $8.3 billion (midpoint estimate), with estimates ranging between $6.2 billion and $10.6 billion. For motorized trail use, there were an estimated 20,117,100 trail visits in the past year, and estimated per-visit consumer surplus was $259.17. Total statewide consumer surplus from motorized trail use was estimated at $5.2 billion annually.

Outdoor recreation amenities support the quality of life and health of individuals, communities, and local economies. Trail access for non-motorized and motorized recreation enriches the lives of community residents and visitors, providing an outlet for exercise, outdoor recreation, and transportation. Results of this study show that a large majority of Arizonans consider access to trails as important or very important in their decisions of where to live and where to visit for leisure, even for Arizonans that do not participate in trail-based outdoor recreation regularly. For communities seeking to attract and retain workforce, or to attract visitors, trail access is an important factor to consider.

This study estimates economic value, also known as consumer surplus. This is distinct from an economic impact or economic contribution study which measures the circulation of money through the economy. While outdoor recreation can generate consumer spending, outdoor recreation is often attractive because it doesn't require people to spend much money to participate. That doesn't mean, however, that the public doesn't value it.

Estimating the economic value associated with use of natural resources and amenities is important to understanding how society is impacted by changes in the quality of or access to those resources. It can help to guide public policy and investments by informing our understanding of the benefits and costs of different actions affecting natural resources and amenities valued by the public. This report provides a baseline understanding of the value of trails to Arizonans and existing demand for their use.

The scope of this study is limited to capturing the value of trail use in Arizona to Arizona residents over age 18. The study does not capture non-use values, consumer surplus of out-of-state residents, nor does it capture the consumer surplus of people under 18 years of age. These areas provide opportunities for future research.

References

Abareshi, M., Zaferanieh, M., Reza Safi, M. (2019). Origin-Destination Matrix Estimation Problem in a Markov Chain Approach. Networks and Spatial Economics. https://doi.org/10.1007/s11067-019-09447-8

American Automobile Association (2019). Your Driving Costs: How Much Are You Really Paying to Drive. Retrieved from https://exchange.aaa.com/wp-content/uploads/2019/09/AAA-Your-Driving-Costs-2019.pdf

Anderson, C. & Taylor, G. (2014). Economic importance of off-highway vehicle recreation: An analysis of Idaho counties. University of Idaho Extension, Publication CIS 1195.

Arizona Department of Transportation (2013). An Economic Impact Study of Bicycling in Arizona. Prepared by McClure Consulting LLC, Phoenix, AZ; Economic & Policy Resource, Inc., Williston, VT; and Kimley-Horn and Associates, Inc., Tucson, AZ.

ASPT (2019). Statewide Trail Database. Arizona State Parks and Trails.

Blaine, T., Lichtkoppler, F., Bader, T., Hartman, T., & Lucente, J. (2015). An examination of sources of sensitivity of consumer surplus estimates in travel cost models. Journal of Environmental Management, Vol 151, pp 427-436.

Blumberg, S. & Luke, J. (2018). Wireless substitution: Early release of estimates from the National Health Interview Survey, July–December 2017. National Center for Health Statistics. Retrieved from https://www.cdc.gov/nchs/nhis.htm

Bowker, J., English, D., Bergstrom, J., & Starbuck, C. (2005). Valuing National Forest Recreation Access: Using a Stratified On-Site Sample to Generate Values across Activities for a Nationally Pooled Sample. Selected Paper Prepared for Presentation at the American Agricultural Economics Association Annual Meeting, Providence Rhode Island, July 24-27, 2005.

Bowker, J., Bergstrom, J., & Gill, J. (2007). Estimating the economic value and impacts of recreation trails: a case study of the Virginia Creeper Rail Trail. Tourism Economics. Vol 13, No. 2, pp 241-260.

Bozdogan, H. (1987). Model Selection and Akaike's Information Criterion (AIC): The General Theory and its Analytical Extensions, Psychometrika, Vol 52, pp 345-370.

Brown, G. & Mendelsohn, R. (1984). The Hedonic Travel Cost Method. The Review of Economics and Statistics, Vol. 66, No. 3, pp. 427-433

Brownson, R., Housemann, R., Brown, D., Jackson-Thompson, J., King, A., Malone, B., & Sallis, J. (2000). Promoting physical activity in rural communities: walking trail access, use, and effects. American Journal of Preventive Medicine, 18(3), 235-241.

Budruk, M., Andereck, K., Prateek, G., & Steffey, E. (2014). 2013-2014 Arizona State Parks Trails Study: Final Technical Report. School of Community Resources and Development, College of Public Programs, Arizona State University.

Burbidge, S., & Goulias, K. (2009). Evaluating the impact of neighborhood trail development on active travel behavior and overall physical activity of suburban residents. Transportation research record, 2135(1), 78-86.

Bureau of Economic Analysis (BEA). (2018). Outdoor Recreation Satellite Account: Updated Statistics for 2012-2016. Retrieved 8/16/2019 from https://www.bea.gov/data/special-topics/outdoor-recreation

Chakraborty, K. & Keith, J. (2000). Estimating the Recreation Demand and Economic Value of Mountain Biking in Moab, Utah: An Application of County Data Models. Journal of Environmental Planning and Management, Vol 43, No 3, pp 461-469.

Chhabra, D., Kim, E., Yoshioka, C., & Stevenson, N. (2018). 2017 Arizona State Parks: Off-Highway Vehicle Recreation Report – Economic Impact of Off-Highway Recreation in the State of Arizona. Arizona State University School of Community Resources and Development.

Cordell, H., Betz, C., Green, G., Stephens, B. (2008). Off-Highway Vehicle Recreation in the United States and its Regions and States: A National Report from the National Survey on Recreation and the Environment (NSRE). USDA Forest Service. Retrieved from https://www.fs.fed.us/recreation/programs/ohv/IrisRec1rpt.pdf

Cordell, H. (2012). Outdoor Recreation Trends and Futures: A Technical Document Supporting the Forest Service 2010 RPA Assessment. USDA Forest Service, General Technical Report SRS-150. Retrieved from https://www.srs.fs.usda.gov/pubs/gtr/gtr_srs150.pdf

Englin, J., Holmes, T., & Sills, E. (2003). Estimating Forest Recreation Demand Using Count Data Models. From "*Forests in a Market Economy*", Sills and Abt (eds.), Springer-Science+Business Media, B.V.

Englin, J. & Shonkwiler, J. (1995). Estimating Social Welfare Using Count Data Models: An Application to Long-Run Recreation Demand Under Conditions of Endogenous Stratification and Truncation. The Review of Economics and Statistics, Vol 77, No 1, pp 104-112.

Englin, J., Holmes, T., Niell, R. (2006). Alternative Models of Recreational Off-Highway Vehicle Site Demand. Environmental & Resource Economics, Vol 35, pp 327-338.

EPA (2019). Recreation Economy for Rural Communities. EPA Smart Growth Program. Retrieved from https://www.epa.gov/smartgrowth/recreation-economy-rural-communities#2019

ESRI (2018). ArcGIS Desktop: Release 10. Redlands, CA: Environmental Systems Research Institute.

Fitzhugh, E. C., Bassett Jr, D. R., & Evans, M. F. (2010). Urban trails and physical activity: a natural experiment. American Journal of Preventive Medicine, 39(3), 259-262.

Glasgow, G., Train, K. (2018). Lost Use-Value from Environmental Injury When Visitation Drops at Undamaged Sites. Land Economics. Vol 94, No 1, pp 87-96.

Greene, W. (2012). *Econometric analysis*. 7th Edition. Prentice Hall, Upper Saddle River, New Jersey.

Griffith, G., Omernik, J., Johnson, C., and Turner, D. (2014). Ecoregions of Arizona (poster): U.S. Geological Survey Open-File Report 2014–1141, with map, scale 1:1,325,000. http://dx.doi.org/10.3133/ofr20141141

Grunseit, A., Crane, M., Klarenaar, P., Noyes, J., & Merom, D. (2019). Closing the loop: short term impacts on physical activity of the completion of a loop trail in Sydney, Australia. International Journal of Behavioral Nutrition and Physical Activity, 16(1), 57.

Haab, T. C., & McConnell, K. E. (2002). Valuing Environmental and Natural Resources: The Econometrics of Non-market Valuation. Cheltenham, U.K.: Edward Elgar Publishing. Retrieved from https://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=81433&site=ehost-live

Headwaters Economics (2018). The Economic Impact of Outdoor Recreation and the Whitefish Trail in Whitefish, Montana. Headwaters Economics, Bozeman, Montana. Retrieved at https://headwaterseconomics.org

Headwaters Economics (2019). Recreation Counties Attracting New Residents and Higher Incomes. January 2019. Retrieved from https://headwaterseconomics.org/wp-content/uploads/recreation-counties-attract-report.pdf

Hellerstein, D. & Mendelsohn, R. (1993). A Theoretical Foundation for Count Data Models. American Journal of Agricultural Economics, Vol 75, pp 604-611.

Holmes, T. P., & Englin, J. E. (2005). User fees and the demand of OHV recreation. In: Shultz, SD comp., ed. Benefits and costs of resource policies affecting public and private land. Pap. FS-1133. Salt Lake City, UT: Western Regional Research: 433.

Holmes, T. P., & Englin, J. E. (2010). Preference heterogeneity in a count data model of demand for off-highway vehicle recreation. Agricultural and Resource Economics Review, 39(1), 75-88.

Jakus, P., Keith, J., Liu, L., & Blahna, D. (2010). The welfare effects of restricting off-highway vehicle access to public lands. Agricultural and Resource Economics Review, 39(1), 89-100.

Johnston, J., Rolfe, J., Rosenberger, R., Brouwer, R. (Eds) (2015). Benefit Transfer of Environmental and Resource Values: A Guide for Researchers and Practitioners. 582 pp.

Lew, D. & Larson, D. (2008). Valuing A Beach Day with a Repeated, Nested Logit Model of Participation, Site Choice, and Stochastic Time Value. Marine Resource Economics, Vol. 23, pp 233-252.

Librett, J., Yore, M., & Schmid, T. (2006). Characteristics of Physical Activity Levels Among Trail Users in a U.S. National Sample. American Journal of Preventative Medicine, Vol 31, No 5, pp 399-405.

McFadden, D. (1974). "Conditional Logit Analysis of Qualitative Choice Behavior." From *Frontiers in Econometrics*. Eds. Zarembka, P. Academic Press, New York. Retrieved from https://eml.berkeley.edu/reprints/mcfadden/zarembka.pdf

Morey, E., Buchanan, T., & Waldman, D. (2002). Estimating the benefits and costs to mountain bikers of changes in trail characteristics, access fees, and site closures: choice experiments and benefits transfer. Journal of Environmental Management, Vol 64, pp 411-422.

Morey, E., Shaw, W., & Rowe, R. (1991). A Discrete-Choice Model of Recreational Participation, Site Choice, and Activity Valuation When Complete Trip Data Are Not Available. Journal of Environmental Economics and Management. Vol 20, pp 181-201.

New York State Parks, Recreation and Historic Preservation (2015). An Analysis of the 2015 Trail User Survey & Count. Retrieved from https://parks.ny.gov/recreation/trails/documents/2015TrailUserSurveyCountReport.pdf

Outdoor Industry Association (2018). 2018 Outdoor Participation Report. Retrieved from https://outdoorindustry.org/resource/2018-outdoor-participation-report/

Outdoor Industry Association (2017). The Outdoor Recreation Economy. Retrieved from https://outdoorindustry.org/wp-content/uploads/2017/04/OIA_RecEconomy_FINAL_Single.pdf

Parsons, G. (2003). The Travel Cost Method. From *A Primer on Non-Market Valuation*. Eds. Champ, P., Boyle, K., & Brown, T. Springer, New York, New York. pp 269-329.

Phaneuf, D.J. & Smith, V.K. (2005). Recreation Demand Models. From *Handbook of Environmental Economics*, Vol. 2, pp 671-761. https://doi.org/10.1016/S1574-0099(05)02015-2

PIB (2019). Custom tabulation of Census data. Partners in Brainstorming.

Plantinga, A., & Bernell, S. (2007). The association between urban sprawl and obesity: is it a two-way street? Journal of Regional Science, 47(5), 857-879.

Prescott, S. G. (2017). Analysis and Economic Valuation of Off Highway Vehicle Use in Southwestern Alberta, Canada. MS. Thesis, Department of Resource Economics and Environmental Sociology, University of Alberta.

Rosenberger, R., & Lindberg, K. (2012). Oregon Resident Outdoor Recreation Demand Analysis: 2013-2017 Oregon Statewide Comprehensive Outdoor Recreation Plan Supporting Documentation. Oregon State University College of Forestry.

Rosenberger, R., White, E., Kline, J., & Cvitanovich, C. (2017). Recreation Economic Values for Estimating Outdoor Recreation Economic Benefits from the National Forest System. USDA Forest Service, Pacific Northwest Research Station, General Technical Report PNW-GTR-957.

Sage, J. & Nickerson, N. (2018). Trail Usage and Value: A Helena Case Study. University of Montana Institute for Tourism & Recreation Research, Research Report 2018-01.

Silberman, J. & Andereck, K. (2006). The Economic Value of Off-Highway Vehicle Recreation. Journal of Leisure Research, Vol 38 No 2, pp 208-223.

Simões, P., Barata, E., & Cruz, L. (2013). Using Count Data and Ordered Models in National Forest Recreation Demand Analysis. Environmental Management, Vol 52, pp 1249-1264.

Sims, C., Hodges, D., English, B., Fly, J., & Stephens, B. (2003). Modeling the Demand for and Value of OHV Recreation in Tennessee. Bugs, Budgets, Mergers, and Fire: Disturbance Economics. Proceedings of the 2003 Southern Forest Economics Workers Annual Meeting March 17 & 18, 2003. New Orleans, Louisiana. S.O. Moffat (Ed.) USDA Forest Service Southern Research Station, Asheville, North Carolina.

Skszek, S. (2004). Actual Speeds on the Roads Compared to the Posted Limits. Report FHWA-AZ-04-551. Arizona Department of Transportation. Retrieved from https://apps.azdot.gov/ADOTLibrary/publications/project_reports/PDF/AZ551.PDF

Snyder, S., Whitmore, J., Schneider, I., & Becker, D. (2008). Ecological criteria, participant preferences and location models: A GIS approach toward ATV trail planning. Applied Geography, Vol 28, pp 248-258. doi:10.1016/j.apgeog.2008.07.001

Southwick Associates (2019). The Economic Contributions of Water-related Outdoor Recreation in Arizona: A Technical Report on Study Scope, Methods, and Procedures. Prepared for Audubon Arizona. March 2019.

Starnes, H., Troped, P., Klenosky, D., & Doehring, A. (2011). Trails and physical activity: a review. Journal of Physical Activity and Health, 8(8), 1160-1174.

StataCorp (2019). Stata Statistical Software: Release 16. College Station, TX: StataCorp LLC.

U.S. Census Bureau (2019). 2019 TIGER/Line Shapefiles (machine-readable data files). Retrieved from https://www.census.gov/cgi-bin/geo/shapefiles/index.php

USDA (2012a). 1981-2010 Annual Average Minimum Temperature by State. USDA/NRCS - National Geospatial Center of Excellence.

USDA (2012b). 1981-2010 Annual Average Maximum Temperature by State. USDA/NRCS - National Geospatial Center of Excellence.

USGS (2019). NLCD 2016 Land Cover Conterminous United States. Retrieved from https://www.mrlc.gov/data/nlcd-2016-land-cover-conus

USGS (2019). National Elevation Dataset (NED). Retrieved from https://www.sciencebase.gov/catalog/item/4f70a58ce4b058caae3f8ddb

USGS (2014). National Transportation Dataset (NTD). Retrieved from https://www.sciencebase.gov/catalog/item/4f70b1f4e4b058caae3f8e16

U.S. Water Resources Council (1983). Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. Retrieved from https://www.govinfo.gov/app/details/FR-2014-12-24/2014-30170/context

Varian, Hal. (2006). *Intermediate Microeconomics: A Modern Approach*. 7th Edition. W.W. Norton & Company, New York.

Washington Recreation and Conservation Office (2019). Economic, Environmental, and Social Benefits of Recreational Trails in Washington State. Retrieved from https://rco.wa.gov/wp-content/uploads/2020/01/HikingBikingStudy.pdf

White, E., Bowker, J., Askew, A., Langner, L., Arnold, R, & English, D. (2016). Federal Outdoor Recreation Trends: Effects on Economic Opportunity. USDA Forest Service, General Technical Report PNW-GTR-945.

Wilson, P. (2015). The misuse of the Vuong test for non-nested models to test for zero-inflation. Economics Letters, Vol 127, pp 51-53.

Appendices

Appendix A. Favorite, Frequent, Furthest Origin-Destination Matrices

The following tables present detailed results of the origin-destination matrix, breaking out origins and destinations by respondents' favorite, most frequently used, and furthest used trails for both non-motorized and motorized trail use. Percentages are presented both row-wise and column-wise in order to analyze where the population from each county travels to, and where visits to each county are coming from.

Non-Motorized Users

*Table 33. County of **Favorite** Non-Motorized Trail Area, Shares by County of Origin*

< Origin > Destination	Apache	Cochise	Coconino	Gila	Graham	Greenlee	La Paz	Maricopa	Mohave	Navajo	Pima	Pinal	Santa Cruz	Yavapai	Yuma
Apache	56%	0%	7%	0%	0%	1%	0%	2%	1%	2%	2%	14%	0%	13%	0%
Cochise	3%	71%	3%	0%	1%	1%	0%	1%	0%	0%	4%	1%	12%	2%	0%
Coconino	2%	2%	79%	0%	0%	0%	0%	2%	0%	4%	0%	0%	0%	10%	0%
Gila	0%	0%	0%	84%	0%	0%	0%	0%	0%	0%	0%	7%	0%	9%	0%
Graham	17%	3%	0%	6%	57%	0%	0%	3%	0%	0%	9%	6%	0%	0%	0%
Greenlee	54%	0%	0%	0%	0%	46%	0%	0%	0%	0%	0%	0%	0%	0%	0%
La Paz	0%	0%	11%	0%	0%	0%	89%	0%	0%	0%	0%	0%	0%	0%	0%
Maricopa	1%	1%	5%	4%	0%	0%	0%	55%	0%	2%	1%	15%	0%	14%	0%
Mohave	1%	0%	9%	1%	0%	0%	0%	0%	78%	0%	0%	2%	0%	10%	0%
Navajo	13%	1%	15%	0%	3%	0%	0%	2%	0%	53%	0%	8%	0%	6%	0%
Pima	1%	3%	4%	1%	2%	0%	0%	1%	1%	1%	74%	4%	3%	3%	0%
Pinal	0%	0%	4%	2%	0%	0%	0%	11%	0%	3%	2%	72%	0%	4%	0%
Santa Cruz	0%	5%	0%	5%	0%	0%	0%	0%	5%	0%	39%	5%	42%	0%	0%
Yavapai	1%	0%	10%	1%	0%	0%	0%	2%	1%	1%	1%	1%	0%	83%	0%
Yuma	0%	2%	8%	0%	0%	0%	2%	4%	1%	1%	9%	5%	0%	7%	60%

*Table 34. County of **Favorite** Non-Motorized Trail Area, Shares by Destination County*

< Origin \ Destination >	Apache	Cochise	Coconino	Gila	Graham	Greenlee	La Paz	Maricopa	Mohave	Navajo	Pima	Pinal	Santa Cruz	Yavapai	Yuma
Apache	25%	0%	1%	0%	0%	5%	0%	0%	0%	1%	0%	1%	0%	1%	0%
Cochise	3%	49%	1%	0%	3%	14%	0%	0%	0%	0%	1%	0%	17%	0%	0%
Coconino	2%	1%	23%	0%	0%	0%	0%	0%	0%	3%	0%	0%	0%	1%	0%
Gila	0%	0%	0%	16%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Graham	4%	0%	0%	1%	31%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Greenlee	3%	0%	0%	0%	0%	26%	0%	0%	0%	0%	0%	0%	0%	0%	0%
La Paz	0%	0%	0%	0%	0%	0%	55%	0%	0%	0%	0%	0%	0%	0%	0%
Maricopa	45%	23%	45%	72%	14%	55%	23%	97%	8%	50%	6%	63%	22%	64%	0%
Mohave	1%	0%	4%	1%	0%	0%	0%	0%	82%	0%	0%	0%	0%	2%	0%
Navajo	8%	0%	3%	0%	4%	0%	0%	0%	0%	27%	0%	1%	0%	0%	0%
Pima	7%	21%	11%	5%	47%	0%	4%	0%	6%	10%	88%	4%	34%	4%	3%
Pinal	0%	1%	3%	4%	0%	0%	5%	2%	1%	6%	1%	28%	2%	2%	0%
Santa Cruz	0%	1%	0%	1%	0%	0%	0%	0%	1%	0%	2%	0%	24%	0%	0%
Yavapai	2%	0%	5%	1%	0%	0%	0%	0%	1%	1%	0%	0%	0%	22%	0%
Yuma	0%	3%	4%	0%	0%	0%	13%	0%	1%	1%	2%	1%	1%	2%	97%

*Table 35. County of **Most Frequently-Used** Non-Motorized Trail Area, Shares by County of Origin*

< Origin \ Destination >	Apache	Cochise	Coconino	Gila	Graham	Greenlee	La Paz	Maricopa	Mohave	Navajo	Pima	Pinal	Santa Cruz	Yavapai	Yuma
Apache	64%	0%	1%	0%	0%	0%	0%	1%	1%	4%	2%	17%	0%	10%	0%
Cochise	1%	80%	1%	0%	1%	0%	2%	6%	1%	0%	4%	2%	4%	0%	0%
Coconino	0%	0%	84%	0%	0%	0%	0%	4%	0%	5%	0%	0%	0%	6%	0%
Gila	0%	0%	3%	87%	0%	0%	0%	0%	0%	0%	0%	7%	0%	3%	0%
Graham	11%	3%	0%	6%	72%	0%	0%	0%	0%	0%	6%	3%	0%	0%	0%
Greenlee	54%	0%	0%	0%	0%	46%	0%	0%	0%	0%	0%	0%	0%	0%	0%
La Paz	0%	0%	11%	0%	0%	0%	78%	0%	11%	0%	0%	0%	0%	0%	0%
Maricopa	2%	0%	4%	2%	0%	0%	0%	67%	1%	1%	2%	13%	0%	6%	0%
Mohave	0%	1%	6%	0%	0%	0%	1%	1%	83%	1%	0%	3%	0%	4%	0%
Navajo	11%	1%	8%	0%	3%	0%	0%	0%	1%	66%	0%	3%	0%	7%	0%
Pima	1%	3%	2%	0%	2%	0%	0%	2%	1%	2%	79%	3%	2%	1%	0%
Pinal	1%	0%	5%	1%	0%	0%	0%	11%	0%	2%	3%	74%	0%	3%	0%
Santa Cruz	0%	5%	0%	0%	0%	0%	0%	0%	0%	0%	37%	0%	57%	0%	0%
Yavapai	1%	0%	4%	1%	0%	0%	0%	1%	0%	0%	1%	1%	0%	91%	0%
Yuma	0%	0%	2%	0%	0%	0%	0%	5%	5%	0%	7%	2%	1%	4%	74%

*Table 36. County of **Most Frequently-Used** Non-Motorized Trail Area, Shares by Destination County*

< Origin \ Destination >	Apache	Cochise	Coconino	Gila	Graham	Greenlee	La Paz	Maricopa	Mohave	Navajo	Pima	Pinal	Santa Cruz	Yavapai	Yuma
Apache	21%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	1%	0%	1%	0%
Cochise	1%	62%	0%	0%	3%	0%	10%	0%	0%	0%	0%	0%	7%	0%	0%
Coconino	0%	0%	32%	0%	0%	0%	0%	0%	0%	4%	0%	0%	0%	1%	0%
Gila	0%	0%	0%	30%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Graham	2%	1%	0%	1%	36%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Greenlee	2%	0%	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%
La Paz	0%	0%	1%	0%	0%	0%	75%	0%	1%	0%	0%	0%	0%	0%	0%
Maricopa	60%	9%	46%	62%	14%	0%	0%	97%	19%	35%	8%	62%	9%	48%	0%
Mohave	0%	1%	4%	0%	0%	0%	10%	0%	71%	1%	0%	1%	0%	1%	0%
Navajo	5%	0%	2%	0%	4%	0%	0%	0%	0%	35%	0%	0%	0%	1%	0%
Pima	6%	23%	6%	2%	43%	0%	0%	1%	4%	17%	87%	4%	38%	3%	3%
Pinal	1%	1%	5%	2%	0%	0%	0%	1%	0%	6%	1%	31%	3%	2%	0%
Santa Cruz	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%	41%	0%	0%
Yavapai	1%	0%	3%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	41%	0%
Yuma	0%	0%	1%	1%	0%	0%	5%	0%	4%	1%	1%	1%	2%	1%	97%

*Table 37. County of **Furthest** Non-Motorized Trail Area, Shares by County of Origin*

< Origin \ Destination >	Apache	Cochise	Coconino	Gila	Graham	Greenlee	La Paz	Maricopa	Mohave	Navajo	Pima	Pinal	Santa Cruz	Yavapai	Yuma
Apache	19%	1%	26%	1%	0%	1%	0%	9%	1%	3%	16%	19%	0%	4%	0%
Cochise	5%	42%	14%	0%	2%	0%	3%	5%	2%	3%	6%	10%	7%	2%	0%
Coconino	1%	3%	48%	3%	0%	0%	0%	8%	3%	5%	7%	1%	1%	19%	2%
Gila	0%	0%	15%	32%	0%	0%	0%	6%	0%	17%	0%	11%	2%	16%	2%
Graham	17%	6%	20%	12%	23%	6%	0%	3%	0%	0%	0%	9%	0%	6%	0%
Greenlee	0%	0%	54%	0%	0%	46%	0%	0%	0%	0%	0%	0%	0%	0%	0%
La Paz	0%	0%	22%	0%	0%	0%	9%	19%	27%	0%	22%	0%	0%	0%	0%
Maricopa	3%	4%	20%	4%	0%	0%	0%	30%	3%	3%	2%	11%	0%	19%	0%
Mohave	3%	2%	24%	0%	0%	0%	1%	7%	39%	1%	2%	8%	0%	13%	0%
Navajo	7%	1%	26%	4%	3%	0%	0%	4%	4%	17%	3%	18%	0%	12%	1%
Pima	2%	7%	17%	1%	2%	1%	1%	3%	1%	4%	38%	10%	5%	10%	0%
Pinal	2%	1%	18%	4%	1%	0%	2%	13%	1%	4%	6%	32%	1%	16%	0%
Santa Cruz	5%	5%	7%	5%	0%	0%	0%	3%	0%	14%	26%	5%	24%	8%	0%
Yavapai	3%	3%	31%	1%	0%	0%	0%	5%	1%	0%	5%	4%	2%	42%	1%
Yuma	2%	1%	15%	0%	0%	0%	1%	9%	4%	3%	7%	5%	0%	6%	46%

*Table 38. County of **Furthest** Non-Motorized Trail Area, Shares by Destination County*

< Origin \ Destination >	Apache	Cochise	Coconino	Gila	Graham	Greenlee	La Paz	Maricopa	Mohave	Navajo	Pima	Pinal	Santa Cruz	Yavapai	Yuma
Apache	6%	0%	1%	0%	0%	4%	0%	0%	0%	1%	1%	1%	0%	0%	0%
Cochise	3%	16%	1%	0%	6%	0%	13%	0%	1%	1%	1%	2%	9%	0%	0%
Coconino	1%	1%	5%	2%	0%	0%	0%	1%	1%	3%	2%	0%	1%	2%	2%
Gila	0%	0%	1%	6%	0%	0%	0%	0%	0%	4%	0%	1%	1%	1%	1%
Graham	3%	1%	0%	1%	18%	12%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Greenlee	0%	0%	0%	0%	0%	19%	0%	0%	0%	0%	0%	0%	0%	0%	0%
La Paz	0%	0%	0%	0%	0%	0%	6%	0%	2%	0%	1%	0%	0%	0%	0%
Maricopa	61%	51%	60%	75%	11%	0%	23%	89%	52%	56%	16%	60%	7%	69%	14%
Mohave	4%	1%	4%	0%	0%	0%	5%	1%	32%	1%	1%	2%	0%	2%	0%
Navajo	3%	0%	1%	1%	7%	0%	0%	0%	1%	6%	0%	2%	0%	1%	0%
Pima	10%	24%	14%	5%	50%	66%	19%	2%	3%	17%	68%	14%	57%	9%	4%
Pinal	4%	1%	5%	6%	5%	0%	25%	3%	2%	6%	3%	15%	5%	5%	1%
Santa Cruz	1%	1%	0%	1%	0%	0%	0%	0%	0%	3%	2%	0%	13%	0%	0%
Yavapai	4%	3%	6%	1%	3%	0%	3%	1%	1%	0%	2%	1%	5%	9%	2%
Yuma	2%	1%	2%	0%	0%	0%	6%	1%	3%	2%	2%	1%	1%	1%	75%

Motorized Users

*Table 39. County of **Favorite** Motorized Trail Area, Shares by County of Origin*

< Origin \ Destination >	Apache	Cochise	Coconino	Gila	Graham	Greenlee	La Paz	Maricopa	Mohave	Navajo	Pima	Pinal	Santa Cruz	Yavapai	Yuma
Apache	60%	0%	1%	0%	0%	0%	0%	0%	9%	4%	1%	23%	0%	1%	0%
Cochise	6%	40%	2%	0%	0%	0%	2%	3%	8%	0%	16%	16%	6%	0%	0%
Coconino	0%	0%	58%	0%	0%	0%	0%	10%	11%	0%	0%	8%	6%	7%	0%
Gila	4%	0%	4%	55%	0%	0%	0%	0%	0%	0%	29%	4%	0%	4%	0%
Graham	41%	0%	0%	0%	21%	14%	0%	0%	0%	0%	0%	24%	0%	0%	0%
Greenlee	52%	0%	0%	0%	31%	17%	0%	0%	0%	0%	0%	0%	0%	0%	0%
La Paz	0%	0%	0%	0%	0%	0%	69%	17%	0%	0%	2%	0%	0%	12%	0%
Maricopa	5%	1%	8%	5%	0%	1%	1%	26%	0%	4%	2%	28%	1%	16%	2%
Mohave	3%	0%	5%	0%	0%	0%	0%	1%	83%	0%	1%	5%	1%	1%	0%
Navajo	12%	0%	15%	2%	0%	0%	0%	0%	0%	42%	0%	18%	0%	11%	0%
Pima	3%	9%	3%	0%	9%	0%	0%	5%	0%	2%	49%	10%	5%	2%	2%
Pinal	0%	0%	3%	3%	0%	0%	0%	7%	1%	4%	10%	63%	0%	9%	1%
Santa Cruz	7%	0%	0%	0%	0%	0%	0%	0%	28%	0%	26%	0%	25%	14%	0%
Yavapai	3%	0%	3%	0%	0%	0%	0%	7%	0%	2%	0%	7%	0%	79%	0%
Yuma	1%	0%	9%	0%	0%	0%	10%	1%	1%	2%	0%	8%	0%	8%	60%

*Table 40. County of **Favorite** Motorized Trail Area, Shares by Destination County*

< Origin \ Destination >	Apache	Cochise	Coconino	Gila	Graham	Greenlee	La Paz	Maricopa	Mohave	Navajo	Pima	Pinal	Santa Cruz	Yavapai	Yuma
Apache	8%	0%	0%	0%	0%	0%	0%	0%	1%	1%	0%	1%	0%	0%	0%
Cochise	2%	25%	1%	0%	0%	0%	3%	0%	4%	0%	3%	1%	7%	0%	0%
Coconino	0%	0%	18%	0%	0%	0%	0%	1%	6%	0%	0%	1%	8%	1%	0%
Gila	1%	0%	0%	15%	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%
Graham	5%	0%	0%	0%	7%	15%	0%	0%	0%	0%	0%	1%	0%	0%	0%
Greenlee	2%	0%	0%	0%	3%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%
La Paz	0%	0%	0%	0%	0%	0%	21%	0%	0%	0%	0%	0%	0%	0%	0%
Maricopa	61%	25%	60%	80%	0%	79%	48%	88%	3%	61%	11%	68%	20%	67%	26%
Mohave	2%	0%	3%	0%	0%	0%	0%	0%	78%	0%	0%	1%	3%	0%	0%
Navajo	4%	0%	3%	1%	0%	0%	0%	0%	0%	17%	0%	1%	0%	1%	0%
Pima	11%	49%	7%	0%	90%	0%	0%	5%	0%	11%	76%	7%	51%	2%	7%
Pinal	0%	0%	3%	5%	0%	0%	0%	2%	1%	6%	6%	17%	0%	4%	1%
Santa Cruz	1%	0%	0%	0%	0%	0%	0%	0%	5%	0%	2%	0%	12%	1%	0%
Yavapai	2%	0%	1%	0%	0%	0%	0%	1%	0%	2%	0%	1%	0%	20%	0%
Yuma	1%	0%	5%	0%	0%	0%	27%	0%	1%	2%	0%	1%	0%	2%	65%

*Table 41. County of **Most Frequently-Used** Motorized Trail Area, Shares by County of Origin*

< Origin \ Destination >	Apache	Cochise	Coconino	Gila	Graham	Greenlee	La Paz	Maricopa	Mohave	Navajo	Pima	Pinal	Santa Cruz	Yavapai	Yuma
Apache	80%	1%	1%	0%	0%	0%	0%	0%	9%	6%	0%	2%	0%	0%	0%
Cochise	8%	53%	0%	0%	0%	0%	0%	3%	5%	0%	16%	11%	4%	0%	0%
Coconino	0%	0%	63%	0%	0%	0%	2%	18%	3%	0%	0%	0%	4%	10%	0%
Gila	4%	29%	8%	55%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%	0%
Graham	14%	0%	0%	0%	38%	24%	0%	0%	0%	0%	11%	0%	0%	14%	0%
Greenlee	0%	0%	0%	0%	0%	64%	0%	0%	0%	0%	0%	0%	0%	36%	0%
La Paz	5%	0%	0%	0%	0%	0%	93%	0%	0%	0%	0%	0%	2%	0%	0%
Maricopa	6%	1%	8%	4%	0%	1%	1%	28%	4%	4%	3%	26%	1%	12%	1%
Mohave	2%	0%	7%	0%	0%	0%	0%	4%	79%	0%	1%	7%	0%	1%	0%
Navajo	17%	0%	13%	0%	0%	0%	0%	3%	0%	41%	0%	18%	0%	8%	0%
Pima	5%	4%	3%	0%	9%	0%	3%	2%	1%	5%	50%	5%	5%	4%	3%
Pinal	3%	0%	0%	4%	0%	0%	0%	7%	0%	1%	6%	68%	5%	4%	2%
Santa Cruz	7%	0%	0%	0%	0%	0%	0%	7%	28%	0%	12%	7%	39%	0%	0%
Yavapai	0%	0%	1%	0%	0%	0%	0%	0%	2%	0%	0%	14%	0%	83%	0%
Yuma	0%	0%	8%	0%	0%	0%	5%	2%	1%	2%	4%	5%	0%	2%	70%

*Table 42. County of **Most Frequently-Used** Motorized Trail Area, Shares by Destination County*

< Origin > Destination	Apache	Cochise	Coconino	Gila	Graham	Greenlee	La Paz	Maricopa	Mohave	Navajo	Pima	Pinal	Santa Cruz	Yavapai	Yuma
Apache	10%	0%	0%	0%	0%	0%	0%	0%	1%	1%	0%	0%	0%	0%	0%
Cochise	3%	38%	0%	0%	0%	0%	0%	0%	2%	0%	3%	1%	3%	0%	0%
Coconino	0%	0%	19%	0%	0%	0%	2%	2%	1%	0%	0%	0%	4%	2%	0%
Gila	1%	9%	1%	15%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Graham	1%	0%	0%	0%	11%	21%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Greenlee	0%	0%	0%	0%	0%	17%	0%	0%	0%	0%	0%	0%	0%	1%	0%
La Paz	0%	0%	0%	0%	0%	0%	21%	0%	0%	0%	0%	0%	0%	0%	0%
Maricopa	61%	27%	62%	77%	12%	62%	37%	90%	35%	59%	14%	69%	30%	60%	10%
Mohave	1%	0%	4%	0%	0%	0%	0%	1%	52%	0%	0%	1%	0%	0%	0%
Navajo	5%	0%	3%	0%	0%	0%	0%	0%	0%	15%	0%	1%	0%	1%	0%
Pima	14%	25%	8%	0%	77%	0%	30%	2%	3%	21%	76%	4%	35%	5%	15%
Pinal	3%	0%	0%	8%	0%	0%	0%	3%	0%	2%	3%	20%	13%	2%	3%
Santa Cruz	1%	0%	0%	0%	0%	0%	0%	0%	4%	0%	1%	0%	14%	0%	0%
Yavapai	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	2%	0%	27%	0%
Yuma	0%	0%	4%	0%	0%	0%	10%	1%	1%	2%	1%	1%	0%	1%	72%

*Table 43. County of **Furthest** Motorized Trail Area, Shares by County of Origin*

< Origin > Destination	Apache	Cochise	Coconino	Gila	Graham	Greenlee	La Paz	Maricopa	Mohave	Navajo	Pima	Pinal	Santa Cruz	Yavapai	Yuma
Apache	55%	1%	11%	0%	0%	4%	0%	0%	9%	4%	0%	0%	0%	15%	0%
Cochise	16%	36%	0%	1%	0%	0%	0%	0%	5%	1%	8%	18%	3%	11%	0%
Coconino	0%	0%	36%	0%	0%	0%	0%	4%	7%	0%	8%	6%	0%	37%	2%
Gila	8%	0%	33%	34%	4%	0%	0%	0%	0%	0%	0%	8%	0%	12%	0%
Graham	38%	14%	0%	0%	11%	0%	0%	14%	0%	11%	14%	0%	0%	0%	0%
Greenlee	17%	0%	0%	0%	31%	8%	0%	0%	0%	8%	0%	36%	0%	0%	0%
La Paz	0%	0%	5%	5%	0%	0%	51%	0%	12%	0%	0%	5%	2%	20%	0%
Maricopa	3%	2%	13%	5%	0%	1%	1%	23%	2%	3%	2%	21%	3%	17%	2%
Mohave	1%	0%	16%	0%	0%	0%	5%	7%	55%	0%	1%	7%	0%	7%	2%
Navajo	13%	4%	9%	3%	0%	0%	2%	4%	0%	17%	5%	18%	0%	19%	7%
Pima	2%	8%	10%	0%	9%	1%	0%	6%	0%	4%	23%	19%	4%	7%	8%
Pinal	5%	2%	19%	6%	0%	0%	0%	10%	3%	9%	8%	23%	4%	11%	2%
Santa Cruz	7%	0%	0%	0%	0%	0%	14%	35%	0%	0%	0%	0%	26%	18%	0%
Yavapai	3%	4%	7%	3%	2%	0%	0%	13%	7%	1%	0%	6%	0%	55%	0%
Yuma	6%	0%	11%	3%	0%	0%	9%	5%	0%	2%	0%	10%	1%	9%	43%

*Table 44. County of **Furthest** Motorized Trail Area, Shares by Destination County*

< Origin > Destination	Apache	Cochise	Coconino	Gila	Graham	Greenlee	La Paz	Maricopa	Mohave	Navajo	Pima	Pinal	Santa Cruz	Yavapai	Yuma
Apache	9%	0%	1%	0%	0%	3%	0%	0%	1%	1%	0%	0%	0%	1%	0%
Cochise	7%	21%	0%	1%	0%	0%	0%	0%	2%	1%	3%	2%	2%	1%	0%
Coconino	0%	0%	6%	0%	0%	0%	0%	1%	4%	0%	3%	1%	0%	5%	1%
Gila	2%	0%	2%	8%	2%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Graham	5%	2%	0%	0%	3%	0%	0%	0%	0%	2%	1%	0%	0%	0%	0%
Greenlee	1%	0%	0%	0%	3%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%
La Paz	0%	0%	0%	1%	0%	0%	13%	0%	1%	0%	0%	0%	0%	1%	0%
Maricopa	47%	26%	57%	75%	9%	76%	46%	81%	29%	54%	18%	65%	61%	61%	29%
Mohave	1%	0%	5%	0%	0%	0%	12%	2%	51%	0%	1%	2%	0%	2%	2%
Navajo	5%	2%	1%	1%	0%	0%	1%	0%	0%	8%	1%	2%	0%	2%	2%
Pima	6%	41%	13%	0%	79%	19%	0%	6%	0%	17%	65%	17%	22%	8%	29%
Pinal	7%	3%	9%	9%	0%	0%	0%	4%	5%	15%	8%	8%	7%	4%	3%
Santa Cruz	1%	0%	0%	0%	0%	0%	7%	2%	0%	0%	0%	0%	7%	1%	0%
Yavapai	2%	4%	2%	3%	4%	0%	0%	3%	6%	1%	0%	1%	0%	12%	0%
Yuma	6%	0%	3%	3%	0%	0%	21%	1%	0%	3%	0%	2%	2%	2%	35%

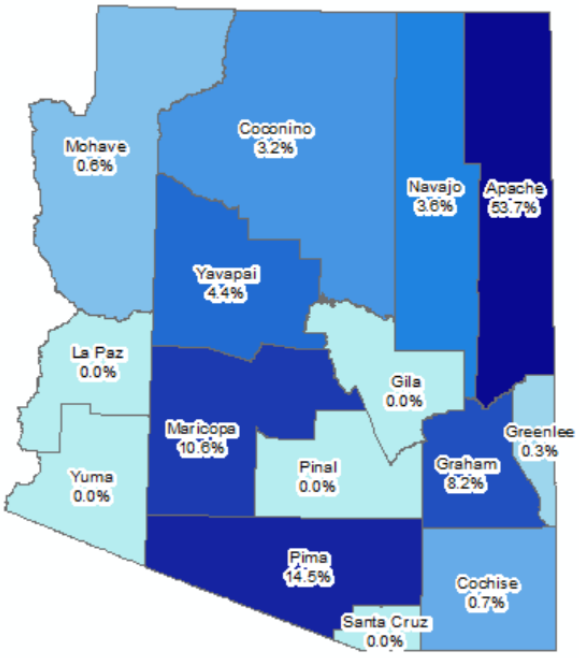
Appendix B. Detailed County-Level Results

This portion of the analysis examines, county by county, the most popular non-motorized and motorized trail use destinations, and where users travel from within the state for trail-based recreation. The origin-destination results reflect respondents' favorite, most frequent, and furthest used trails in the past year only. For some respondents, other trails in other areas may have been visited in the past year, but are not reflected in the results. **Zero entries in the matrices should <u>not</u> be interpreted as lack of in-state trail activity, but rather due to non-coverage as a favorite, most frequent, or furthest trail use area, or due to non-coverage in the survey sample.**

Apache County

An estimated 53.7% of in-state non-motorized trail use in Apache County was by residents of Apache County. That was followed by residents of Pima County (14.5%), Maricopa County (10.6%), and Graham County (8.2%) (Figure 10).

Figure 10. Share of Apache County In-State Non-Motorized Trail Use by User County of Origin



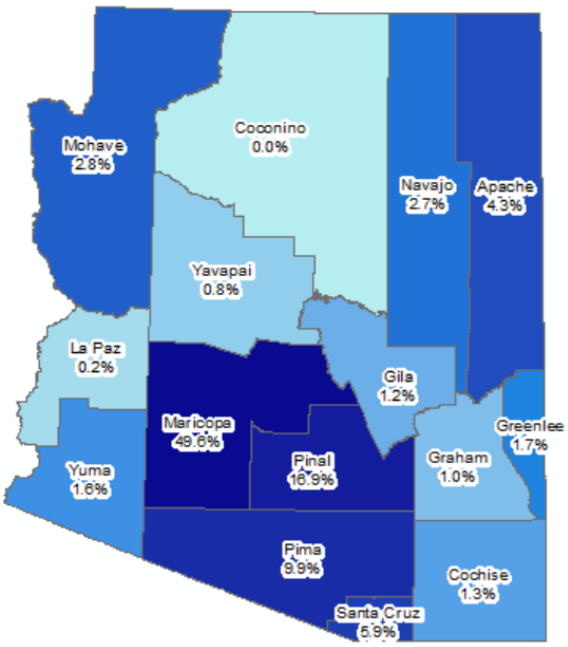
Top non-motorized trail use destination in Apache County include Alpine, Fort Defiance, Window Rock, Greer, and Lukachukai (Table 45).

Table 45. Apache County Top In-State Non-Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Alpine	34.4%
Fort Defiance	19.7%
Window Rock	10.9%
Greer	9.6%
Lukachukai	7.1%
Eagar	3.8%
Chambers	3.3%
Nutrioso	3.1%
Chinle	2.2%
Petrified Forest Natl Park	1.8%
Dennehotso	1.5%
Many Farms	1.4%
Springerville	0.9%
Mcnary	0.2%
Vernon	0.1%
Saint Johns	0.0%

Motorized trail use in Apache County is dominated by visitors from Maricopa County (49.6%), and to a lesser extent by visitors from Pinal (16.9%) and Pima counties (9.9%) (Figure 11). 4.3% of motorized trail use in Apache County is by Apache County residents.

Figure 11. Share of Apache County In-State Motorized Trail Use by User County of Origin



The top motorized trail use destinations in Apache County include Alpine, Blue Gap, Chambers, Vernon, and Springerville (Table 46).

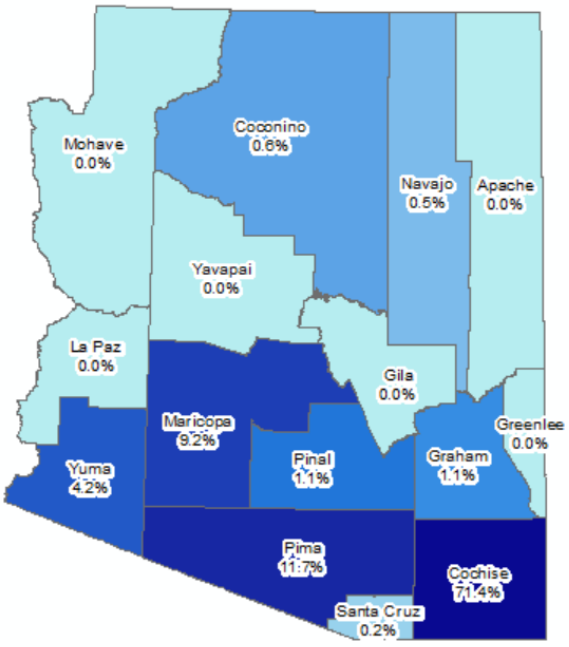
Table 46. Apache County Top In-State Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Alpine	77.0%
Blue Gap	8.0%
Chambers	4.7%
Vernon	2.6%
Springerville	2.4%
Concho	1.4%
Houck	0.9%
Eagar	0.8%
Greer	0.8%
Rock Point	0.6%
Chinle	0.6%
Window Rock	0.1%

Cochise County

Nearly three-quarters (71.4%) of non-motorized trail use in Cochise County is by in-county residents. That is followed by residents of Pima County (11.7%) and Maricopa County (9.2%) (Figure 12).

Figure 12. Share of Cochise County In-State Non-Motorized Trail Use by User County of Origin



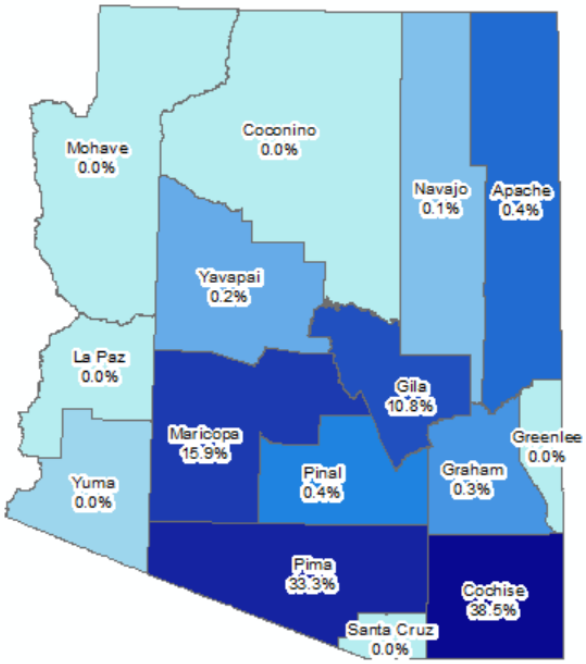
Top non-motorized trail use destinations in Cochise County include Sierra Vista, Bisbee, Hereford, Cochise, and Willcox (Table 47).

Table 47. Cochise County Top In-State Non-Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Sierra Vista	23.0%
Bisbee	21.5%
Hereford	10.4%
Cochise	10.2%
Willcox	8.2%
Pearce	6.6%
Saint David	5.9%
Benson	5.6%
Tombstone	4.8%
Fort Huachuca	1.6%
Douglas	1.4%
Dragoon	0.7%
Huachuca City	0.0%

Approximately 38.5% of motorized in-state trail use in Cochise County is by in-county residents. That is followed by Pima County residents (33.3%) and Maricopa County residents (15.9%) (Figure 13).

Figure 13. Share of Cochise County In-State Motorized Trail Use by User County of Origin



Top trail use destinations in Cochise County include Bisbee, Benson, Douglas, Willcox, and Sierra Vista (Table 48).

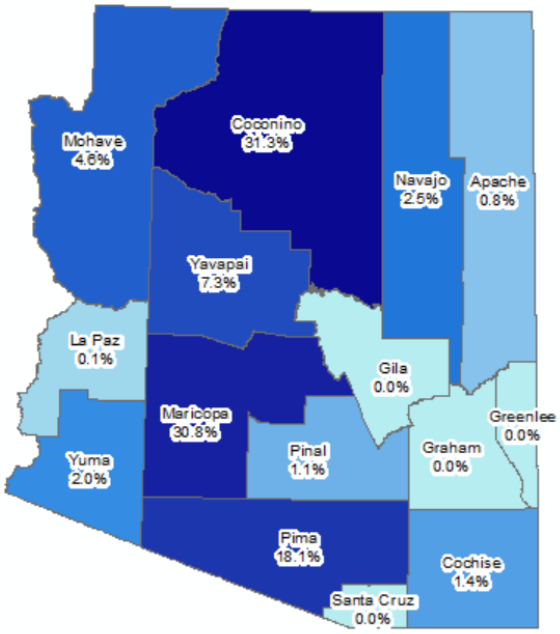
Table 48. Cochise County Top In-State Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Bisbee	26.1%
Benson	22.2%
Douglas	16.2%
Willcox	11.1%
Sierra Vista	5.8%
Dragoon	4.1%
Bowie	3.5%
Fort Huachuca	3.5%
Huachuca City	2.7%
Cochise	2.4%
Saint David	1.0%
Tombstone	0.7%
Elfrida	0.6%
Hereford	0.2%

Coconino County

31.3% of non-motorized trail use in Coconino County is by in-county residents, another 30.8% from Maricopa County, and 18.1% from Pima County (Figure 14).

Figure 14. Share of Coconino County In-State Non-Motorized Trail Use by User County of Origin



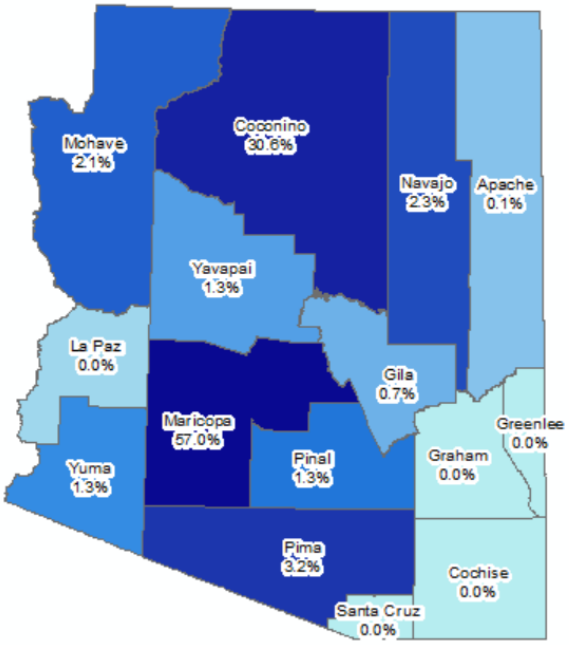
Top non-motorized trail use destinations in Coconino County include Flagstaff, Grand Canyon, Happy Jack, Page, and Tonalea (Table 49).

Table 49. Coconino County Top In-State Non-Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Flagstaff	56.2%
Grand Canyon	25.9%
Happy Jack	4.1%
Page	2.5%
Tonalea	2.1%
Fredonia	2.1%
Williams	1.9%
Supai	1.6%
Munds Park	1.2%
Parks	1.1%
Forest Lakes	0.5%
North Rim	0.4%
Bellemont	0.3%
Mormon Lake	0.2%

Motorized trail use in Coconino County is dominated by visitors from Maricopa County (57.0%), followed by in-county users (30.6%) (Figure 15).

Figure 15. Share of Coconino County In-State Motorized Trail Use by User County of Origin



Top motorized trail use destinations in Coconino County include Flagstaff, Forest Lakes, Grand Canyon area, Happy Jack, and Williams (Table 50).

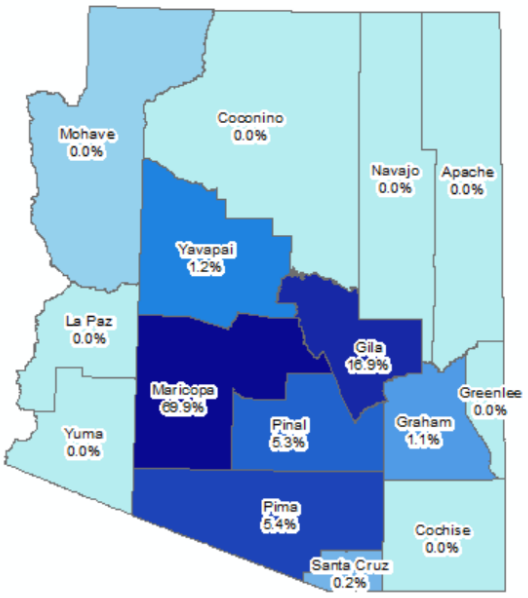
Table 50. Coconino County Top In-State Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Flagstaff	49.9%
Forest Lakes	26.4%
Grand Canyon	7.8%
Happy Jack	4.8%
Williams	2.0%
Page	2.0%
Kaibeto	1.9%
Munds Park	1.8%
Mormon Lake	1.4%
Bellemont	1.1%
North Rim	0.4%
Gray Mountain	0.3%
Fredonia	0.1%
Marble Canyon	0.1%
Cameron	0.0%

Gila County

In-state non-motorized trail users in Gila County come primarily from Maricopa County (69.9%), followed by in-county users (16.9%), and Pima County (5.4%) (Figure 16).

Figure 16. Share of Gila County In-State Non-Motorized Trail Use by User County of Origin



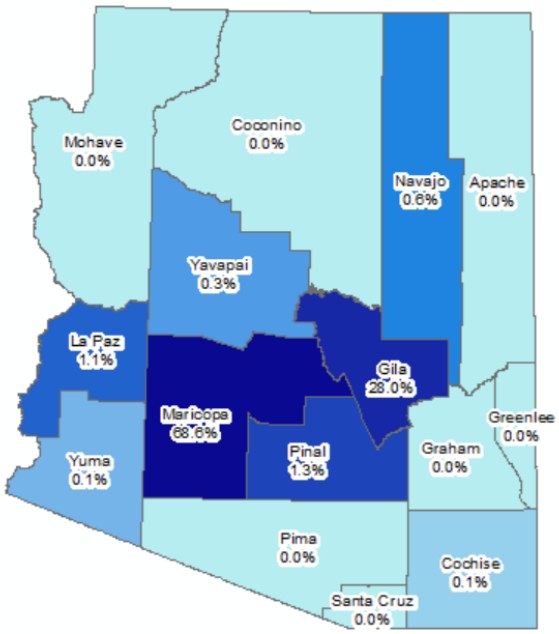
Top non-motorized trail use destinations in Gila County include Payson, Roosevelt, Tonto Basin, Globe, and Pine (Table 51).

Table 51. Gila County Top In-State Non-Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Payson	64.6%
Roosevelt	13.7%
Tonto Basin	7.9%
Globe	5.9%
Pine	5.8%
Peridot	2.0%
San Carlos	0.1%
Young	0.0%

In-state motorized trail users in Gila County are principally from Maricopa County (68.6%), followed by in-county users (28.0%) (Figure 17).

Figure 17. Share of Gila County In-State Motorized Trail Use by User County of Origin



Top motorized trail use destinations in Gila County include Payson, Peridot, Young, Roosevelt, and Tonto Basin (Table 52).

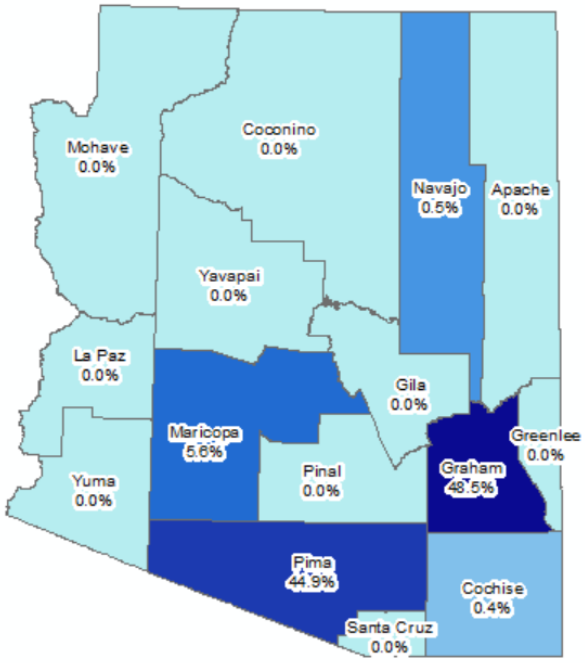
Table 52. Gila County Top In-State Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Payson	61.1%
Peridot	13.9%
Young	9.0%
Roosevelt	5.3%
Tonto Basin	4.2%
Pine	4.2%
San Carlos	1.3%
Claypool	1.1%

Graham County

In-state non-motorized trail users in Graham County are most commonly from in-county (48.5%), Pima County (44.9%), and Maricopa County (5.6%) (Figure 18).

Figure 18. Share of Graham County In-State Non-Motorized Trail Use by User County of Origin



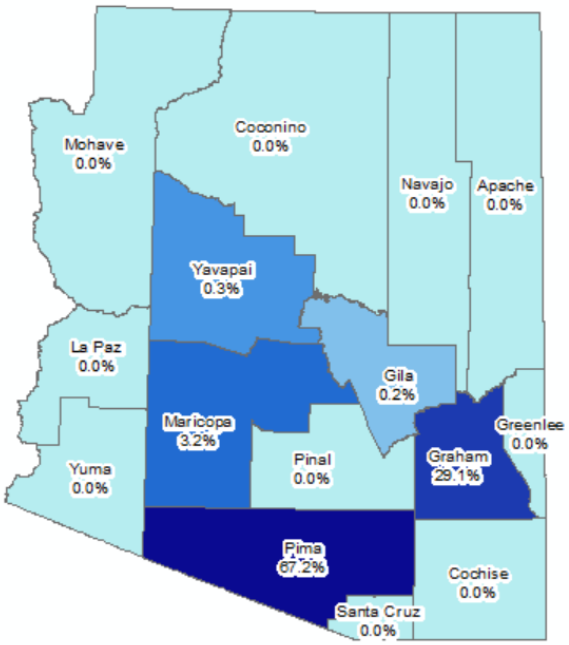
Top non-motorized trail use destinations in Graham County include Safford, Pima, and Bylas (Table 53).

Table 53. Graham County Top In-State Non-Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Safford	53.0%
Pima	45.0%
Bylas	1.1%
Central	0.5%
Thatcher	0.4%

In-state motorized trail users in Graham County are predominantly from Pima County (67.2%) as well as from in-county (29.1%) (Figure 19).

Figure 19. Share of Graham County In-State Motorized Trail Use by User County of Origin



Top motorized trail use destinations in Graham County are Pima and Safford (Table 54).

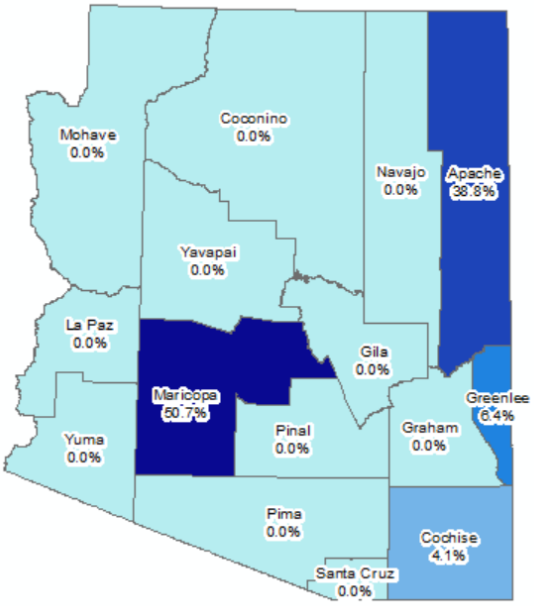
Table 54. Graham County Top In-State Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Pima	58.8%
Safford	34.9%
Central	3.9%
Fort Thomas	2.5%

Greenlee County

Non-motorized trail users in Greenlee County originate most frequency from Maricopa County (50.7%), Apache County (38.8%), followed by in-county residents (6.4%) (Figure 20).

Figure 20. Share of Greenlee County In-State Non-Motorized Trail Use by User County of Origin



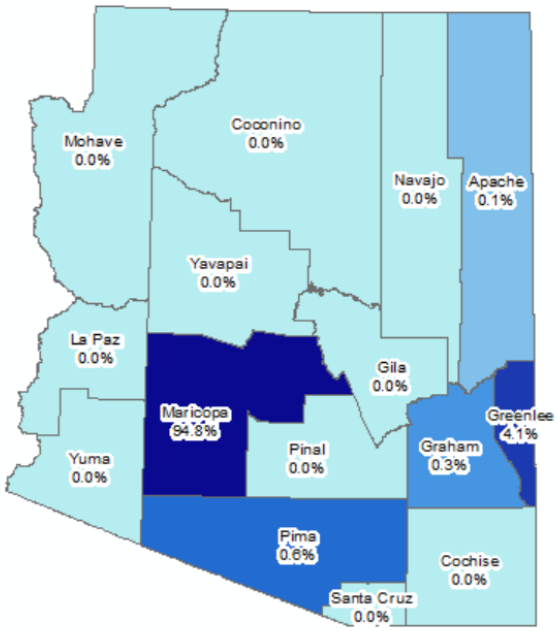
The top non-motorized trail use destination in Greenlee County is Blue (Table 55).

Table 55. Greenlee County Top In-State Non-Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Blue	95.9%
Clifton	4.1%

Motorized trail users in Greenlee County originate primarily from Maricopa County (94.8%) and from in-county (4.1%) (Figure 21).

Figure 21. Share of Greenlee County In-State Motorized Trail Use by User County of Origin



Top motorized recreation destinations in Greenlee County include Duncan, Blue, and Clifton (Table 56).

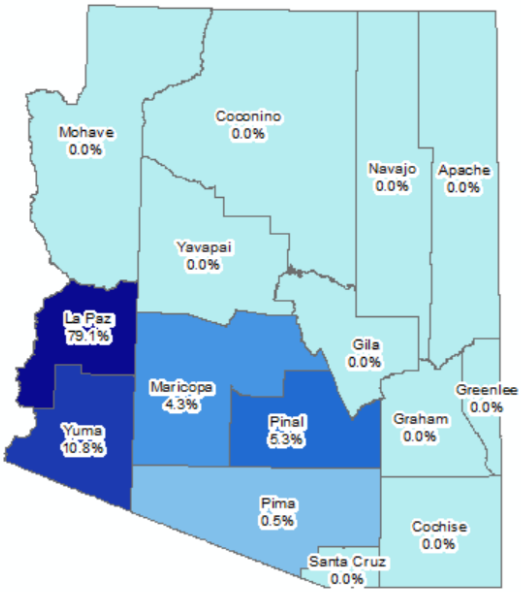
Table 56. Greenlee County Top In-State Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Duncan	91.6%
Blue	4.5%
Clifton	3.6%
Morenci	0.2%

La Paz County

In-state non-motorized trail users in La Paz County originate primarily from in-county (79.1%), from Yuma County (10.8%), and from Pinal County (5.3%) (Figure 22).

Figure 22. Share of La Paz County In-State Non-Motorized Trail Use by User County of Origin



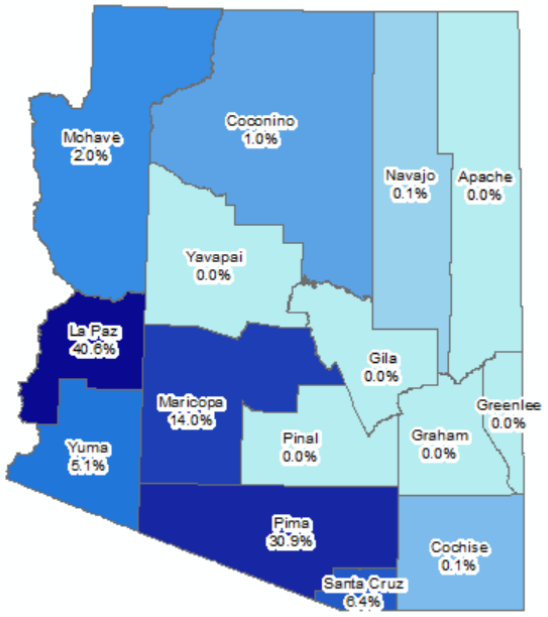
Top non-motorized trail use destinations in La Paz County include Vicksburg, Parker, Quartzsite, Ehrenberg, and Salome (Table 57).

Table 57. La Paz County Top In-State Non-Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Vicksburg	48.1%
Parker	26.0%
Quartzsite	16.1%
Ehrenberg	5.9%
Salome	3.2%
Hope (New Hope)	0.5%
Cibola	0.3%

In-state motorized trail users in La Paz County originate most frequently from in-county (40.6%), from Pima County (30.9%), and from Maricopa County (14.0%) (Figure 23).

Figure 23. Share of La Paz County In-State Motorized Trail Use by User County of Origin



Top motorized trail use destinations in La Paz County include Parker, Quartzsite, and Bouse (Table 58).

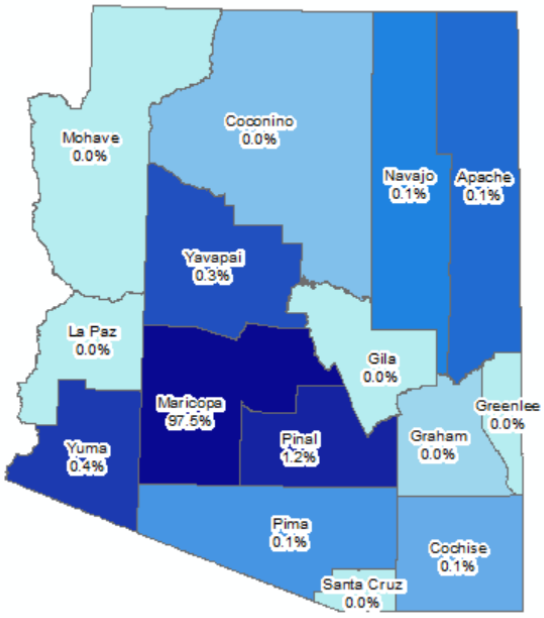
Table 58. La Paz County Top In-State Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Parker	42.0%
Quartzsite	35.9%
Bouse	13.4%
Vicksburg	3.1%
Wenden	1.9%
Ehrenberg	1.5%
Brenda	1.2%
Cibola	0.9%

Maricopa County

In-state non-motorized trail users in Maricopa County originate heavily from within Maricopa County (97.5%) (Figure 24).

Figure 24. Share of Maricopa County In-State Non-Motorized Trail Use by User County of Origin



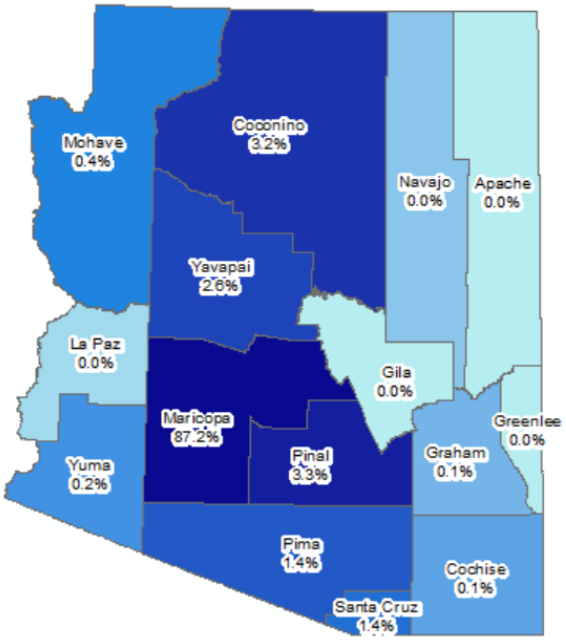
Top non-motorized trail use destinations in Maricopa County include Phoenix, Scottsdale, Chandler, Gilbert, and Cave Creek (Table 59). Due to the concentration of population in Maricopa County, the area's trail areas are estimated as experiencing high volumes of use.

Table 59. Maricopa County Top In-State Non-Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Phoenix	27.1%
Scottsdale	13.4%
Chandler	8.2%
Gilbert	7.0%
Cave Creek	6.4%
Mesa	4.9%
Tempe	3.3%
Carefree	3.3%
Peoria	2.8%
Glendale	2.8%
Surprise	2.8%
Queen Creek	2.6%
Avondale	2.5%
Buckeye	2.4%
Waddell	1.7%
Paradise Valley	1.7%
Litchfield Park	1.5%
Higley	1.2%
Goodyear	1.1%
Fountain Hills	0.7%
Aguila	0.6%
Sun City	0.5%
Cashion	0.4%
Gila Bend	0.3%
Laveen	0.2%
Chandler Heights	0.2%
Youngtown	0.1%
El Mirage	0.1%
Wickenburg	0.1%
Wittmann	0.0%
Palo Verde	0.0%
Tolleson	0.0%
Tortilla Flat	0.0%

In-state motorized trail users in Maricopa County originate most frequently from within Maricopa County (87.2%), followed by Pinal County (3.3%), and Coconino County (3.2%) (Figure 25).

Figure 25. Share of Maricopa County In-State Motorized Trail Use by User County of Origin



Top motorized trail use destinations in Maricopa County include Buckeye, Carefree, Tempe, Avondale, and Cave Creek (Table 60). Again, we present results as reported by survey respondents. Tempe is cited as a top motorized trail use destination, despite the fact that few, if any, motorized trails are available in Tempe. Respondents reporting of Tempe as a trail use destination may reflect Tempe as a group rendezvous point, or as the city or town that trail users consider as closest to their motorized trail use destinations.

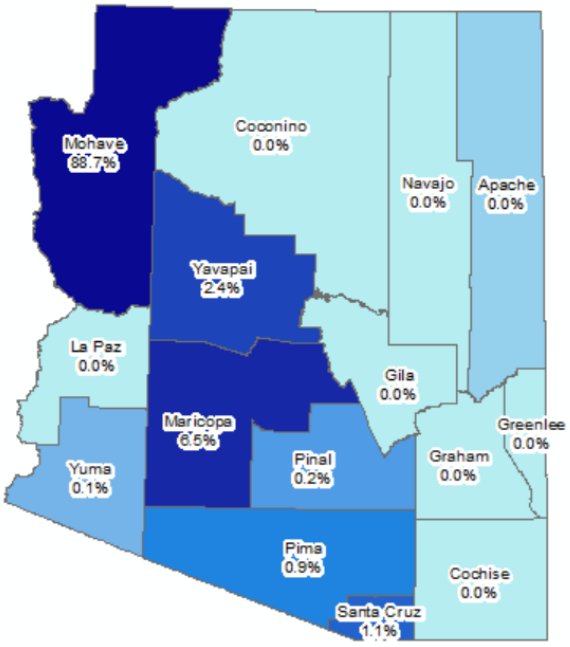
Table 60. Maricopa County Top In-State Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Buckeye	16.1%
Carefree	14.6%
Tempe	9.6%
Avondale	9.5%
Cave Creek	9.4%
New River	8.7%
Phoenix	6.2%
Chandler	5.7%
Glendale	3.4%
Arlington	2.6%
Queen Creek	2.6%
Mesa	2.3%
Scottsdale	2.1%
Chandler Heights	1.4%
Aguila	1.3%
Fort McDowell	0.9%
Sun City West	0.9%
Peoria	0.7%
Wickenburg	0.5%
Rio Verde	0.5%
Morristown	0.3%
Tortilla Flat	0.2%
Fountain Hills	0.1%
Gila Bend	0.1%
Waddell	0.1%
Tonopah	0.1%
Gilbert	0.1%
Paradise Valley	0.1%
Palo Verde	0.0%
Wittmann	0.0%

Mohave County

Non-motorized in-state trail use in Mohave County is dominated by in-county residents (88.7%), followed by visitors from Maricopa County (6.5%) (Figure 26).

Figure 26. Share of Mohave County In-State Non-Motorized Trail Use by User County of Origin



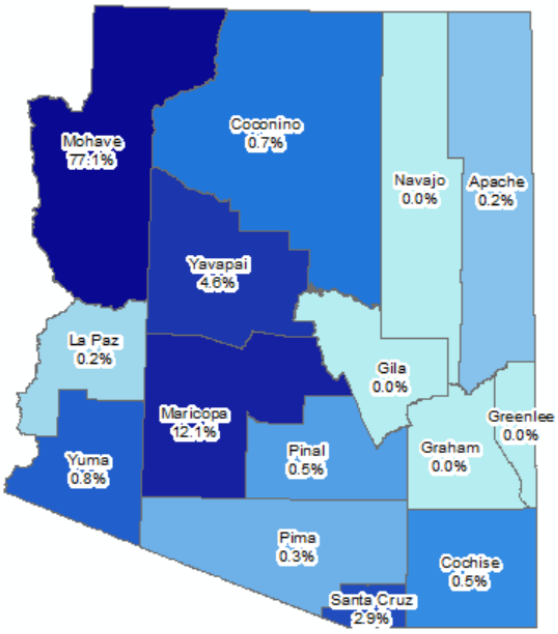
Top non-motorized trail use destinations in Mohave County include Bullhead City, Lake Havasu City, and Topock (Table 61).

Table 61. Mohave County Top In-State Non-Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Bullhead City	37.3%
Lake Havasu City	16.7%
Topock	7.8%
Kingman	7.6%
Oatman	6.1%
Fort Mohave	5.0%
Peach Springs	4.2%
Hualapai	3.6%
Hackberry	2.1%
Dolan Springs	1.9%
Mohave Valley	1.7%
Colorado City	1.6%
Chloride	1.5%
Littlefield	1.0%
Willow Beach	0.8%
Golden Valley	0.6%
Meadview	0.5%

In-state motorized trail users in Mohave County originate primarily from within Mohave County (77.1%), followed by Maricopa County (12.1%) (Figure 27).

Figure 27. Share of Mohave County In-State Motorized Trail Use by User County of Origin



Top motorized trail use destinations in Mohave County include Bullhead City, Golden Valley, and Lake Havasu City (Table 62).

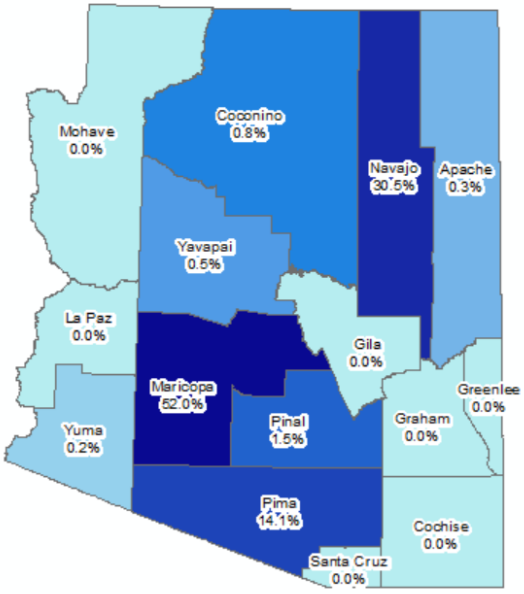
Table 62. Mohave County Top In-State Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Bullhead City	37.7%
Golden Valley	23.9%
Lake Havasu City	18.3%
Kingman	5.9%
Mohave Valley	3.8%
Chloride	3.6%
Fort Mohave	1.7%
Hualapai	1.4%
Dolan Springs	1.2%
Yucca	0.9%
Colorado City	0.6%
Peach Springs	0.3%
Wikieup	0.2%
Oatman	0.2%
Meadview	0.1%
Topock	0.1%

Navajo County

In-state non-motorized trail users in Navajo County originate most commonly from Maricopa County (52.0%), within Navajo County (30.5%), and Pima County (14.1%) (Figure 28).

Figure 28. Share of Navajo County In-State Non-Motorized Trail Use by User County of Origin



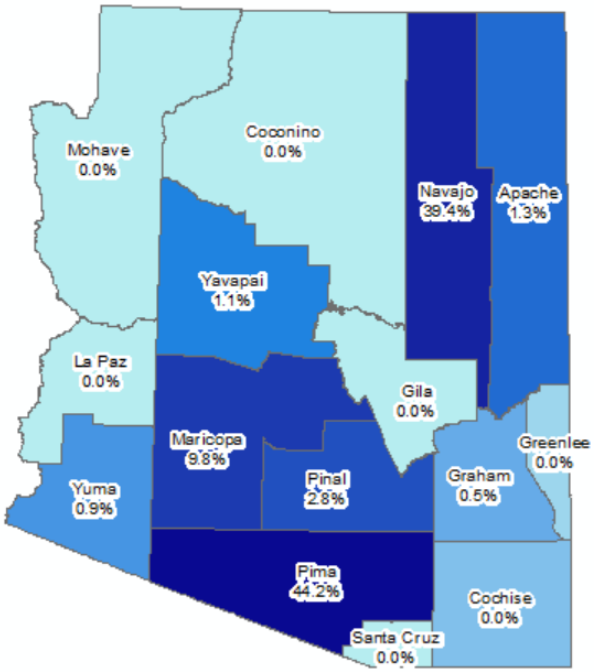
Top non-motorized trail use destinations in Navajo County include Pinetop, Show Low, Winslow, Indian Wells, and Clay Springs (Table 63).

Table 63. Navajo County Top In-State Non-Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Pinetop	30.1%
Show Low	19.4%
Winslow	10.3%
Indian Wells	9.2%
Clay Springs	8.3%
Pinedale	6.4%
Overgaard	5.4%
Lakeside	5.3%
Kayenta	1.9%
White Mountain Lake	1.8%
Snowflake	1.3%
Heber	0.4%
Holbrook	0.1%
Cibecue	0.1%

In-state motorized trail users in Navajo County originate most commonly from Pima County (44.2%), within Navajo County (39.4%), and Maricopa County (9.8%) (Figure 29).

Figure 29. Share of Navajo County In-State Motorized Trail Use by User County of Origin



Top motorized trail use destinations in Navajo County include Pinetop, Show Low, Piñon, Kayenta, and Heber (Table 64).

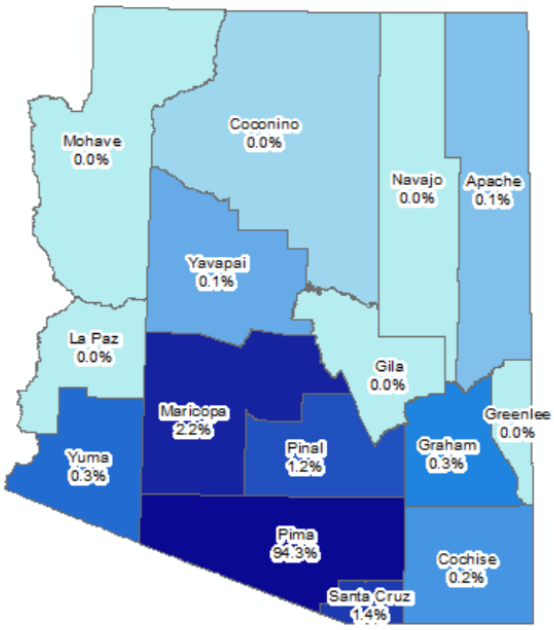
Table 64. Navajo County Top In-State Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Pinetop	51.7%
Show Low	11.3%
Pinon	10.4%
Kayenta	8.9%
Heber	4.2%
Taylor	3.0%
Kykotsmovi Village	2.0%
Fort Apache	2.0%
White Mountain Lake	1.5%
Snowflake	1.3%
Holbrook	1.2%
Lakeside	0.9%
Pinedale	0.7%
Cibecue	0.5%
Sun Valley	0.4%

Pima County

In-state non-motorized trail users in Pima County originate heavily from within Pima County (94.3%), followed by Maricopa County (2.2%) (Figure 30).

Figure 30. Share of Pima County In-State Non-Motorized Trail Use by User County of Origin



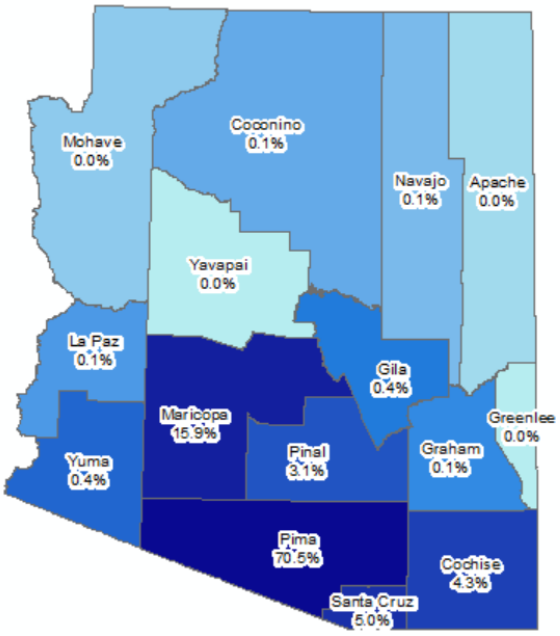
Top non-motorized trail use destinations in Pima County include Tucson, Mount Lemmon, Ajo, Catalina, and Oro Valley (Table 65).

Table 65. Pima County Top In-State Non-Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Tucson	64.8%
Mount Lemmon	8.3%
Ajo	6.7%
Catalina	4.6%
Oro Valley	4.5%
Marana	4.0%
Green Valley	3.5%
Sahuarita	2.6%
Arivaca	0.7%
Vail	0.3%
Cortaro	0.0%

In-state motorized trail users in Pima County originate from within Pima County (70.5%), Maricopa County (15.9%), Santa Cruz County (5%), and Cochise County (4.3%) (Figure 31).

Figure 31. Share of Pima County In-State Motorized Trail Use by User County of Origin



Top motorized trail use destinations in Pima County include Tucson, Ajo, Mount Lemmon, Catalina, and Sahuarita (Table 66).

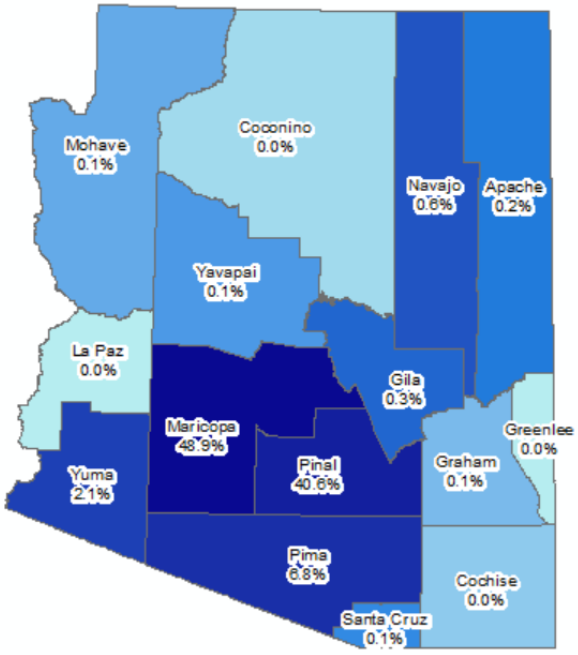
Table 66. Pima County Top In-State Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Tucson	36.1%
Ajo	21.5%
Mount Lemmon	13.1%
Catalina	6.4%
Sahuarita	6.2%
Arivaca	5.6%
Vail	4.9%
Green Valley	3.3%
Marana	2.7%
Cortaro	0.1%

Pinal County

In-state non-motorized trail users in Pinal County originate most commonly from Maricopa County (48.9%), from within Pinal County (40.6%), and Pima County (6.8%) (Figure 32).

Figure 32. Share of Pinal County In-State Non-Motorized Trail Use by User County of Origin



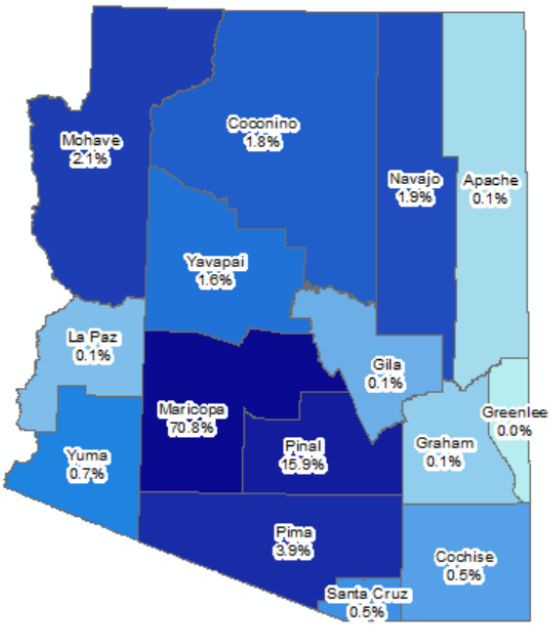
Top non-motorized trail use destinations in Pinal County include Apache Junction, Maricopa, Coolidge, Casa Grande, and Arizona City (Table 67).

Table 67. Pinal County Top In-State Non-Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Apache Junction	38.4%
Maricopa	13.2%
Coolidge	10.3%
Casa Grande	8.5%
Arizona City	8.4%
Gold Canyon	7.5%
San Tan Valley	4.7%
Superior	3.4%
Picacho	2.0%
Florence	1.9%
Oracle	0.8%
Red Rock	0.6%
Mammoth	0.3%

In-state motorized trail users in Pinal County originate most frequently from Maricopa County (70.8%), from within Pinal County (15.9%), and from Pima County (3.9%) (Figure 33).

Figure 33. Share of Pinal County In-State Motorized Trail Use by User County of Origin



Top motorized trail use destinations in Pinal County include Apache Junction, Arizona City, Casa Grande, Florence, and Maricopa (Table 68).

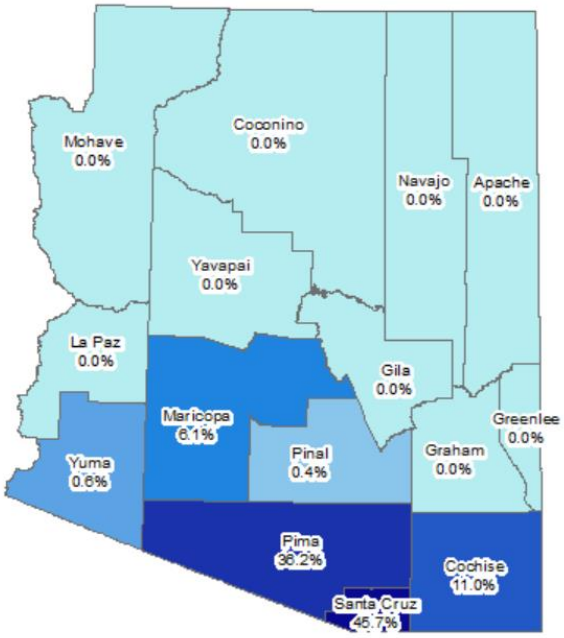
Table 68. Pinal County Top In-State Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Apache Junction	51.4%
Arizona City	17.4%
Casa Grande	10.3%
Florence	7.2%
Maricopa	6.6%
Gold Canyon	4.1%
San Tan Valley	1.2%
Bapchule	0.4%
Superior	0.3%
San Manuel	0.3%
Picacho	0.3%
Eloy	0.2%
Red Rock	0.2%
Oracle	0.0%
Sacaton	0.0%

Santa Cruz County

In-state non-motorized trail users in Santa Cruz County originate most frequently from within Santa Cruz County (45.7%), Pima County (36.2%), Cochise County (11.0%), and Maricopa County (6.1%) (Figure 34).

Figure 34. Share of Santa Cruz County In-State Non-Motorized Trail Use by User County of Origin



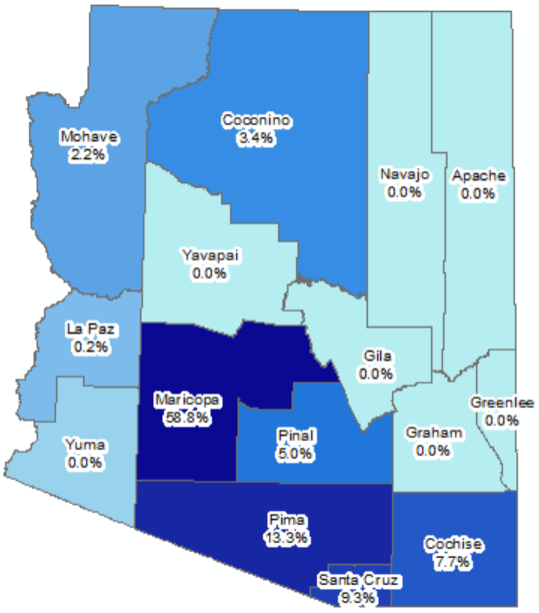
Top non-motorized trail use destinations in Santa Cruz County include Patagonia, Tubac, Nogales, and Amado (Table 69).

Table 69. Santa Cruz County Top In-State Non-Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Patagonia	61.5%
Tubac	12.5%
Nogales	10.9%
Amado	7.1%
Rio Rico	2.6%
Sonoita	2.6%
Elgin	2.0%
Tumacacori	0.9%

In-state motorized trail users in Santa Cruz County originate most frequently from Maricopa County (58.8%), Pima County (13.3%), within Santa Cruz County (9.3%), and Cochise County (7.7%) (Figure 35).

Figure 35. Share of Santa Cruz County In-State Motorized Trail Use by User County of Origin



Top motorized trail use destinations in Santa Cruz County include Nogales, Amado, and Patagonia (Table 70).

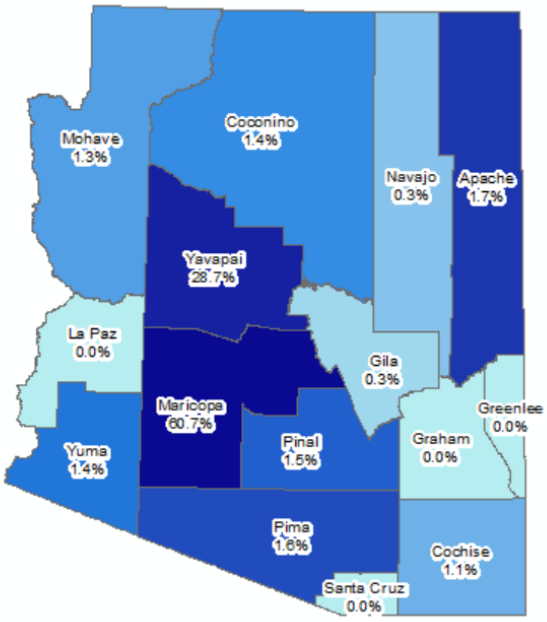
Table 70. Santa Cruz County Top In-State Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Nogales	50.3%
Amado	44.9%
Patagonia	3.1%
Sonoita	0.7%
Elgin	0.7%
Tubac	0.3%

Yavapai County

In-state non-motorized trail users in Yavapai County originate most often from Maricopa County (60.7%) and from within Yavapai County (28.7%) (Figure 36).

Figure 36. Share of Yavapai County In-State Non-Motorized Trail Use by User County of Origin



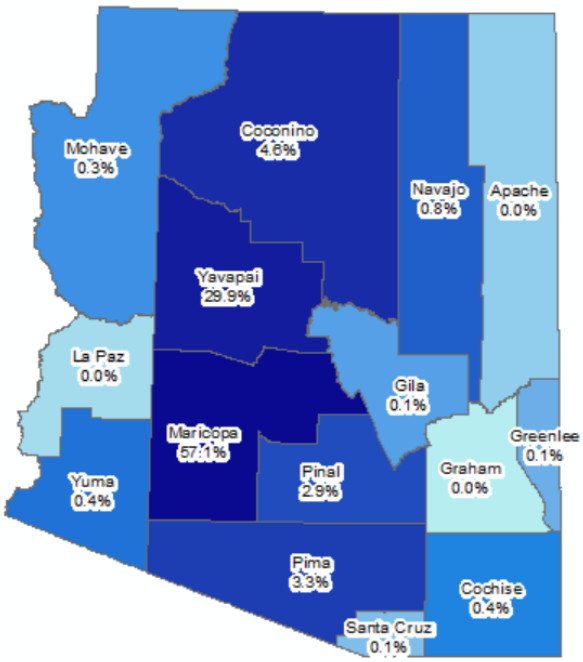
Top non-motorized trail use destinations in Yavapai County include Sedona, Prescott, Black Canyon City, and Camp Verde (Table 71).

Table 71. Yavapai County Top In-State Non-Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Sedona	43.6%
Prescott	25.0%
Black Canyon City	11.1%
Camp Verde	7.1%
Prescott Valley	3.7%
Ash Fork	2.9%
Cottonwood	2.8%
Yarnell	1.1%
Crown King	0.8%
Jerome	0.7%
Chino Valley	0.6%
Cornville	0.3%
Humboldt	0.1%
Clarkdale	0.0%
Seligman	0.0%
Rimrock	0.0%

In-state motorized trail users in Yavapai County originate most frequently from Maricopa County (57.1%), from within Yavapai County (29.9%), and from Coconino County (4.6%) (Figure 37).

Figure 37. Share of Yavapai County In-State Motorized Trail Use by User County of Origin



Top motorized trail use destinations in Yavapai County include Black Canyon City, Camp Verde, Prescott Valley, Prescott, Yarnell, Sedona, and Cottonwood (Table 72).

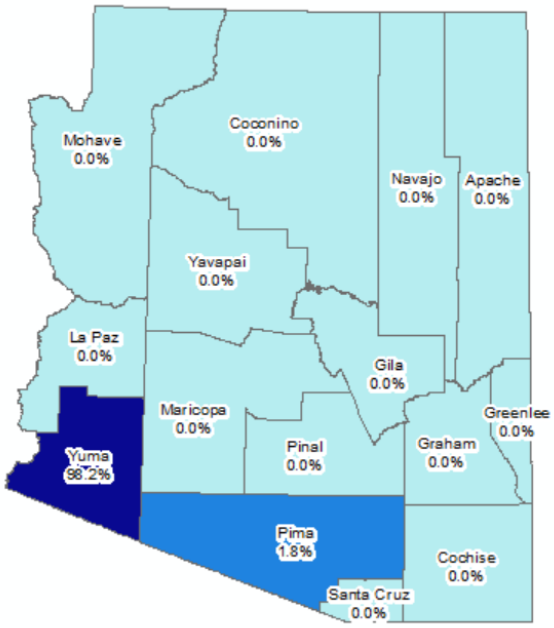
Table 72. Yavapai County Top In-State Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Black Canyon City	26.5%
Camp Verde	18.4%
Prescott Valley	7.4%
Prescott	6.7%
Yarnell	6.4%
Sedona	5.9%
Cottonwood	4.5%
Rimrock	3.9%
Bagdad	3.9%
Ash Fork	3.9%
Crown King	3.8%
Dewey	2.5%
Mayer	2.2%
Kirkland	2.0%
Paulden	0.8%
Cornville	0.3%
Skull Valley	0.3%
Lake Montezuma	0.1%
Congress	0.1%
Seligman	0.1%
Chino Valley	0.1%
Jerome	0.0%

Yuma County

In-state non-motorized trail users in Yuma County originate heavily from within Yuma County (98.2%), (Figure 38).

Figure 38. Share of Yuma County In-State Non-Motorized Trail Use by User County of Origin



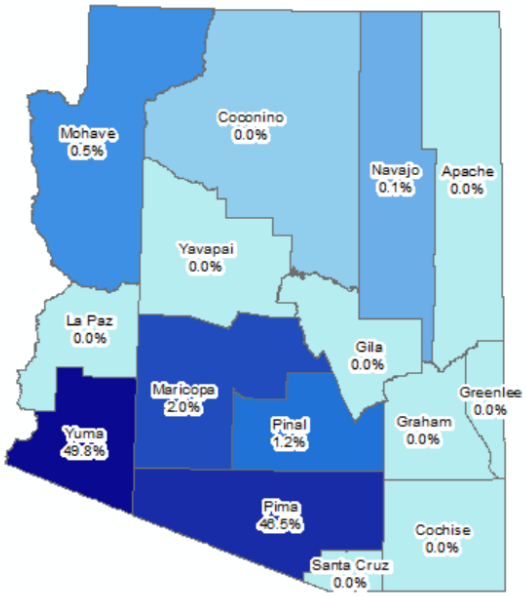
Top non-motorized trail use destinations in Yuma County include Yuma and Wellton (Table 73).

Table 73. Yuma County Top In-State Non-Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Yuma	90.6%
Wellton	5.6%
Tacna	3.9%

In-state motorized trail users in Yuma County originate most often from within Yuma County (49.8%) and from Pima County (46.5%) (Figure 39).

Figure 39. Share of Yuma County In-State Motorized Trail Use by User County of Origin



Top motorized trail use destinations in Yuma County include Yuma, San Luis, and Somerton (Table 74).

Table 74. Yuma County Top In-State Motorized Trail-Use Destinations

Destination	Estimated Share of Trail Use in County
Yuma	87.9%
San Luis	5.5%
Somerton	3.9%
Wellton	1.0%
Roll	0.9%
Dateland	0.5%
Tacna	0.3%

Appendix C. Survey Respondent & Statewide Population Distributions by Demographic Variables

The following tables (Tables 75 – 81) present weighted percentages of survey respondents by demographic characteristics compared with Census data for the Arizona population age 18 and older (PIB, 2019). Survey responses were collected using a multi-modal strategy in order to obtain a representative sample of the population, particularly in terms of respondent age, considering that landline telephonic surveys are likely to skew much older than the population on average (Blumberg & Luke, 2018). A representative sample of the population is important in order to derive reliable estimates and conclusions about the state population overall. Sample stratification was based on county population to ensure sufficient sample size for individual counties or county groups. Survey data were weighted by gender and Hispanic origin using custom Census data tabulations (PIB, 2019) for population 18 years of age and older to account for under-representation of males and individuals of Hispanic origin in the sample. Generally, the weighted data are reflective of the distributions of Arizona's adult population across demographic categories.

Table 75. Survey Sample by Age Compared with Arizona Population

Age	Sample	AZ Population 18 & Over*
18-24	13.4%	12.9%
25-34	19.9%	17.7%
35-44	15.6%	16.2%
45-54	15.1%	16.2%
55-64	17.1%	15.6%
65-74	15.0%	21.3%**
>75	3.9%	
All Ages	100%	100%

*Custom Census data tabulation, PIB (2019)

** 65 years old and older

Table 76. Survey Sample by Gender Compared with Arizona Population

Gender	Sample	AZ Population 18 & Over
Male	48.9%	49.3%
Female	50.4%	50.7%
Other	0.4%	N/A
Prefer not to answer	0.3%	N/A
Total	100%	100%

Table 77. Survey Sample by Hispanic Origin Compared with Arizona Population

Hispanic Origin	Sample	AZ Population 18 & Over
Hispanic	26.5%	26.8%
Non-Hispanic	72.4%	73.2%
Prefer not to answer	1.1%	N/A
Total	100%	100%

Table 78. Survey Sample by Race Compared with Arizona Population

Race	Sample	AZ Population 18 & Over
White	79.7%	79.6%
Black/African American	5.6%	4.1%
American Indian/Alaska Native	4.5%	4.0%
Asian	2.7%	3.3%
Native Hawaiian/Other Pacific Islander	1.1%	0.2%
Prefer Not to Answer	6.4%	N/A
Total	100%	100%

Table 79. Survey Sample by Educational Attainment Compared with Arizona Population

Educational Attainment	Sample	AZ Population 18 & Over
Less than 9th grade	0.5%	5.4%
Some high school	3.9%	8.5%
High school graduate	19.6%	25.2%
Some college	27.8%	27.1%
Associate's degree or technical/vocational	15.9%	8.1%
Bachelor's degree	20.6%	16.4%
Graduate or professional degree	11.3%	9.4%
Prefer not to answer	0.4%	N/A
Total	100%	100%

Table 80. Survey Sample by Employment Status

Employment Status	Sample
Employed	48.2%
Unemployed	8.5%
U.S. Armed Forces	0.7%
Student	4.7%
Retired	22.3%
Homemaker, Parent, or Caregiver	8.3%
Disabled, Not Working	6.1%
Prefer not to answer	1.2%
Total	100%

Table 81. Survey Sample by Household Income Compared with Arizona Population

Income	Sample	AZ Population 18 & Over
Less than $10,000	9.3%	7.2%
$10,000 to $14,999	5.6%	4.8%
$15,000 to $24,999	10.1%	10.3%
$25,000 to $34,999	12.3%	10.3%
$35,000 to $49,999	14.3%	14.2%
$50,000 to $74,999	18.7%	18.6%
$75,000 to $99,999	11.0%	12.2%
$100,000 to $149,999	9.2%	12.9%
$150,000 to $199,999	2.3%	4.8%
$200,000 or more	1.8%	4.7%
Prefer not to answer	5.6%	N/A
Total	100%	100%

Appendix D. Annual Household Income Proxy

Random sample survey respondents reported income in ranges, therefore, for purposes of estimation, we use a synthetic proxy for annual household income consisting of the midpoint of each income range, with the exception of the highest income range, which is assigned as the minimum of the range (Table 82).

Table 82. Income Ranges and Assigned Midpoints

Range	Midpoint
Less than $10,000	$5,000
$10,000 to $14,999	$12,500
$15,000 to $24,999	$20,000
$25,000 to $34,999	$30,000
$35,000 to $49,999	$42,500
$50,000 to $74,999	$62,500
$75,000 to $99,999	$87,500
$100,000 to $149,999	$125,000
$150,000 to $199,999	$175,000
$200,000 or more	$200,000
Prefer not to answer	N/A

To evaluate the midpoints as a proxy for annual household income, we regressed the proxy against demographic variables. All explanatory variables are indicator variables for their respective categories. Results show that the proxy annual household income variable behaves according to expectation, with annual household income peaking in middle-age, increasing with educational attainment, lower for the unemployed, retired, and students, and lower for women and most minorities (Table 83).

Table 83. Household Income Proxy Variable OLS Regression on Respondent Demographic Variables

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	27,795	6,882.8	4.04	<.0001
AGE – Reference Category = 18 to 24					
25 to 34	1	7,116	2,142.5	3.32	0.0009
35 to 44	1	12,778	2,303.9	5.55	<.0001
45 to 54	1	15,825	2,322.4	6.81	<.0001
55 to 64	1	13,506	2,393.3	5.64	<.0001
65 to 74	1	14,276	2,894.2	4.93	<.0001
Over 75	1	13,161	3,878.5	3.39	0.0007
Education – Reference Category = Less than 9th grade					
Some high school	1	-3,792	7,167.3	-0.53	0.5968
High school graduate	1	5,221	6,688.0	0.78	0.4351
Some college	1	13,632	6,652.2	2.05	0.0405
Associates / tech. degree	1	20,475	6,708.1	3.05	0.0023
Bachelor's degree	1	41,480	6,688.3	6.2	<.0001
Graduate degree	1	59,466	6,788.8	8.76	<.0001
Employment Status – Reference Category = Employed					
Unemployed	1	-18,512	2,145.7	-8.63	<.0001
Student	1	-7,317	2,987.4	-2.45	0.0143
Retired	1	-2,591	1,978.8	-1.31	0.1904
Gender – Reference Category = Male					
Female	1	-5,981	1,139.0	-5.25	<.0001
Other	1	-16,702	9,193.9	-1.82	0.0693
Hispanic or Latino Origin – Reference Category = Non-Hispanic					
Hispanic / Latino	1	2,650	1,468.1	1.8	0.0712
Race – Reference Category = White					
Black / African American	1	-3,691	2,402.9	-1.54	0.1245
American Indian / Alaska Native	1	-12,861	2,719.5	-4.73	<.0001
Asian	1	4,820	3,395.2	1.42	0.1557
Native Hawaiian / Other Pacific Islander	1	-5,891	5,805.8	-1.01	0.3103
n = 4,726 R^2 = 0.2615 Adj. R^2 = 0.2581					

Predicted values from this model were used to interpolate missing income values for those random sample survey respondents that declined to provide their annual household income range (n=288) for purposes of calculating travel costs.

Appendix E. Survey Instrument

ASPT 2020 Trails Plan Survey

Q0
Thank you for your interest in participating in this survey, which is being conducted on behalf of Arizona State Parks and Trails. Your responses will help determine how state funds are spent to improve both public access to and use of trails in Arizona for outdoor recreational activities. We are not selling anything and your participation is voluntary and confidential. No information is ever released that would allow anyone to identify you or anyone else in your family.

To record responses, either type the answer in the space provided or select the box or boxes that correspond to the answer choice. To advance the survey to the next page, use the "Next" button below. **Please answer each question in order and do not try to go back to a previous question,** as this might prevent your responses from being entered correctly.

Thank you.

Q0_1
Do you prefer to continue this survey in English or Spanish? Please select one.

- ☐ English
- ☐ Spanish

Screener questions related to eligibility to participate

First we need to ask you just a few questions to find out whether you qualify to participate in the survey.

S1. Do you live in Arizona, either year-round or for part of the year? Please select one.

- ☐ Yes, year-round *[Continue with S2, then skip to S4]*
- ☐ Yes, for part of the year—for example, as a winter visitor *[Continue with S2]*
- ☐ No, do not live in Arizona ***[TERMINATE]***

NOTE: Current termination message reads: *Thank you for taking time out of your day to participate in our survey. Unfortunately, you do not meet the qualifications to participate.*

S2. Which Arizona zip code do you live in, either year-round or for part of the year? Please type in your response. *[If invalid AZ zip, ask respondent to verify Arizona home zip code; if an invalid zip is again entered, allow and code as Other Zip]*

_____

S3. When not living in Arizona for part of the year, where do you reside?

- ☐ U.S. state or territory *[If selected, present QS3a]*
- ☐ Canada
- ☐ Mexico
- ☐ Other country (please specify: _____)

S3a. Which U.S. state or territory do you live in? *[Present drop-down list; alphabetical listing of U.S. states and territories]*

S4. What is your age? Please select one.

- ☐ Under 18 ***[TERMINATE]***
- ☐ 18–24
- ☐ 25–34
- ☐ 35–44
- ☐ 45–54
- ☐ 55–64
- ☐ 65–74
- ☐ 75 and older

Survey questions regarding trail use, for coding of non-motorized users, motorized users, and non-users – non-users skip to demographics (Q1–Q3)

Q1 Intro

During this survey, you will be asked if you have ever used trails in Arizona and if you have used trails during the past 12 months.

A trail is a recreation pathway, **on land or through water,** used for either non-motorized or motorized recreational purposes. Trails are located on public and private lands throughout the state. Trails do not include sidewalks, city streets, or rural highways.

Q1. Have you **ever** used trails on public or private lands in Arizona for **non-motorized recreation?** This includes activities such as trail hiking, jogging, mountain biking, backpacking, horseback riding, and viewing wildlife. Non-motorized water trail use includes activities such as canoeing kayaking, and stand-up paddle boarding. Pease select one.

- ☐ Yes *[Continue to Q1a]*

☐ No *[Skip to Q2]*

Q1a: Have you used trails during the **past 12 months** for non-motorized recreation?

☐ Yes [Continue to Q2]

☐ No

Q2. Have you **ever** used trails on public or private lands in Arizona for **motorized recreation**? This includes activities such as driving a quad or all-terrain vehicle (ATV), driving a 4x4 on trails, and riding a dirt bike. Please select one.

☐ Yes *[Continue to Q2a]*

☐ No

Q2a: Have you used trails during the **past 12 months** for motorized recreation?

☐ Yes

☐ No

We are no longer doing this.

Q3. You stated that during the past 12 months you have used Arizona trails for **both motorized and non-motorized** recreational activities. As best as you can recall, did you use trails more for motorized activities, for non-motorized activities, or did you spend about the same amount of time doing each? Please select one.

☐ More for motorized activities

☐ More for non-motorized activities

☐ About the same amount of time for each – motorized and non-motorized activities

Programming instructions for coding – Based on responses to Q1, Q1a, Q2, Q2a, and Q3; refer to Coding Worksheet

- Respondents who are coded "NON-USER/NEVER USED" or "NON-USER/PAST YEAR" skip to demographics (Q32); this is the "short" survey.
- Respondents coded as any of the following types of **users** complete the longer version of the survey, per the following instructions:
    - Respondents coded as Motorized Only or Mixed/Motorized continue with Q4–Q13, then skip to Q24.

- Respondents coded as Non-Motorized Only or Mixed/Non-Motorized skip to Q14 and continue.

- Respondents coded as Mixed continue at Q4 or skip to Q14, depending on "low bucket assignment" to complete Motorized or Non-Motorized use questions.

Questions specific to motorized use (Q4–Q13)

The next few questions will ask you about your experiences in using Arizona trails for **motorized** recreational activities.

Q4.

During the past 12 months, how often have you used trails on public or private lands in Arizona for the following types of **motorized** recreational activities? Please select one in each row.	**Not at all**	**Once**	**A few times**	**Every couple of months**	**Once a month**	**Every few weeks**	**Once a week**	**More often than once a week**
a. Riding a dirt bike								
b. Riding an e-bike – bicycle that runs on electric power as well as by pedaling, including electric-assist mountain bike (eMTB)								
c. Driving a quad / side-by-side / all-terrain vehicle (ATV) / utility terrain vehicle (UTV)								
d. Driving a 4x4								
e. Other motorized recreation activities								

[Programming: If respondent selects Q4e and selects an answer choice other than "Not at all," present this follow-up open-end question, Q4.e.1]:

Q4.e.1. What other types of motorized recreation activities have you used Arizona trails for in the past 12 months? _____

Q5. **In total**, how many **times** during the past 12 months have you used trails for **motorized recreation** in Arizona? Would you say … Please select one.

☐ Once or a few times (approximately 1–3 times)

☐ Every couple of months (approximately 4–8 times)

☐ Once a month (approximately 9–14 times)

☐ Every few weeks (approximately 15–35 times)

☐ Once a week (approximately 36–52 times)

☐ More than once a week (approximately 52+ times)

Q6. Looking ahead to the next 12 months, do you think your use of Arizona trails for **motorized recreation** will probably be less, the same as, or more than in the past 12 months? Please select one.

☐ Less than in the past 12 months

☐ About the same as in the past 12 months

☐ More than in the past 12 months

NOTE: Q7a & Q7b appear on same screen page.

Q7a. How many people **age 18 and older** do you typically ride with when using trails in Arizona for motorized recreation activities? ____ # of people age 18 and older

Q7b. How many people **under age 18** do you typically ride with when using trails in Arizona for motorized recreation activities? _____ # of people under age 18

Q8. When you use trails in Arizona for **motorized** activities, which of these ride lengths do you like most? Please select one.

☐ Shorter than 25 miles

☐ 25 to 49 miles

☐ 50 to 74 miles

☐ 75 to 100 miles

☐ Longer than 100 miles

Q9a. Which town or city is closest to where you access each of the following? Please select one in each row. *[Drop-down list of Arizona towns & cities provided for each row]*

Your **favorite** Arizona trail for **motorized** recreational activities

The Arizona trail that you **most frequently use** for **motorized** recreational activities

The Arizona trail that you **traveled furthest to** for **motorized** recreational activities

Q9b

[Programming: Auto-populate name of town/city answer choices from Q9a into Q9b and Q9c]

Approximately how long does it take you to get from your home to where you access each of the following? *Please select one in each row.*	**Less than 5 minutes**	**5–15 minutes**	**16–30 minutes**	**31 minutes to 1 hour**	**1–2 hours**	**2–4 hours**	**4 hours or more**
Your **favorite trail** for motorized recreational activities, in or near XXX?							
The trail that you **most frequently use** for motorized recreational activities, in or near XXX?							
The trail that you **traveled furthest to** for motorized recreational activities, in or near XXX?							

Q9c

During the past 12 months, how often did you use each of the following? *Please select one in each row.*	**Not at all**	**Once during the year**	**A few times during the year**	**Every couple of months**	**Once a month**	**Every few weeks**	**Once a week**	**More than once a week**
Your **favorite trail** for motorized recreational activities, in or near XXX?								
The trail that you **most frequently use** for motorized recreational activities, in or near XXX?								
The trail that you **traveled furthest to** for motorized recreational activities, in/near XXX?								

Q12. Overall, how satisfied are you with **motorized trails** in Arizona? Would you say that you are …

[NOTE: To simplify programming in the online survey, question numbering remains unchanged

after questions are deleted; this is transparent for respondents since they do not see question numbers]

- ☐ Very dissatisfied
- ☐ Somewhat dissatisfied
- ☐ Somewhat satisfied
- ☐ Very satisfied

Q13. In the past **5 years,** do you think that access to trails **for motorized recreation** has gotten better, stayed the same, or gotten worse?

- ☐ Gotten worse
- ☐ Stayed the same
- ☐ Gotten better
- ☐ Unable to answer—have not lived in Arizona for 5 years or longer

Questions specific to non-motorized use (Q14–Q23).

The next few questions will ask you about your experiences in using Arizona trails for **non-motorized** recreational activities.

Q14.

During the past 12 months, how often have you used trails on public or private lands in Arizona for the following types of **non-motorized** recreational activities? Please select one in each row.	**Not at all**	**Once**	**A few times**	**Every couple of months**	**Once a month**	**Every few weeks**	**Once a**	**More often than once a**
Trail hiking, jogging, running, or backpacking								
Mountain biking								
Horseback riding								
Canoeing, kayaking, or stand-up paddle boarding on a water trail								
Viewing wildlife, including bird-watching								
Other non-motorized recreational activity								

[Programming: If respondent selects Q14f and selects an answer choice other than "Not at all," present this follow-up open-end question, Q14.f.1]:

Q14.f.1. What other types of non-motorized recreation activities have you used Arizona trails for in the past 12 months? _____

Q15. **In total**, how many **times** during the past 12 months have you used trails for **non-motorized recreation** in Arizona? Would you say . . . Please select one.

- ☐ Once or a few times (approximately 1–3 times)
- ☐ Every couple of months (approximately 4–8 times)
- ☐ Once a month (approximately 9-14 times)
- ☐ Every few weeks or a few times a month (approximately 15-35 times)
- ☐ Once a week (approximately 36-52 times)
- ☐ More than once a week (approximately 52+ times)

Q16. Looking ahead to the next 12 months, do you think your use of Arizona trails for **non-motorized recreation** will probably be less, the same as, or more than in the past 12 months? Please select one.

- ☐ Less than in the past 12 months
- ☐ About the same as in the past 12 months
- ☐ More than in the past 12 months

NOTE: Q17a & Q17b appear on same screen page.

Q17a. How many people **age 18 and older** are typically with you when you use trails in Arizona for non-motorized recreation activities? ____ # of people age 18 and older

Q17b. How many people **under age 18** are typically with you when you use trails in Arizona for non-motorized recreation activities? _____ # of people under age 18

Q18. When you use trails in Arizona for **non-motorized** activities, which of these trail lengths do you like most? Please select one.

- ☐ Shorter than 1 mile
- ☐ 1 to 5 miles
- ☐ 6 to 15 miles
- ☐ 16 to 30 miles
- ☐ Longer than 30 miles

Q19a. Which town or city is closest to where you access each of the following? Please select one in each row. *[Drop-down list of Arizona towns & cities provided for each row]*

Your **favorite Arizona** trail for **non-motorized** recreational activities

The Arizona trail that you **most frequently use** for non-**motorized** recreational activities

The Arizona trail that you **traveled furthest to** for non-**motorized** recreational activities

Q19b

[Programming: Auto-populate name of town/city answer choices from Q19a into Q19b and Q19c]

Approximately how long does it take you to get from your home to where you access each of the following? *Please select one in each row.*	**Less than 5 minutes**	**5-15 minutes**	**16-30 minutes**	**31 minutes to 1 hour**	**1–2 hours**	**2–4 hours**	**4 hours or more**
your **favorite trail** for non-motorized recreational activities, in or near XXX?							
The trail that you **most frequently use** for non-motorized recreational activities, in or near XXX?							
The trail that you **traveled furthest to** for non-motorized recreational activities, in or near XXX?							

Q19c

During the past 12 months, how often did you use each of the following? *Please select one in each row.*	**Not at all**	**Once during the year**	**A few times during the year**	**Every couple of months**	**Once a month**	**Every few weeks**	**Once a week**	**More than once a week**
Your **favorite trail** for non-motorized recreational activities, in or near XXX?								
The trail that you **most frequently use** for non-motorized recreational								

activities, in or near XXX?								
The trail that you **traveled furthest to** for non-motorized recreational activities, in or near XXX?								

Q22. Overall, how satisfied are you with **non-motorized trails** in Arizona? Would you say that you are . . . [NOTE: To simplify programming in the online survey, question numbering remains unchanged after questions are deleted; this is transparent for respondents since they do not see question numbers]

- ☐ Very dissatisfied
- ☐ Somewhat dissatisfied
- ☐ Somewhat satisfied
- ☐ Very satisfied

Q23. In the past **5 years,** do you think that access to trails for **non-motorized recreation** has gotten better, stayed the same, or gotten worse?

- ☐ Gotten worse
- ☐ Stayed the same
- ☐ Gotten better
- ☐ Unable to answer—have not lived in Arizona for 5 years or longer

Questions asked of all respondents (Q24–Q36)

The next few questions will ask your opinions on various topics related to Arizona trails generally.

Q24.

How important is it to have trails nearby.... Please select one in each row.	**Not at all important**	**Not very important**	**Somewhat important**	**Very important**
If you were deciding where to live in Arizona?				
When choosing a destination for vacation or leisure travel in Arizona?				

We are no longer doing this.

Q26. Which of the following tools do you use to find and use trails in Arizona? Please select all that apply.

- ☐ GPS
- ☐ Smartphone apps
- ☐ Guidebooks
- ☐ Online interactive guides
- ☐ Paper maps
- ☐ Digital maps
- ☐ Agency or organization websites (e.g., Arizona State Parks & Trails, Arizona State Land Department, U.S. Bureau of Land Management, U.S. Forest Service, Arizona Game & Fish, etc.)
- ☐ Websites with suggestions, recommendations, tips, etc. from other people who use trails in Arizona
- ☐ Social media
- ☐ Trail signs
- ☐ Word of mouth (e.g., friends, family, other trail users)
- ☐ Other (please specify) _____
- ☐ None of the above – I do not use any specific tools

Q27. Thinking about possible environmental and cultural conditions that **might negatively affect** your trail experience, how much of a problem is each of the following on the Arizona **trails you use most for recreation activities?** Please select one in each row.

	Not a problem	**Slight problem**	**Moderate problem**	**Serious problem**
Erosion of trails				
Loss of scenic quality				
Litter or trash dumping				
Amount of dust in the air				
Damage to vegetation				
Damage to historical or archaeological sites				

Q28. Thinking about possible social conditions that **might negatively affect** your trail experience, how much of a problem is each of the following on the Arizona **trails you use most for recreation activities?** Please select one in each row.

	Not a problem	**Slight problem**	**Moderate problem**	**Serious problem**
Too many people				
Poor trail etiquette by other users				

Conflict between users				
Closure of trails				
Target shooting				
Vandalism				
Unsafe off-highway vehicle use				
Noise (e.g., vehicle noise, loud music)				
Urban development limiting trail access or use				
Pets				

Q29. How important to you are the following trail management priorities?

	Not at all important	**Not very important**	**Somewhat important**	**Very important**
Obtain land for trails and trail access				
Provide facilities, like restrooms, parking, and campsites, near trails				
Provide trail signs				
Provide trail maps and information				
Enforce existing rules and regulations in trail areas				
Maintain existing trails				
Prevent or repair damage to environmental & cultural sites near trails				
Promote safe and responsible recreation programs				
Construct new trails				
Develop trails and facilities to increase accessibility for people with disabilities				
Connect trails to other trails, parks, and communities				

Q30. In general, which of the following statements best represents your opinion of how recreation on Arizona **trails** should be managed? Recreation on Arizona trails should be managed for …

☐ Multiple activities, with motorized and non-motorized activities COMBINED.

☐ Multiple activities, with motorized and non-motorized activities SEPARATED.

☐ A single motorized or non-motorized activity only.

Q31. If you were able to make one recommendation or suggestion to improve Arizona trails in general, what would it be? *[Program for optional open-end response*.]

Survey Questions: Demographics

Finally, we need some basic information about you to help us better understand who is using and not using trails in Arizona and to better provide for everyone's needs. This information will remain strictly confidential and will be used for statistical purposes only.

Q32. What is your gender?

- ☐ Male
- ☐ Female
- ☐ Other (please specify) _____
- ☐ Prefer not to answer

Q33. Are there any individuals in your household with a disability who require accommodations related to their use of Arizona trails?

- ☐ Yes *[Programming: Present Q33a]*
- ☐ No *[Continue to Q34]*
- ☐ Prefer not to answer *[Continue to Q34]*

Q33a. If yes, please identify the type of disability. Select all that apply.

- ☐ Hearing
- ☐ Speech
- ☐ Cognitive
- ☐ Visual
- ☐ Mobility
- ☐ Chemical or electrical sensitivity
- ☐ Other (please specify) _____
- ☐ Prefer not to answer

Q34. How long have you lived in Arizona, either year-round or for part of the year? Please select one.

- ☐ Less than 6 months
- ☐ 6 months through 1 year
- ☐ 1 year through 5 years
- ☐ 5 through 10 years
- ☐ Longer than 10 years
- ☐ Prefer not to answer

Q35a. Are you of Hispanic, Latino, or Spanish origin? Please select one.

☐ Yes

☐ No

☐ Prefer not to answer

Q35b. Which of the following racial groups do you most identify with? Please select one.

☐ White

☐ Black/ African American

☐ American Indian/ Alaskan Native

☐ Asian

☐ Native Hawaiian/Other Pacific Islander

☐ Prefer not to answer

Q36. What is the highest level of education you have completed? Please select one.

☐ Less than 9th grade

☐ Some high school (9th to 12th grade, no diploma)

☐ High school graduate (includes GED)

☐ Some college, no degree

☐ Associate's degree or technical/vocational program graduate

☐ Bachelor's degree

☐ Graduate or professional degree

☐ Prefer not to answer

Q37. What is your current employment status? Please select one.

☐ Employed

☐ Unemployed

☐ In the U.S. Armed Forces

☐ Student *[Programming: present Q37a]*

☐ Retired *[Programming: present Q37a]*

☐ Full-time homemaker, stay-at-home parent, or caregiver

☐ Disabled, not currently working

☐ Prefer not to answer

Q37a. You stated that you were a *[Programming: auto-populate with student or retiree.]* Are you also… Please select one.

☐ Employed full-time

☐ Employed part-time

☐ Not employed

Q38. Which category best describes your total annual household income before taxes? Please select one.

☐ Less than $10,000

☐ $10,000 to $14,999

☐ $15,000 to $24,999

☐ $25,000 to $34,999

☐ $35,000 to $49,999

☐ $50,000 to $74,999

☐ $75,000 to $99,999

☐ $100,000 to $149,999

☐ $150,000 to $199,999

☐ $200,000 or more

☐ Prefer not to answer

Message at end of survey:

You have reached the end of this survey. Thank you for sharing your time and opinions. Your responses will help support Arizona State Parks & Trails in planning and managing Arizona recreational trails for years to come.

Appendix F. Detailed Travel Cost Model Regression Results

Table 84. Non-Motorized Zero-Inflation Stage & Frequency Stage Regression Results

Model →	Minimum > Once A Week = 53				25th Percentile > Once A Week = 131				Midpoint > Once A Week = 209			
	Est.	***S.E.***	***t***	***P>|t|***	***Est.***	***S.E***	***T***	***P>|t|***	***Est.***	***S.E***	***t***	***P>|t|***
Zero-Inflation Step												
Age – 25 to 34	-0.1170	0.3324	-0.35	0.725	-0.1031	0.3324	-0.31	0.757	-0.0965	0.3314	-0.29	0.771
Age – 35 to 44	0.0479	0.3620	0.13	0.895	0.0871	0.3581	0.24	0.808	0.1069	0.3543	0.30	0.763
Age – 45 to 54	0.2724	0.3603	0.76	0.450	0.3176	0.3562	0.89	0.373	0.3408	0.3519	0.97	0.333
Age – 55 to 64	-0.1733	0.3930	-0.44	0.659	-0.0905	0.3815	-0.24	0.813	-0.0454	0.3737	-0.12	0.903
Age – 65 to 74	0.3691	0.5188	0.71	0.477	0.5118	0.4739	1.08	0.280	0.5636	0.4573	1.23	0.218
Age – Over 75	0.3634	0.8082	0.45	0.653	0.5894	0.7476	0.79	0.431	0.7239	0.7062	1.03	0.305
Gender – Female	-0.3387	0.1919	-1.77	0.078	-0.3090	0.1841	-1.68	0.093	-0.2909	0.1791	-1.62	0.105
Gender – Other	0.7118	0.8251	0.86	0.388	0.6952	0.8188	0.85	0.396	0.6884	0.8179	0.84	0.400
Hispanic	-0.1520	0.2405	-0.63	0.528	-0.1751	0.2363	-0.74	0.459	-0.1895	0.2330	-0.81	0.416
Black / Af. American	-0.2458	0.4809	-0.51	0.609	-0.2860	0.4869	-0.59	0.557	-0.3071	0.4872	-0.63	0.528
American Indian	-0.3598	0.5288	-0.68	0.496	-0.3560	0.5195	-0.69	0.493	-0.3490	0.5088	-0.69	0.493
Asian American	0.1568	0.5067	0.31	0.757	0.1932	0.4694	0.41	0.681	0.2011	0.4541	0.44	0.658
Native Hawaiian/P.I.	-0.6439	1.0076	-0.64	0.523	-0.6651	1.0060	-0.66	0.509	-0.6747	1.0055	-0.67	0.502
College Graduate	-0.2579	0.2174	-1.19	0.236	-0.2336	0.2098	-1.11	0.266	-0.2146	0.2048	-1.05	0.295
Unemployed	0.2039	0.3821	0.53	0.594	0.2425	0.3630	0.67	0.504	0.2625	0.3508	0.75	0.454
Student	0.4485	0.4451	1.01	0.314	0.4417	0.4455	0.99	0.322	0.4364	0.4434	0.98	0.325
Retired	-0.4755	0.3909	-1.22	0.224	-0.4906	0.3520	-1.39	0.164	-0.4971	0.3363	-1.48	0.139
Income – 10k-14k	0.7757	0.3843	2.02	**0.044**	0.7469	0.3781	1.98	**0.048**	0.7251	0.3737	1.94	0.052
Income – 15k-24k	-0.3785	0.4077	-0.93	0.353	-0.4313	0.4030	-1.07	0.285	-0.4638	0.4001	-1.16	0.246
Income – 25k-34k	-0.0282	0.3393	-0.08	0.934	-0.0624	0.3285	-0.19	0.849	-0.0783	0.3212	-0.24	0.807
Income – 35k-49k	-0.4977	0.3667	-1.36	0.175	-0.5039	0.3522	-1.43	0.153	-0.4979	0.3421	-1.46	0.146
Income – 50k-74k	-0.4008	0.3411	-1.17	0.240	-0.3788	0.3266	-1.16	0.246	-0.3604	0.3161	-1.14	0.254
Income – 75k-99k	-0.2560	0.4221	-0.61	0.544	-0.2766	0.4040	-0.68	0.494	-0.2799	0.3911	-0.72	0.474
Income – 100k-149k	-0.8760	0.5125	-1.71	0.088	-0.8530	0.4683	-1.82	0.069	-0.8461	0.4488	-1.89	0.060
Income – 150k-199k	0.1051	0.6207	0.17	0.866	0.0654	0.5962	0.11	0.913	0.0414	0.5807	0.07	0.943
Income – Over 200k	-1.5415	2.0326	-0.76	0.448	-1.0033	0.9721	-1.03	0.302	-0.8872	0.8032	-1.10	0.269
Constant	-2.6957	0.4244	-6.35	**0.000**	-2.7033	0.4193	-6.45	**0.000**	-2.7035	0.4140	-6.53	**0.000**
Frequency Step												
Travel Cost	-0.0078	0.0007	-10.69	**0.000**	-0.0091	0.0010	-9.11	**0.000**	-0.0100	0.0012	-8.05	**0.000**
% Forested	-0.1065	0.2197	-0.48	0.628	-0.1922	0.2942	-0.65	0.514	-0.2349	0.3547	-0.66	0.508
Ave. Slope	0.0101	0.0179	0.56	0.574	-0.0073	0.0253	-0.29	0.774	-0.0180	0.0314	-0.57	0.567
Std. Dev. Slope	-0.0984	0.0290	-3.39	**0.001**	-0.0836	0.0405	-2.06	**0.039**	-0.0737	0.0497	-1.48	0.139
Ave. Max. Temp.	-0.0084	0.0068	-1.23	0.220	-0.0170	0.0093	-1.83	0.067	-0.0219	0.0112	-1.95	0.051
Non-Mot. Trail Miles	0.0000	0.0000	-0.31	0.757	0.0000	0.0000	-0.38	0.703	0.0000	0.0001	-0.38	0.708
Age – 25 to 34	0.0955	0.0966	0.99	0.323	0.2141	0.1188	1.80	0.072	0.3007	0.1425	2.11	**0.035**
Age – 35 to 44	0.1337	0.1035	1.29	0.196	0.3076	0.1264	2.43	**0.015**	0.4310	0.1503	2.87	**0.004**
Age – 45 to 54	0.3312	0.1021	3.24	**0.001**	0.5789	0.1298	4.46	**0.000**	0.7469	0.1563	4.78	**0.000**
Age – 55 to 64	0.2537	0.1127	2.25	**0.024**	0.4914	0.1431	3.43	**0.001**	0.6540	0.1711	3.82	**0.000**
Age – 65 to 74	0.0380	0.1355	0.28	0.779	0.2329	0.1737	1.34	0.180	0.3709	0.2062	1.80	0.072
Age – Over 75	-0.1518	0.2191	-0.69	0.489	0.1553	0.2871	0.54	0.589	0.3471	0.3303	1.05	0.293
Gender – Female	-0.1271	0.0478	-2.66	**0.008**	-0.1474	0.0632	-2.33	**0.020**	-0.1599	0.0763	-2.10	**0.036**

Model →	Minimum > Once A Week = 53				25th Percentile > Once A Week = 131				Midpoint > Once A Week = 209			
	Est.	***S.E.***	***t***	***P>|t|***	***Est.***	***S.E***	***T***	***P>|t|***	***Est.***	***S.E***	***t***	***P>|t|***
Gender – Other	0.3247	0.2161	1.5	0.133	0.3196	0.3141	1.02	0.309	0.3223	0.4098	0.79	0.432
Hispanic	0.0794	0.0619	1.28	0.200	0.0452	0.0813	0.56	0.578	0.0225	0.0987	0.23	0.820
Black / Af. American	0.0653	0.1146	0.57	0.569	0.0902	0.1433	0.63	0.529	0.1062	0.1717	0.62	0.536
American Indian	0.4826	0.0986	4.89	**0.000**	0.5668	0.1323	4.29	**0.000**	0.6186	0.1593	3.88	**0.000**
Asian American	-0.2415	0.1438	-1.68	0.093	-0.3590	0.1786	-2.01	**0.045**	-0.4408	0.2166	-2.03	**0.042**
Native Hawaiian/P.I.	0.2924	0.2344	1.25	0.212	0.5161	0.2743	1.88	0.060	0.6439	0.3042	2.12	**0.034**
College Graduate	0.0992	0.0547	1.81	0.070	0.0851	0.0770	1.11	0.269	0.0751	0.0944	0.80	0.427
Unemployed	-0.0789	0.1090	-0.72	0.469	0.0101	0.1616	0.06	0.950	0.0637	0.1969	0.32	0.746
Student	-0.0356	0.1228	-0.29	0.772	-0.0371	0.1488	-0.25	0.803	-0.0389	0.1789	-0.22	0.828
Retired	0.1056	0.0874	1.21	0.227	0.2088	0.1157	1.81	0.071	0.2656	0.1364	1.95	0.052
Income – 10k-14k	-0.0034	0.1389	-0.02	0.981	-0.0350	0.1925	-0.18	0.856	-0.0532	0.2334	-0.23	0.820
Income – 15k-24k	0.0744	0.1042	0.71	0.475	0.0129	0.1410	0.09	0.927	-0.0241	0.1692	-0.14	0.887
Income – 25k-34k	-0.1234	0.1029	-1.2	0.231	-0.2598	0.1368	-1.90	0.058	-0.3437	0.1643	-2.09	**0.037**
Income – 35k-49k	-0.0993	0.0982	-1.01	0.312	-0.2424	0.1296	-1.87	0.061	-0.3318	0.1560	-2.13	**0.034**
Income – 50k-74k	0.1209	0.0907	1.33	0.183	0.0487	0.1226	0.40	0.692	0.0061	0.1471	0.04	0.967
Income – 75k-99k	0.1075	0.1020	1.05	0.292	0.0463	0.1395	0.33	0.740	0.0099	0.1683	0.06	0.953
Income – 100k-149k	0.2126	0.1053	2.02	**0.044**	0.1647	0.1457	1.13	0.258	0.1360	0.1762	0.77	0.440
Income – 150k-199k	0.5251	0.1548	3.39	**0.001**	0.5943	0.1976	3.01	**0.003**	0.6294	0.2297	2.74	**0.006**
Income – Over 200k	0.3356	0.1531	2.19	**0.029**	0.4408	0.2026	2.18	**0.030**	0.4912	0.2351	2.09	**0.037**
Constant	3.8493	0.5607	6.87	**0.000**	4.7323	0.7548	6.27	**0.000**	5.2649	0.9091	5.79	**0.000**
Estimated Consumer Surplus per Visit												
$-1/\beta_{TC}$	**128.03**				**109.55**				**100.06**			

Table 84 Continued…

Model →	75th Percentile > Once A Week = 287				Maximum > Once A Week = 365			
	Est.	***S.E.***	***t***	***P>|t|***	***Est.***	***S.E***	***T***	***P>|t|***
Zero-Inflation Step								
Age – 25 to 34	-0.0927	0.3295	-0.28	0.779	-0.0899	0.3273	-0.27	0.784
Age – 35 to 44	0.1185	0.3504	0.34	0.735	0.1259	0.3467	0.36	0.717
Age – 45 to 54	0.3537	0.3474	1.02	0.309	0.3609	0.3429	1.05	0.293
Age – 55 to 64	-0.0202	0.3668	-0.06	0.956	-0.0066	0.3611	-0.02	0.985
Age – 65 to 74	0.5899	0.4474	1.32	0.187	0.6052	0.4405	1.37	0.170
Age – Over 75	0.8052	0.6747	1.19	0.233	0.8551	0.6492	1.32	0.188
Gender – Female	-0.2775	0.1755	-1.58	0.114	-0.2666	0.1727	-1.54	0.123
Gender – Other	0.6822	0.8176	0.83	0.404	0.6760	0.8175	0.83	0.408
Hispanic	-0.1995	0.2300	-0.87	0.386	-0.2070	0.2275	-0.91	0.363
Black / Af. American	-0.3191	0.4845	-0.66	0.510	-0.3265	0.4804	-0.68	0.497
American Indian	-0.3419	0.4978	-0.69	0.492	-0.3362	0.4874	-0.69	0.490
Asian American	0.2040	0.4435	0.46	0.645	0.2053	0.4347	0.47	0.637
Native Hawaiian/P.I.	-0.6779	1.0061	-0.67	0.500	-0.6756	1.0082	-0.67	0.503
College Graduate	-0.1999	0.2005	-1.00	0.319	-0.1887	0.1966	-0.96	0.337
Unemployed	0.2742	0.3419	0.80	0.423	0.2820	0.3348	0.84	0.400
Student	0.4323	0.4405	0.98	0.326	0.4294	0.4373	0.98	0.326
Retired	-0.5022	0.3280	-1.53	0.126	-0.5051	0.3232	-1.56	0.118

Model →	**75th Percentile > Once A Week = 287**				**Maximum > Once A Week = 365**			
	Est.	***S.E.***	***t***	***P>|t|***	***Est.***	***S.E***	***T***	***P>|t|***
Income – 10k-14k	0.7099	0.3701	1.92	0.055	0.6996	0.3673	1.90	0.057
Income – 15k-24k	-0.4839	0.3974	-1.22	0.223	-0.4958	0.3949	-1.26	0.209
Income – 25k-34k	-0.0841	0.3155	-0.27	0.790	-0.0842	0.3112	-0.27	0.787
Income – 35k-49k	-0.4883	0.3344	-1.46	0.144	-0.4775	0.3285	-1.45	0.146
Income – 50k-74k	-0.3454	0.3082	-1.12	0.262	-0.3318	0.3021	-1.10	0.272
Income – 75k-99k	-0.2771	0.3817	-0.73	0.468	-0.2709	0.3751	-0.72	0.470
Income – 100k-149k	-0.8355	0.4371	-1.91	0.056	-0.8202	0.4285	-1.91	0.056
Income – 150k-199k	0.0270	0.5695	0.05	0.962	0.0192	0.5614	0.03	0.973
Income – Over 200k	-0.8371	0.7435	-1.13	0.260	-0.8038	0.7202	-1.12	0.264
Constant	-2.7023	0.4088	-6.61	**0.000**	-2.7013	0.4039	-6.69	**0.000**
Frequency Step								
Travel Cost	-0.2599	0.3978	-0.65	0.514	-0.2760	0.4293	-0.64	0.520
% Forested	-0.0253	0.0358	-0.70	0.481	-0.0305	0.0391	-0.78	0.435
Ave. Slope	-0.0667	0.0564	-1.18	0.237	-0.0615	0.0613	-1.00	0.316
Std. Dev. Slope	-0.0251	0.0126	-1.99	**0.047**	-0.0273	0.0136	-2.01	**0.045**
Ave. Max. Temp.	0.0000	0.0001	-0.36	0.716	0.0000	0.0001	-0.35	0.723
Non-Mot. Trail Miles	0.3668	0.1634	2.24	**0.025**	0.4192	0.1812	2.31	**0.021**
Age – 25 to 34	0.5236	0.1709	3.06	**0.002**	0.5957	0.1882	3.17	**0.002**
Age – 35 to 44	0.8695	0.1780	4.89	**0.000**	0.9633	0.1959	4.92	**0.000**
Age – 45 to 54	0.7732	0.1939	3.99	**0.000**	0.8646	0.2126	4.07	**0.000**
Age – 55 to 64	0.4740	0.2312	2.05	**0.040**	0.5541	0.2510	2.21	**0.027**
Age – 65 to 74	0.4818	0.3595	1.34	0.180	0.5826	0.3809	1.53	0.126
Age – Over 75	-0.1685	0.0860	-1.96	**0.050**	-0.1746	0.0932	-1.87	0.061
Gender – Female	0.3270	0.4834	0.68	0.499	0.3318	0.5401	0.61	0.539
Gender – Other	0.0063	0.1122	0.06	0.956	-0.0059	0.1226	-0.05	0.962
Hispanic	0.1172	0.1938	0.60	0.545	0.1253	0.2109	0.59	0.552
Black / Af. American	0.6537	0.1785	3.66	**0.000**	0.6792	0.1925	3.53	**0.000**
American Indian	-0.5014	0.2504	-2.00	**0.045**	-0.5482	0.2793	-1.96	**0.050**
Asian American	0.7269	0.3234	2.25	**0.025**	0.7853	0.3365	2.33	**0.020**
Native Hawaiian/P.I.	0.0677	0.1069	0.63	0.527	0.0621	0.1161	0.53	0.593
College Graduate	0.0996	0.2206	0.45	0.652	0.1254	0.2374	0.53	0.597
Unemployed	-0.0406	0.2060	-0.20	0.844	-0.0421	0.2292	-0.18	0.854
Student	0.3017	0.1504	2.01	**0.045**	0.3268	0.1604	2.04	**0.042**
Retired	-0.0652	0.2623	-0.25	0.804	-0.0738	0.2834	-0.26	0.795
Income – 10k-14k	-0.0489	0.1887	-0.26	0.796	-0.0667	0.2029	-0.33	0.742
Income – 15k-24k	-0.4008	0.1844	-2.17	**0.030**	-0.4421	0.1994	-2.22	**0.027**
Income – 25k-34k	-0.3932	0.1757	-2.24	**0.025**	-0.4381	0.1906	-2.30	**0.022**
Income – 35k-49k	-0.0220	0.1641	-0.13	0.893	-0.0420	0.1763	-0.24	0.812
Income – 50k-74k	-0.0143	0.1884	-0.08	0.939	-0.0317	0.2029	-0.16	0.876
Income – 75k-99k	0.1169	0.1973	0.59	0.554	0.1032	0.2124	0.49	0.627
Income – 100k-149k	0.6505	0.2513	2.59	**0.010**	0.6647	0.2664	2.49	**0.013**
Income – 150k-199k	0.5206	0.2563	2.03	**0.042**	0.5399	0.2709	1.99	**0.046**
Income – Over 200k	5.6323	1.0181	5.53	**0.000**	5.9075	1.0980	5.38	**0.000**
Constant	-0.0106	0.0014	-7.40	**0.000**	-0.0111	0.0016	-6.96	**0.000**
Estimated Consumer Surplus per Visit								
$-1/\beta_{TC}$	**94.25**				**90.32**			

Table 85. Motorized Zero-Inflation Stage & Frequency Stage Regression Results

> Once A Week = 110	***Est.***	***S.E.***	***t***	***P>|t|***
Zero-Inflation Step				
Age – 25 to 34	-0.4182	0.415	0.415	0.415
Age – 35 to 44	0.0542	0.911	0.911	0.911
Age – 45 to 54	-0.2811	0.651	0.651	0.651
Age – 55 to 64	-1.6168	0.073	0.073	0.073
Age – 65 to 74	-1.6159	0.099	0.099	0.099
Age – Over 75	0.3291	0.773	0.773	0.773
Gender – Female	0.0628	0.851	0.851	0.851
Gender – Other	-28.5403	0.000	0.000	**0.000**
Hispanic	0.1637	0.676	0.676	0.676
Black / Af. American	0.1763	0.775	0.775	0.775
American Indian	0.1353	0.857	0.857	0.857
Asian American	-27.6084	0.000	0.000	**0.000**
Native Hawaiian/P.I.	-10.2663	0.000	0.000	**0.000**
College Graduate	-0.1158	0.734	0.734	0.734
Unemployed	-1.4343	0.057	0.057	0.057
Student	-0.5455	0.476	0.476	0.476
Retired	0.8441	0.254	0.254	0.254
Income – 10k-14k	0.0306	0.966	0.966	0.966
Income – 15k-24k	-1.5178	0.139	0.139	0.139
Income – 25k-34k	-0.6888	0.185	0.185	0.185
Income – 35k-49k	-0.8946	0.115	0.115	0.115
Income – 50k-74k	-0.0640	0.888	0.888	0.888
Income – 75k-99k	-1.0020	0.140	0.140	0.140
Income – 100k-149k	-1.4436	0.071	0.071	0.071
Income – 150k-199k	0.3951	0.643	0.643	0.643
Income – Over 200k	-27.9858	0.000	0.000	**0.000**
Constant	-2.5550	0.000	0.000	0.000
Frequency Step				
Travel Cost	-0.0039	0.0008	-4.79	**0.000**
% Forested	0.1650	0.4450	0.37	0.711
Ave. Slope	0.0575	0.0323	1.78	0.075
Std. Dev. Slope	-0.1146	0.0528	-2.17	**0.030**
Ave. Max. Temp.	0.0091	0.0140	0.65	0.516
Mot. Trail Miles	0.0000	0.0000	0.23	0.820
Age – 25 to 34	0.4232	0.1665	2.54	**0.011**
Age – 35 to 44	0.5346	0.1777	3.01	**0.003**
Age – 45 to 54	0.4306	0.1975	2.18	**0.030**
Age – 55 to 64	0.4065	0.2309	1.76	0.079
Age – 65 to 74	0.4755	0.2824	1.68	0.093
Age – Over 75	0.0917	0.6729	0.14	0.892
Gender – Female	0.0271	0.0980	0.28	0.782
Gender – Other	-1.4037	0.2827	-4.97	**0.000**
Hispanic	-0.0548	0.1093	-0.50	0.616
Black / Af. American	0.0365	0.1454	0.25	0.802
American Indian	-0.1056	0.2141	-0.49	0.622

> Once A Week = 110	***Est.***	***S.E.***	***t***	***P>|t|***
Asian American	0.3373	0.2281	1.48	0.140
Native Hawaiian/P.I.	-1.5777	0.1345	-11.73	**0.000**
College Graduate	-0.0180	0.1023	-0.18	0.860
Unemployed	0.0791	0.1858	0.43	0.670
Student	0.5384	0.2211	2.43	**0.015**
Retired	-0.3035	0.2149	-1.41	0.158
Income – 10k-14k	0.1646	0.2632	0.63	0.532
Income – 15k-24k	-0.2513	0.2045	-1.23	0.220
Income – 25k-34k	-0.2558	0.1968	-1.30	0.194
Income – 35k-49k	-0.2681	0.1865	-1.44	0.151
Income – 50k-74k	0.2528	0.1806	1.40	0.162
Income – 75k-99k	-0.0599	0.1914	-0.31	0.754
Income – 100k-149k	-0.0285	0.2029	-0.14	0.888
Income – 150k-199k	0.1537	0.3401	0.45	0.651
Income – Over 200k	0.5988	0.2590	2.31	**0.021**
Constant	2.2737	1.2449	1.83	0.068
Estimated Consumer Surplus per Visit				
$-1/\beta_{TC}$	**259.17**			

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