# TRANSPORT ON TRAILS:

## A CYCLIST TYPOLOGY STUDY OF ANCHORAGE'S GREENBELT TRAILS

Supervised Research Project Report
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May 15, 2020

# ACKNOWLEDGEMENTS

This project was made possible through support from the Sciences and Humanities Research Council of Canada (SSHRC). Special thanks to Barrett Hedges and the Eco-Counter Montreal team for the training on counter data and project inspiration. I am grateful to the Anchorage Park Foundation, the Municipality of Anchorage Parks and Recreation and Traffic departments, and Bike Anchorage for their support of the project and assistance distributing the survey. And thank you to the enthusiastic group of Anchorage cyclists who donated their time to answer the survey questions.

Many thanks to Professor Ahmed El-Geneidy, whose communication and supervision never wavered even during the most unprecedented situation. To Gladys Chan, thank you for never missing a beat. Finally, endless gratitude to my family and friends for their emotional support from all corners of the continent.

# POLICY BRIEF

*THE ISSUE*

The Municipality of Anchorage, Alaska and many local partner organizations share a goal to increase transport cycling rates in order to improve quality of life and reduce vehicle trips. Cyclist traffic pattern data collected by permanent automated counters indicate that Anchorage's greenbelt trails support both transport and recreational travel, but no specific studies have attempted to classify cyclist types or understand the scope of cycling for transport on Anchorage Trails.

*METHODS AND DATA*

Drawing on vetted cyclist typology frameworks, this study gathered data from 255 Anchorage cyclists via an online survey. A principal component factor analysis followed by a cluster analysis is used to generate a cyclist typology for Anchorage Trails and reveal factors that influence cyclists and their propensity toward transport or recreational cycling. The data is then analyzed alongside trail counter data to learn more about greenbelt path cyclists.

*FINDINGS*

Despite their design to serve recreational users and their alignment with natural features, Anchorage Trails offer sustainable, healthy modes for daily travel and protect cyclists from vehicle traffic. While cyclists use the greenbelt paths most often for fun and exercise, survey and trail counter data confirm a substantial presence of transport cycling on Anchorage Trails, especially Chester Creek Trail. Four types of cyclists emerged from the survey data with distinct behaviors and preferences: confident commuters, fairweather cyclists, cyclists-of-all-trades, and social recreationalists. Confident commuters and cyclists-of-all-trades comprise about 40% of this sample and use Chester and Campbell Creek Trails as commuting corridors multiple times a week during peak season. Fairweather cyclists are a younger and majority female group who are concerned about winter weather and safety on the trails. Social recreationalists are an older group who value the social aspects of cycling and are concerned about secure bicycle parking. The typology results confirm the mixed utilitarian and recreational patterns seen from the permanent trail counters and provide insight into heterogeneous populations using the trails.

*RECOMMENDATIONS*

This study equips professionals in Anchorage with evidence to bolster policy and infrastructure interventions related to transport cycling on Anchorage greenbelt paths. The following policy and physical interventions are recommended to help more Anchorage residents use trails for commuting and running errands on bicycle:

- **Revitalize land use** and **promote commercial development** around the Chester Creek Trail to make the trail safer and more useful for running errands.

- Connect Anchorage Trails to **on-street bicycle infrastructure** that is segregated from vehicle traffic by grade-separated barriers (raised medians, planters, or greenery) and kept clear of snow in winter.

- Improve fluid **trail connectivity between South Anchorage and Downtown**, offering safe ways to travel through the Midtown commercial area.

- Create a **safe crossing on the Campbell Creek Trail at Lake Otis** to reduce risk and encourage use.

- Encourage employers and businesses to **provide secure bicycle parking options.**

- Promote bicycle commuting through w**orkplace partnerships and social initiatives**, especially those that focus on women and transport cycling.

Anchorage Trails pose a clear opportunity for residents to complete everyday trips on bicycle. This study provides new and timely data about cycling populations using Anchorage Trails that can guide resource investments for planners and bicycle advocates.

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# 1. INTRODUCTION

## CONTEXT

Birch trees rustle overhead, snow-capped peaks greet you across the inlet, a bull moose crosses your path: while cycling along one of the paved greenbelt paths in Anchorage, Alaska, it can be easy to forget you are in the middle of the state's largest city (Figure 1). While these paths – known locally as Anchorage Trails – are marketed and used for diverse types of recreational activities, paths separated from vehicle traffic can act as transport corridors that help cyclists reach everyday destinations, improve health, and reduce car trips (Oja et al., 2011). In order to learn more about how many people use the trails, the Municipality of Anchorage deployed permanent automated counters beginning in 2014 that record volumes of cyclists at 15-minute intervals. Cities can also use volume data to classify travel patterns as utilitarian, mixed, or recreational, helping transport planners better understand bicycle facility user populations, prioritize trail maintenance, and guide project planning (Miranda-Moreno et al., 2013).

The 2010 Anchorage Bicycle Plan, part of the municipality's non-motorized transport plan, describes the greenbelt trails as primarily intended for recreational users. They were designed to follow natural watersheds rather than connect to destinations, and they accommodate many slower-moving users like pedestrians. However, the count data from the three most popular Anchorage Trails – Chester Creek, Coastal, and Campbell Creek – each show distinct patterns and suggest a mix of cyclist user types (Figure 2). The distinct peaks during morning and evening commute times suggest that the Chester Creek Trail is an important commuting corridor. The gradual increase to a midday peak on the Coastal

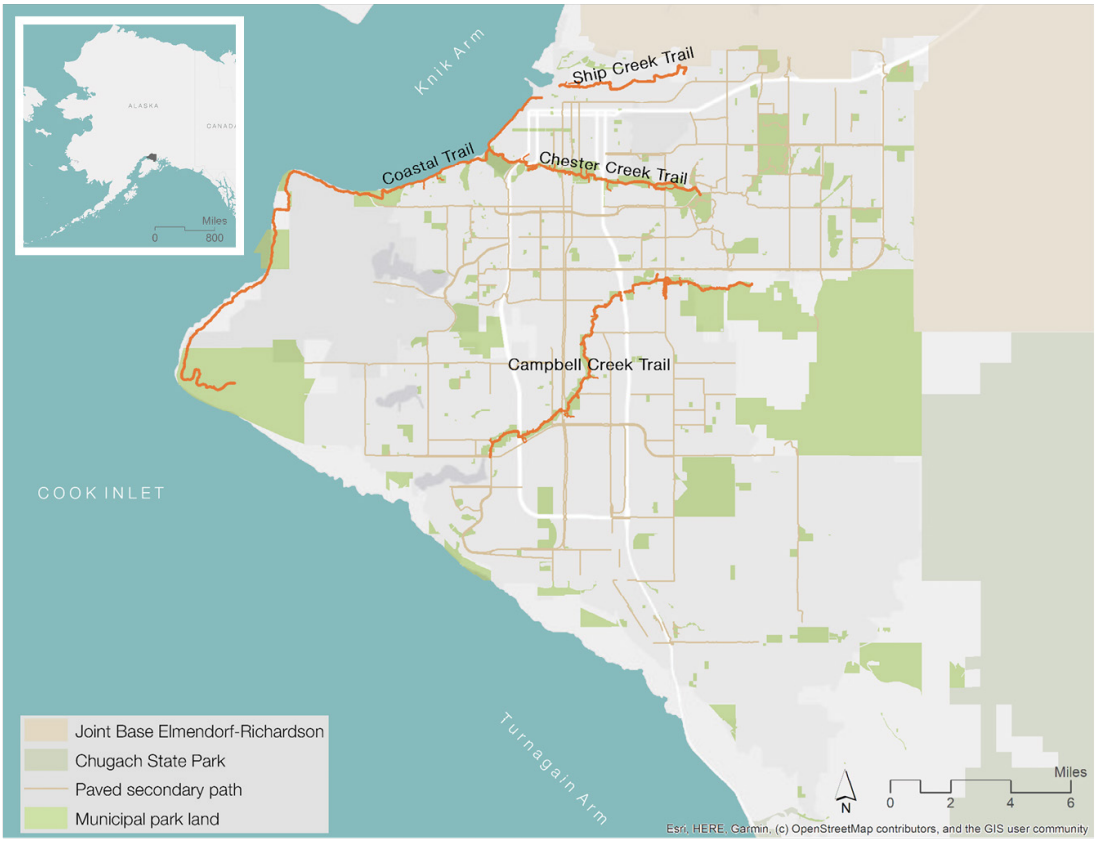


**FIGURE 1: Greenbelt multi-use trails in the Municipality of Anchorage, Alaska**

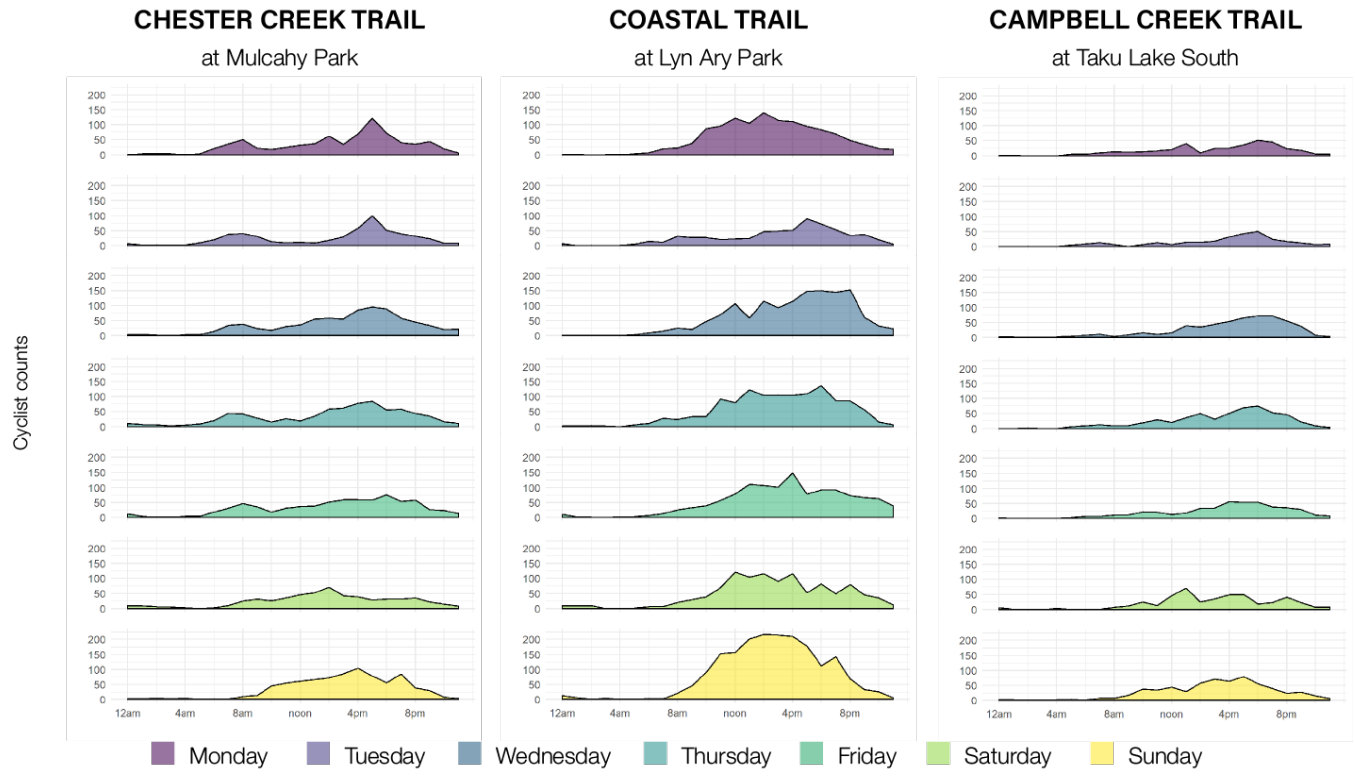


**FIGURE 2: Peak season hourly cyclist counts by day of the week and trail (June 17 - 23, 2019)**

Trail reflects the recreational and scenic quality of this trail, and Campbell Creek Trail shows lower volumes and a mixed hourly pattern. Examining these count patterns alone may overlook the heterogeneity of cyclists' motivations, habits, and preferences, but further study could help specify how many utilitarian cyclists use the trails. A deeper understanding of what motivates cyclists to use Anchorage Trails could help many organizations and municipal planning initiatives reach their goals to increase trail use and contribute new knowledge about transport cycling on trails.

Researchers often use cyclist typology analyses to break down a regional or local cycling population into categories. Typology studies show that recreational and transport cyclists differ in their preferences for infrastructure type and its connectivity and access to destinations (Damant-Sirois et al., 2014; Kroesen & Handy, 2014; Larsen & El-Geneidy, 2011). Currently in Anchorage, Bike to Work Day surveys are the main source of additional data about transport cyclists. With transport cycling becoming a growing focus for Anchorage, understanding more about the typologies of cyclists on Anchorage Trails could help planners and active transport advocates adequately tailor program and infrastructure interventions to the populations using the trails.

## RESEARCH QUESTIONS AND METHODOLOGY

To complement the robust cyclist volume data maintained by the municipality, this research project aims to understand how frequently cyclists use Anchorage Trails for recreational versus transport trips, and how cyclists' trail preferences, resilience to weather, and socioeconomic factors relate to their travel patterns. This project employs a survey of Anchorage cyclists' behaviors, motivations, preferences, and personal factors in order to create a multidimensional cyclist typology of Anchorage Trails. The survey asks about trip purpose and how trip purpose affects behavior, such as frequency of cycling and resilience to weather (Appendix A and B). The questions are modeled from similar studies conducted in Montreal through the Transportation Research at McGill (TRAM) group and are informed by the author's local knowledge of Anchorage and personal communications with local cycling

advocates. The survey provides data for a principal component factor analysis followed by a k-means cluster analysis that can reveal the most significant groups of variables in the survey and identify groupings of cyclists with similar behavior and preferences.

## DESIRED OUTCOMES

The result of the survey and the typology analyses will be a more robust profile of Anchorage Trails travel patterns and user populations. Anchorage park and transport planners can use the results of this project to ensure that trail infrastructure reflects the different needs of Anchorage cyclists. Government and trail advocacy professionals will be able to use the automated count data more fluently in their work to articulate the value that greenbelt trails add to Anchorage and describe the populations who will benefit from different interventions. The municipality can use the findings to expand support for active transport planning initiatives and help partners pursue relevant policy and infrastructure goals to increase cycling on Anchorage Trails. This project also has implications beyond the local Anchorage context. This type of study can be an example for cities seeking to increase value of their count data, enhance understandings of cycling patterns, and improve cycling infrastructure and programs.

## PROJECT OUTLINE

Chapter 2 will summarize the highlights of existing transportation research about cyclist motivations and typologies and explains how cities can use typology studies to make decisions about infrastructure and policy. In Chapter 3, the counter data is examined in further detail alongside a review of Anchorage's built environment and active transport planning initiatives. Chapter 4 describes the survey and multivariate analyses used to answer the research questions and create a cyclist typology. Chapter 5 reveals the survey and typology results and synthesizes these findings in a discussion of important themes. Chapter 6 concludes the project with a brief synthesis of the project findings and intervention recommendations, acknowledges the strengths and limitations of this research, and lays a groundwork for next steps for research and action.


**FIGURE 3: Pedestrians walk along the Campbell Creek Trail**

# 2. LITERATURE REVIEW

Cyclists are heterogeneous populations with unique preferences and respond differently to external factors. For example, cyclists wanting to get exercise in nature may prefer different types of infrastructure than those commuting to work or running errands (Badland et al., 2013; Heesch et al., 2012; Pikora et al., 2003). Weather, the urban environment, and socioeconomic factors also influence cycling behavior. This study aims to propose a typology of Anchorage cyclists who use greenbelt paths to help the municipality and cycling advocacy organizations understand the factors influencing the cycling traffic patterns seen in the counter data. The following literature review summarizes previous cyclist typology research and explains how cities can use typology studies to make decisions about infrastructure and policy.

## CYCLIST TYPOLOGY STUDIES

By studying cyclist behavior in categories, or typologies, cities can better demonstrate bicycle infrastructure expansion and investment. One prolific example is a typology developed by Roger Gellar for the City of Portland in 2006, which surveyed residents about their comfort cycling on different types of bicycle facilities. Gellar found four categories ranging from the "no way, no how" group – unlikely to cycle for a variety of reasons – to the "strong and the fearless" cyclists who are comfortable cycling alongside traffic (Dill & McNeil, 2013). Gellar's typology guides a number of city plans and offers a conceptual frame for which to think about the range of cyclist markets (Dill & McNeil, 2013). However, he admits that his approach is subjective and based purely on people's perceptions of bicycle facilities. Dill & McNeil's (2013) follow-up study of this typology demonstrates its limited ability to adequately capture the behavior of Portland cyclists.

Transport researchers continue to experiment with other methods for developing cyclist typologies and understand how trip purpose relates to cycling behavior. Using spatial and longitudinal data from a Dutch study, Krosen & Handy (2014) found that people who cycled for commuting and recreation had more stable travel behaviors than those only cycling to work. Larsen & El-Geneidy (2007) found that recreational, infrequent cyclists are more likely to go out of their way to use bicycle facilities segregated from traffic in Montreal, Canada. Damant-Sirois et al. (2014) use principal component factor analysis to form a typology based on over 2,000 survey respondents in Montreal who answered questions about cycling behavior and preferences. In this study, trip speed motivated 68% of people who always cycled to work or school, emphasizing the importance of direct and convenient routes for commuter cycling frequency (Damant-Sirois et al., 2014).

Typology analyses can also incorporate weather and climate, which can have a strong influence on cycling behavior in cities with harsh winters or heavy precipitation. In studying Swedish workplaces, Bergström and Magnusson (2003) found that winter cyclists were concerned with getting exercise while summer-only cyclists had concerns with temperature and road conditions. Commuters may be more resistant to bad weather than recreational cyclists due to strong habits or the convenience of cycling over other modes (Richardson, 2006). Treating all utilitarian cyclists as hearty riders may overlook important sub-populations, however, as Damant-Sirois et al. (2014)'s findings show that both cyclists motivated by enjoyment and cyclists motivated by convenience can be affected by bad weather. Understanding how populations react differently to weather could help cities maintain higher rates of winter cycling (Tilahun et al., 2007). Bergström and Magnusson (2003) suggest snow clearance as a maintenance measure to improve winter cycling frequency, but Damant-Sirois et al. (2014) posit that plowing bicycle lanes may only improve rates of cycling among those who already frequently

commute, since the snowy weather itself deters many cyclists. Employer-based cycling initiatives may also be able to mitigate some of the seasonal variation of bicycle commuting (Cleary & McClintock, 2000).

## HOW CAN CITIES ACT ON KNOWLEDGE ABOUT CYCLING POPULATIONS?

Cities can use knowledge of local cycling populations to make decisions about the type and placement of bicycle infrastructure. In U.S. cities, increased presence of infrastructure is associated with higher rates of bicycle commuting (Dill & Carr, 2003). Bicycle infrastructure can range from on-road interventions (like a painted lane or shoulder) to off-road dedicated paths that provide a traffic-free experience. Separated bicycle paths, much like the Anchorage greenbelt trail system, recur in the literature as highly desirable for both transport and recreational cyclists (Heesch et al., 2012; Tilahun et al., 2007). The separation from motor vehicle traffic helps cyclists feel safe and may even draw cyclists away from their shortest possible route, especially if they are traveling relatively longer distances (Dill, 2009; Krizek et al., 2007; Larsen & El-Geneidy, 2011). Separated infrastructure also appeals more to infrequent cyclists, suggesting that its construction may increase uptake from non-cyclists (Larsen & El-Geneidy, 2011). On-street bicycle lanes with clear markings and signage on streets can also promote a sense of safety and convenience and are less costly than separated paths (Damant-Sirois et al., 2014). Cities must weigh the costs and benefits of infrastructure with the preferences and behaviors of cyclists in their region.

Qualities of an urban environment like land use mix, density, existing cycling culture, and supportive amenities also change the appeal of bicycle infrastructure. For example, shorter trip distance and proximity to major destinations is associated with higher cycling rates (Fraser & Lock, 2010; Heesch et al., 2015). How close people live to bicycle infrastructure appears to have a “dosage effect” for commuter cycling rates, with every unit closer to the intervention associated with a higher likelihood of cycling to work (Panter et al., 2016; Prins et al., 2016). Studies tracking cycling behavior before and after residential relocation show that higher neighborhood density -- both real and perceived -- is related to increased rates of transport cycling (Beenackers et al., 2012). New infrastructure that feeds into or creates comprehensive networks allow for a larger portion of a city’s residents to reach more employment areas and destinations (Goodman et al., 2013b; Hirsch et al., 2017; Krizek et al., 2009). While it may be difficult to change land use near existing infrastructure, planners can build new infrastructure near commercial and residential areas in order to increase visibility of the intervention, to be perceived as more welcoming and safer, and to provide access to everyday destinations (Sahlqvist et al., 2015). Programs and institutional encouragement may provide extra encouragement to populations who are already poised to cycle to work. Researchers highlight successful examples of employers offering personalized trip planning and social encouragement to bicycle commuters (Bourke et al., 2018; Goodman et al., 2013a). Availability of bicycle parking, lockers, and showers at work locations can also make cycling more attractive (Bourke et al., 2018; Goodman et al., 2013a). Alongside the construction of bicycle facilities, transport planners can enact supportive policies and urban environments as mechanisms that encourage people to cycle.

## KNOWLEDGE GAPS AND CHALLENGES

Dividing cyclists into typologies can help planners learn the nuances of local populations and provide helpful evidence for planning bicycle infrastructure. In developing these categories, cities should also assess common interests and strategies for increasing cycling rates for all types of cyclists. For example, recreational cyclists may be well-positioned to start commuting by bicycle, and efforts that focus on cycling to work have the power to “spill over” to recreational cyclists (Dill & McNeil, 2013; Kroesen & Handy, 2014).

Cyclist typologies must also consider how social determinants enable or deter people from cycling in the first place. Socioeconomic status may prevent

someone from owning a car, making a bicycle a necessity rather than a choice. Gender is a recurring determinant of transport cycling, with women less likely to be transport cyclists in existing studies (Badland et al., 2013; Heesch et al., 2015; Heesch et al., 2012; Pedroso et al., 2016). The 2017 American Community Survey also found that women comprise less than one-third of all commuter cyclists in the nation (U.S. Census Bureau, 2017). The influence of one's social network could have a substantial effect on transport cycling, demonstrated by Dill & McNeil's (2013) survey where over half of respondents who cycled for transport lived with other transport cyclists. Programs that encourage bicycle commuting through workplaces and social initiatives may be especially influential by promoting cycling-friendly culture (Bourke et al., 2018; Goodman et al., 2013a). It is clear that a city hoping to increase transport cycling will need to consider how their interventions will mitigate or perpetuate the social determinants of cycling.

One challenge for future research named by Dill & McNeil (2013) is that actual cyclist behavior differs from self-reported comfort and interest, the latter of which often forms the basis for cycling typologies. Thus, analyzing and comparing actual cyclist traffic volumes alongside self-reported behavior could provide a more nuanced and realistic understanding of how different cyclists use bicycle facilities. With this knowledge, planners can match bicycle infrastructure development to actual data and knowledge about populations using the trails.

**FIGURE 4: View of Cook Inlet and Mount Susitna from the Coastal Trail**

# 3. STUDY CONTEXT

## WELCOME TO ANCHORAGE: PEOPLE, CLIMATE, AND URBAN ENVIRONMENT

Anchorage is home to 40% of the population in the entire state of Alaska, with an estimated 291,538 residents in 2018 (U.S. Census Bureau, 2018). The city is geographically isolated from other urban areas but home to some of the most ethnically diverse zip codes and public schools in the United States.[1] Located at a high northern latitude, Anchorage is a winter city that sees dramatic changes in daylight hours between the summer and winter solstices – 19 hours of daylight in June diminishing to 5.5 hours in December. Summers are generally mild in Anchorage, but 2019 was the hottest year on record, setting all-time records with temperatures up to 90°F, compared to the average July high temperature of 65°F. Most precipitation falls between July and October, and snow falls between October and April with an annual mean accumulation of 74.5 inches. The coldest month on average is January, with a mean high and low temperatures of 23/11°F.[2]

Anchorage saw most of its urban expansion in the late 1970s and early 1980s after the discovery of oil and major federal lands designations brought a wealth of job opportunities to the young state (Markon, 2003). The city's development followed the major road network and reached the Anchorage Bowl's natural boundaries: the rugged terrain of the Chugach Mountain range to the east and Cook Inlet and Turnagain Arm to the west and south (Figure 1). Developable land is now limited while the general density remains low. There are three geographic employment clusters in Anchorage: Downtown, the university-medical (UMED) district, and the Midtown commercial area.[3] These are interspersed with single family and multifamily housing units – mostly separate from commercial corridors – and abundant city parks and natural space.

On-street bicycle infrastructure is limited in Anchorage but includes some bicycle lanes, shared-use roadways, and paved shoulders. Off-street infrastructure is more common, with over 120 miles of separated paths and greenbelt trails. Most of the separated paths run

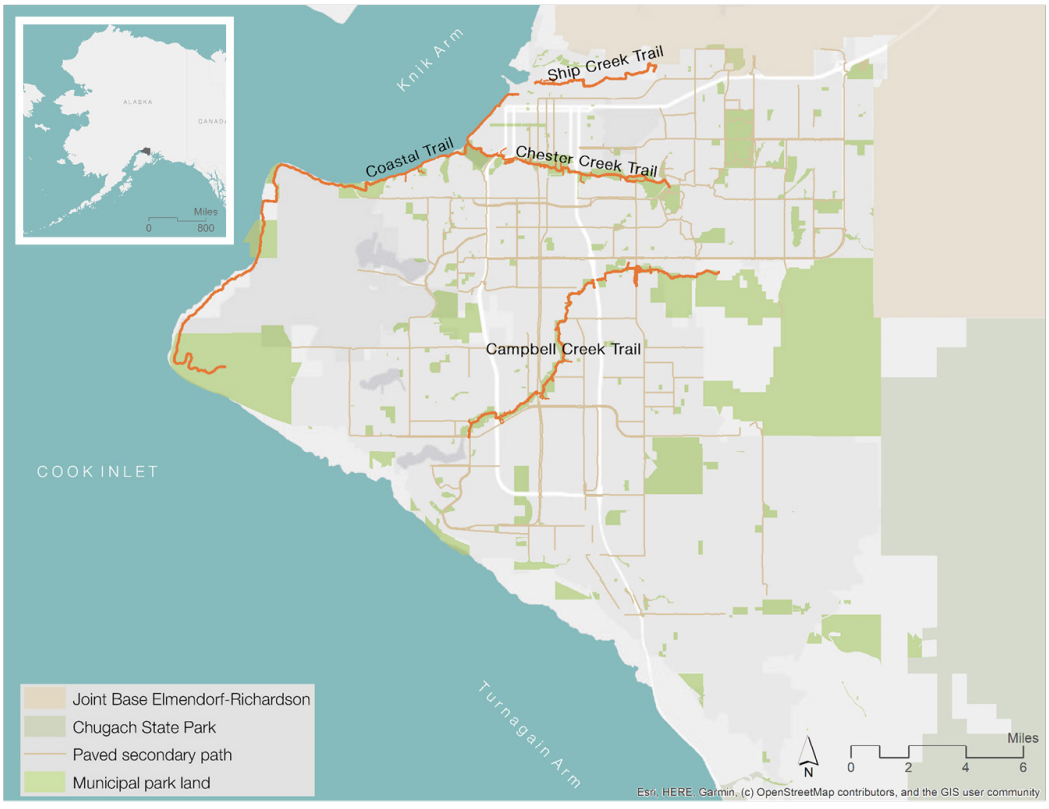


**FIGURE 1: Greenbelt multi-use trails in the Municipality of Anchorage, Alaska**

**1** In 2019, non-white and biracial/multiracial students comprised 58% of the Anchorage School District student population, and 20% percent of students reported speaking languages other than English at home.

**2** National Climatic Data Center

**3** Anchorage 2040 Land Use Plan Map

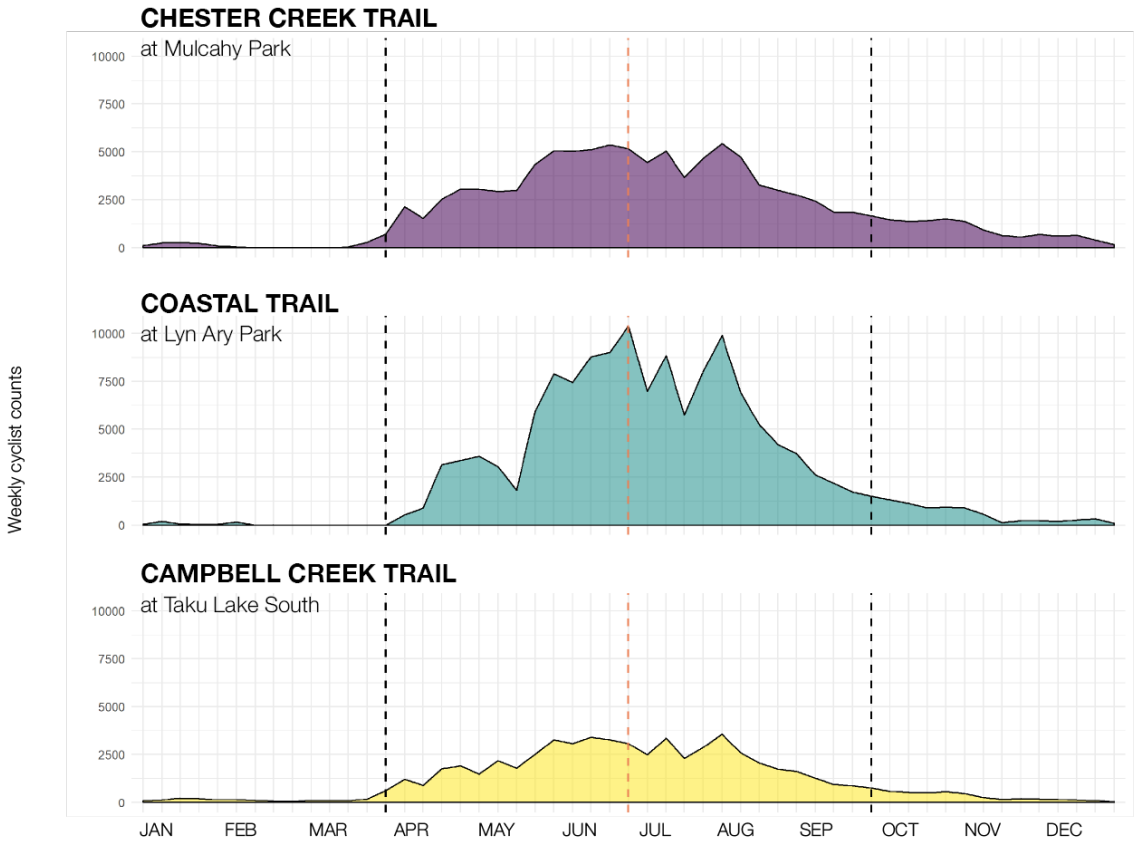


**FIGURE 5: Weekly cyclist counts in 2019 by trail**

along major transport corridors, but contrary to the greenbelt trails, separated paths must cross conflict points like driveways and intersections and the paths are often not marked with wayfinding signage. The Anchorage Bicycle Plan acknowledges that access to separated bicycle facilities is not equal among all Anchorage neighborhoods and districts; for example, Midtown Anchorage is an unfriendly area to utility cyclists due to its lack of on and off-street bicycle infrastructure and higher traffic speeds.[4]

The greenbelt trail system originated while much of Anchorage's development was happening in the early 1970s. Cycling advocate Lanie Fleischer led efforts to construct the first east-west paved trail along the Chester Creek watershed flowing from the Chugach Mountains to Cook Inlet in 1974. Almost five decades later, the Anchorage Trails system includes four major trails: the Tony Knowles Coastal Trail (11 miles), Lanie Fleischer Chester Creek Trail (4 miles), Campbell Creek Trail (8 miles), and Ship Creek Trail (< 3 miles) (Figure 1).[5] These trails connect various residential areas in Anchorage to Downtown and the UMED district, two of the city's employment hubs. They also connect people to major recreation destinations like the Westchester Lagoon and Kincaid Park. The Coastal Trail is particularly popular with visitors, who are treated to views of the water, wildlife, and the immense Alaska Range across the inlet.

## CYCLISTS IN ANCHORAGE

The municipality maintains two main sources of data on cyclists: traffic volumes from permanent automated counters and absolute counts and survey data collected during Bike to Work Day events. Recognizing the greenbelt trail system as an asset for informing health, recreation, and transportation plans, the Municipality of Anchorage deployed the permanent counters on the trails starting in 2014 that record volumes of cyclists and pedestrians at

**4** Anchorage Bicycle Plan – Proposed Bicycle Network Map, Anchorage Metropolitan Area Transportation Solutions

**5** Fish Creek Trail is a shorter, less well-maintained greenbelt path that has attracted funding and advocacy in recent years for its potential to connect the Turnagain Neighborhood in West Anchorage to the more extensive Coastal Trail and become a viable part of the system.

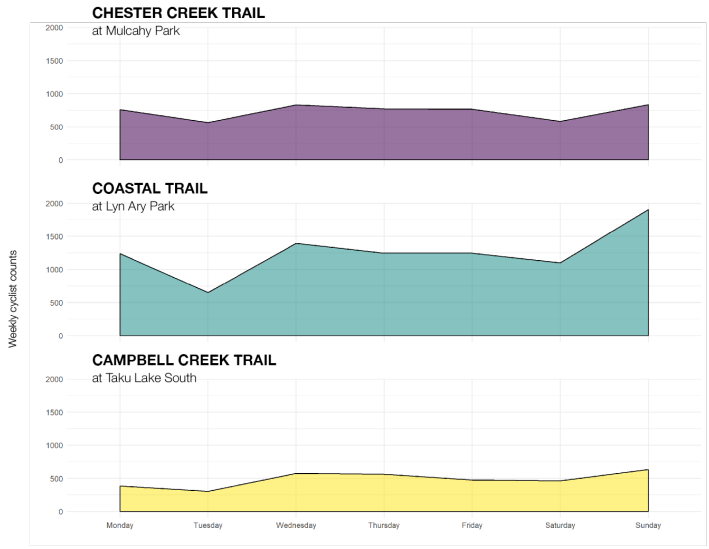


**FIGURE 6: Daily cyclist counts by trail, June 17 - 23, 2019**

15-minute intervals.[6] The municipality publishes trail volume count data every year in a traffic report and makes the data available online for download.

Looking at the counter data at various scopes provides an overview of how cyclists use Anchorage Trails for recreation and transport. Figure 5 shows weekly counts on Anchorage Trails throughout 2019. Anchorage bicycle counts begin to climb in April, when temperatures begin to rise and the municipality starts to plow the melting trails. Counts ramp up in May and reach a peak in July, tailoring off in September and October, when the first snow flurries arrive. The Coastal Trail sees the highest volumes in peak season with over 10,000 weekly cyclists reported the week of July 1, 2019. The Chester Creek Trail shows a more stable ridership after peak season through December, indicating its use by locals. Campbell Creek Trail shows lower ridership overall with less dramatic peaks in the summer, also reflecting a more local user population.

Figures 2 and 6 take a closer look at this data during a June week with normal weather to see how the bicycle count patterns align with the four categories presented in Miranda-Moreno et al.'s (2013) classification analysis: primarily utilitarian, mixed utilitarian, mixed recreational, and primarily recreational. Figure 6 shows the daily count comparison by day of the week. The Coastal Trail shows the most dramatic peak in ridership on the weekends with a more subtle Sunday peak for the Chester and Campbell Creek Trails. Overall, Chester and Campbell Creek Trails see less change between weekdays and weekends. All three trails saw highest counts Sunday and the lowest on Tuesday, but it is clear that the Coastal Trail resembles a stronger recreational pattern with the other two trails appearing mixed.

In Figure 2, it is possible to compare the hourly traffic profile by each day of the week to further our understanding of the bicycle traffic patterns.[7] Chester Creek is a great example of the mixed utilitarian profile with two weekday peaks: one around 8am and a higher one around 5p.m. The Coastal Trail meets the mixed recreational category: on weekdays, the hourly counts increase to a peak anywhere between 2 and 8p.m., and the weekend counts are slightly higher overall with a steeper increase to the afternoon peak. Campbell Creek Trail also leans toward mixed recreational with gradual peaks on weekdays and weekends between 1 and 5p.m. and not as much change in ridership between the weekdays and weekends.

The ability to commute by bicycle using the greenbelt trail system is celebrated and marketed by the municipality during annual summer and winter Bike to Work Day events, coordinated by non-profit Bike Anchorage and the municipality's environmental health division. The 2017 American Community Survey estimates that biking to work makes up 1.1% of the commuting population in Anchorage, or close to 1700 people. Participation in Bike to Work Day has increased since 2009 with the average respondent being 41 years old and the sample being 54% female (Barry, 2019). In a report on 2019's event and survey results, the Chester Creek Trail saw the highest counts during Bike to Work Day, which matched the survey respondents' origin-destination data, showing that most respondents' residence and place of work fell along the east-west corridor. In 2019, 62% of cyclists surveyed at this most populous location reported using a route that diverted from the most direct path. When asked how long it would take to commute to work

**6** Anchorage Traffic Report and counter locations

**7** Since Ship Creek Trail does not have a permanent trail counter, it is excluded from the visualizations of trail counter and trip purpose data for simplification.

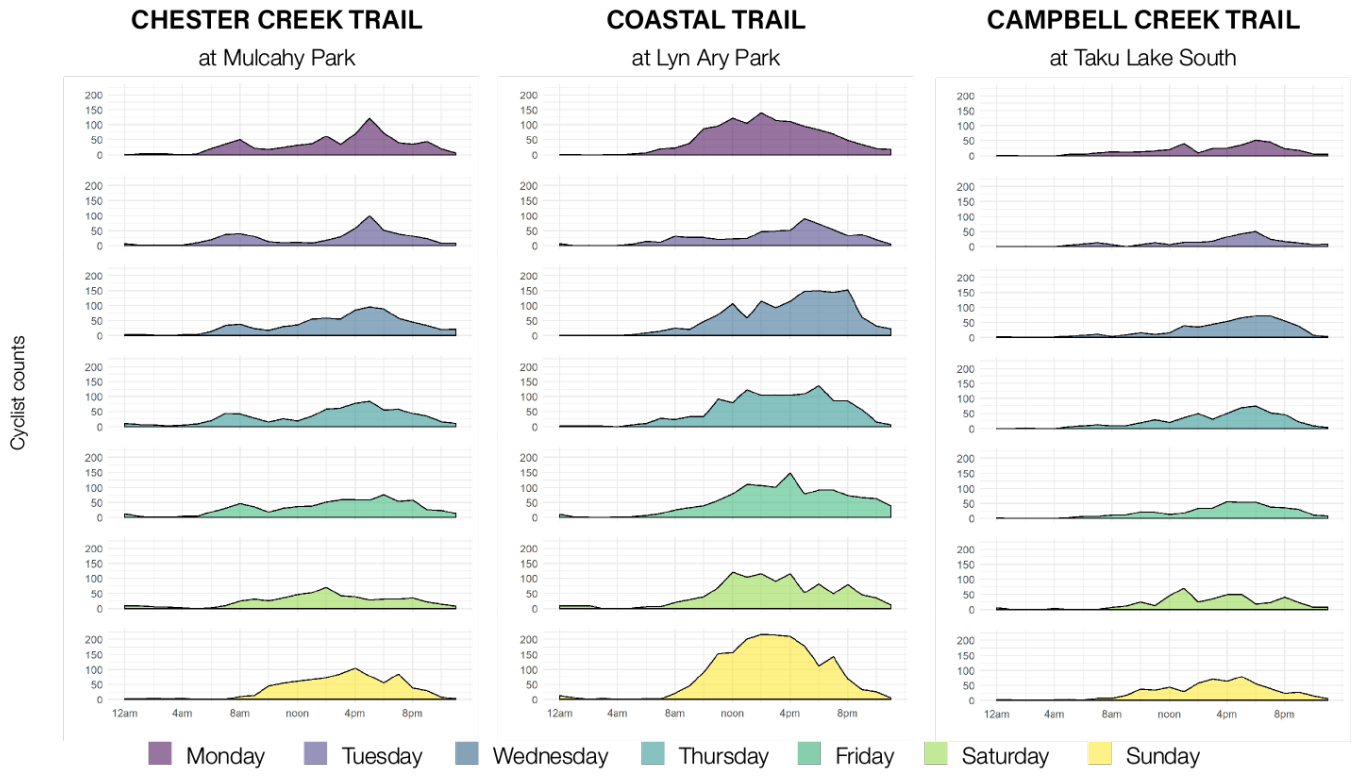


**FIGURE 2: Peak season hourly cyclist counts by day of the week and trail (June 17 - 23, 2019)**

in a car, the average response was 15 minutes; the average bicycle commute length was 31 minutes, and most respondents cycled to work three days per week. While the sample was whiter and more highly educated than the general Anchorage population, the findings from Bike to Work Day studies reveal a dedicated commuting population that are willing to extend their commute time in order to cycle on the greenbelt trails.

There are no existing typology studies of Anchorage cyclists and limited data on what motivates people to use the greenbelt trails. Both the 2014 Regional Household Travel Survey and the 2019 Bike to Work Day survey found that the most frequent reason to ride a bike was to exercise (Anchorage Metropolitan Area Transportation Solutions, 2014). To encourage more cycling among locals, non-profits and the municipality host a number of engagement programs and educational initiatives. In 2018, Bike Anchorage started enticing commuters by hosting treat stations Friday mornings on the trails. The Anchorage Museum partners with Bike Anchorage to host free social Summer Bike Tours around the city. Other organizations in Anchorage focus on helping youth build cycling confidence, like Anchorage GRIT, a program that mentors young women in how to safely and confidently ride mountain bicycles.

## ANCHORAGE TRAILS AS TRANSPORT CORRIDORS

Anchorage Trails are used simultaneously as recreational and transport corridors – in addition to cyclists, the trails are designated multi-use to also accommodate walkers and joggers, along with ski joring, dog mushing, and cross-country skiing in the winter. In envisioning Anchorage as the #1 city to live, work, and play by 2025, the Anchorage Economic Development Corporation describes a vision of a trail system robust enough to allow “anyone in the city [to] commute by bike to work and ride those same trails for recreation” (Anchorage Economic Development Corporation, 2015). Anchorage land use plans identify broken trail connections and prohibitive street grid designs as barriers to integrating the trails as transportation corridors. The Lake Otis Crossing is one example of a break in the otherwise continuous Campbell Creek Trail that is a focus for local park and trail advocates. While recent projects aim to

improve bicycle lane visibility with paint and signage, there are no examples of separated bicycle lanes on streets in Anchorage other than double-striped bicycle shoulders. Connectivity from the trails to streets with bicycle lanes is also limited. Anchorage's Vision Zero chapter conducted a survey in 2016 of 503 Anchorage residents showing that around 60% of respondents reported low satisfaction with cycling safety, suggesting that the greenbelt trails are even more important for their separation from traffic.

Despite these known barriers, the present moment is opportune for Anchorage to make transport cycling more viable. In February 2020, the Anchorage Assembly passed a resolution supporting increased federal investment in active transport infrastructure in order "to link trails, sidewalks, and bicycle facilities into a seamless system for community mobility."[8]

**8** AR 2020-42

To accommodate new households, the Anchorage 2040 Land Use Plan outlines a number of goals and strategies to promote higher-density living and active transport, including infill and mixed-use development, forming trail connections, complete street projects, and encouraging development around the greenbelt trails. In addition, the city and core stakeholders such as Bike Anchorage, the Anchorage Park Foundation, the Anchorage Economic Development Corporation, and the University of Alaska Anchorage share visions to promote climate resilience, revitalize the downtown economy, and improve health outcomes, and increasing cycling for transport is one action that meets these goals simultaneously. These shared goals are formalized through a number of plans and working groups described in Table 1.

While the municipality currently uses and publishes the cycling traffic count data to help prioritize trail maintenance and guide project planning, the counters

**Table 1. Relevant plans, actors, and strategies**

| PLAN / AGENCY | GOALS AND STRATEGIES |
|---|---|
| **Anchorage Bike Plan 2010** | - Double the amount of utility bicycling<br>- Establish Trail-to-Trail routes to provide connections between greenbelt trails and other separated paths for utility cyclists |
| **Anchorage Non-Motorized Plan** | - Increase bicycle facilities (e.g. miles of infrastructure) and the use of bicycles for transportation |
| **Anchorage 2040 Land Use Plan** | - Implement greenbelt-supported development corridors, complete streets, and mixed-use development |
| **Anchorage Trails Initiative** | - Market trail connections and everyday destinations through the 33-mile Moose Loop<br>- Address trail connectivity to neighborhoods<br>- Connect people to parks and trails through healthcare, workplace wellness, businesses, and active school programs |
| **Anchorage Economic Development Corporation: Live. Work. Play.** | - Trails can revitalize neighborhoods through increased property values and enhanced quality of life |
| **Vision Zero** | - Prioritize transport improvement projects on high pedestrian/bicycle injury corridors<br>- Promote safer road design and active-friendly routes |
| **Anchorage Assembly** | - AR 2020-42: Encourage federal development in active transport infrastructure |
| **Anchorage Climate Action Plan** | - Fund and implement policies and projects recommended in the Anchorage Non-Motorized Plan<br>- Promote the use of transportation modes other than single- occupancy vehicles (e.g. expanding Bike to Work Day) |

**FIGURE 7: Chester Creek Trail in winter**

are well-maintained and provide a robust source of primary data for expanded research about the cycling trends and patterns seen on Anchorage greenbelt trails. The results have potential to inform recent major planning initiatives undertaken by the municipality to promote active transport. Specifically, count data analyzed along with cycling motivation and preference data can produce more complex understandings about how external and personal factors affect people's choice to cycle.

Thus, this project seeks to develop a multifaceted analysis of the current use patterns of Anchorage Trails and describe how count data and cycling typologies can inform planning for the trails as transport corridors. With excellent cycling traffic data, quality trail infrastructure, and a municipal context eager to strengthen residents' abilities to travel by bicycle, studying how and why cyclists use Anchorage Trails can provide valuable data for guiding infrastructural expansion and trail connectivity projects.

# 4. METHODOLOGY

## SURVEY

Local organizations helped distribute an online survey link to gather data about cyclists' trail cycling habits and preferences to inform the typology analyses (a plain text version is included as Appendix B). The survey was directed at cyclists who are at least 18 years old and who use the greenbelt paths in Anchorage. For respondents to be eligible to proceed with the survey, they confirmed that they had cycled in the last 12 months. Those who had not were asked to mark the reasons they did not cycle. The second eligibility question asked respondents to indicate which of the four greenbelt paths they had used in the last 12 months. Those who had not were asked to indicate why they did not cycle on the trails specifically.

The survey link was sent electronically to key organizations working with cyclists and cycling data, including Bike Anchorage, Anchorage Park Foundation, and the municipality's Parks and Recreation department, all of which have prominent social media platforms. The author also relied on her professional network and knowledge of local context and emailed 18 additional organizations with the survey invitation.

*MEASURES*

The survey includes four main topics: cycling behavior, weather resilience, trail preferences, and personal profile. In order to ensure questions were relevant to the Anchorage context and non-duplicative of existing data, the author consulted with employees who work in active transport advocacy and with the Municipality of Anchorage before designing the survey. Each survey topic is further described below.

**BEHAVIOR**: Respondents indicated what months of the year and what times of day they generally cycle. For each trail and season (summer and winter), respondents indicated how often they cycled on the trail among six different trip purposes. Rather than ask participants to provide their own interpretation of transport versus recreational, the survey offered three specific trip purposes in both categories. Transport trips included to go to work, to go to school, or to run errands; recreational trips included to attend social activities, to have fun, or to exercise.

**WEATHER**: In this section, respondents indicated how strongly different weather events prevent them from cycling using a five-point Likert scale. These questions were modeled after the Montreal typology study developed by Damant-Sirois et al. (2014) and adapted for the specific Anchorage context.

**TRAIL PREFERENCES**: Participants were asked what they like and dislike about the trails and how often they cycle on city streets next to traffic. An open-ended question in this section invited participants to explain any additional thoughts they had about cycling on Anchorage Trails.

**PERSONAL PROFILE**: Participants completed a sociodemographic profile that included geospatial data on where they live and where they work. Participants were asked how many bicycles and cars they own, and questions about self-selection to check for bias. The form also asked questions about how many bicycles the respondent owns to assess their enthusiasm toward cycling and financial resources.

## TYPOLOGY ANALYSES

In order to interpret the survey results and understand how cyclists use the Anchorage Trails, this paper uses a principal component factor analysis to reveal how survey responses relate to one another. This method exposes groups of related variables (factors or components) which offer an interpretation of the patterns seen among survey respondents, rather than assessing the results of each question in isolation. The factors are then used to identify clusters of respondents, or cyclist types, through a k-means

cluster test. Other transport studies employ the same tests for identifying cycling and public transit user typologies. These precedents show how typology categories can help planners understand who uses transport infrastructure and how many users may be within reach to expand sustainable mode share (Krizek & El-Geneidy, 2007; Gatersleben & Haddad, 2010).

# 5. RESULTS

## OVERVIEW

255 complete survey responses are included in this analysis. Respondents were born between 1932 and 1997 and the average respondent is 46 years old. 70.6% of respondents reported riding a bicycle between October and April (winter) and all but one respondent had rode a bicycle between May and September (peak season). 50.2% of the sample is female. The sample is whiter, more educated, and higher income than the general population of Anchorage: 83.1% of respondents were white alone, 46.3% of the sample hold a graduate degree, and another 43.1% had earned an undergraduate degree.

Table 2 summarize trip purposes by trail and season. The percentages indicate how many respondents cycled on the trail for the reason listed at least once a week or more. Cycling to school and cycling to social activities are excluded from this table because of their low response rates. The majority of respondents use the trail system most frequently for enjoyment or to get exercise, but Chester Creek Trail stands out from the other three trails as used frequently for commuting. Ship Creek Trail had the lowest use overall by all respondents, which can be explained by its shorter length and positioning along an industrial corridor in the Port of Anchorage. There is a clear seasonal drop-off for all trip purposes between October and April with 18.9% of respondents commuting at least once a week or more on the Chester Creek Trail.

Figure 8 illustrates that while most respondents indicated that their decision to cycle was not strongly affected by weather events, smoke from wildfires and snow plowing did affect 55% of respondents. Figure 9 shows the trail counter data the week before, during, and after a smoke advisory in the Anchorage Bowl confirms that trail volumes were lower on days with the worst air quality. Respondents were the least concerned about heat and humidity; while the summers in Anchorage are usually mild, this is a noteworthy finding because the summer of 2019 set multiple heat records.

**Table 2: Percent of respondents who cycle at least once a week or more, by trail and trip purpose (n = 255)**

| Trail used | Trip purpose, May through September (% of sample) | | | |
|---|---|---|---|---|
| | *Commuting to work* | *Running errands* | *For fun* | *For exercise* |
| Chester Creek | 30.2% | 18.4% | 65.5% | 63.1% |
| Coastal | 16.9% | 6.3% | 57.3% | 58.4% |
| Campbell Creek | 15.7% | 8.6% | 43.9% | 44.7% |
| Ship Creek | 3.9% | 2.0% | 21.6% | 22.7% |
| **Trail used** | **Trip purpose, October through April (% of sample)** | | | |
| | *Commuting to work* | *Running errands* | *For fun* | *For exercise* |
| Chester Creek | 18.9% | 7.8% | 27.8% | 29.7% |
| Coastal | 5.9% | 2.0% | 22.7% | 25.1% |
| Campbell Creek | 9.0% | 4.0% | 21.6% | 22.7% |
| Ship Creek | 4.7% | 0.8% | 5.9% | 7.1% |

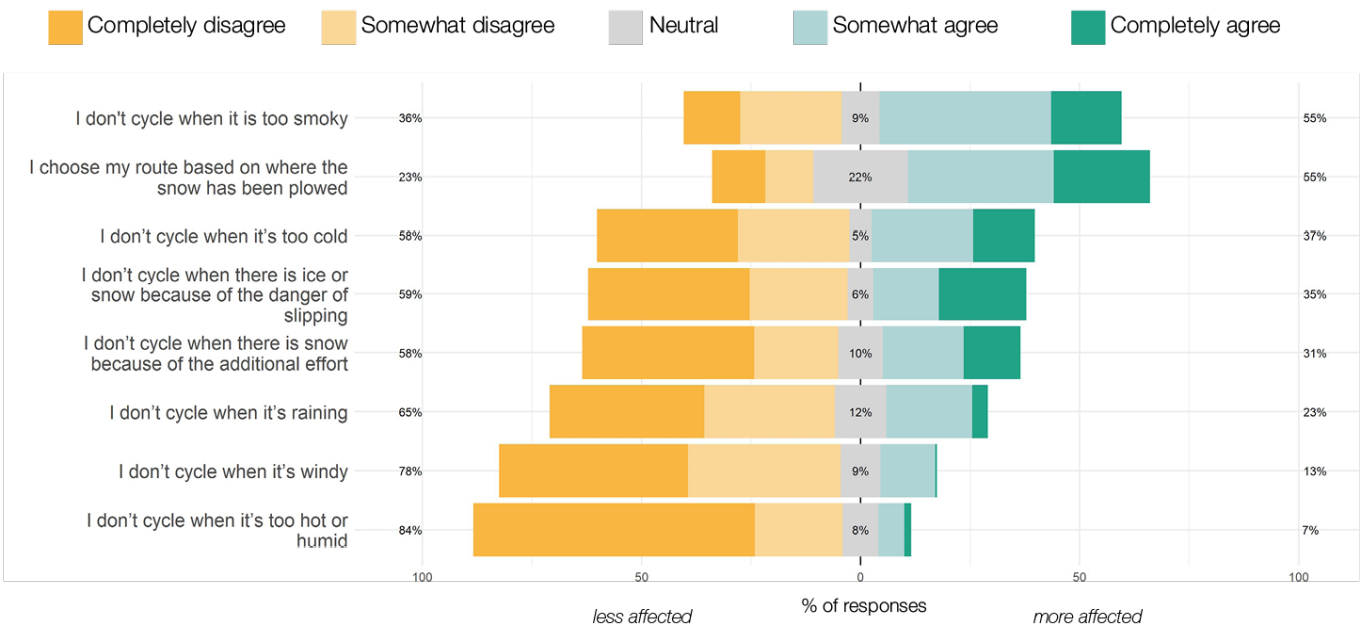


**FIGURE 8: Attitudes toward weather, all respondents (n = 255)**

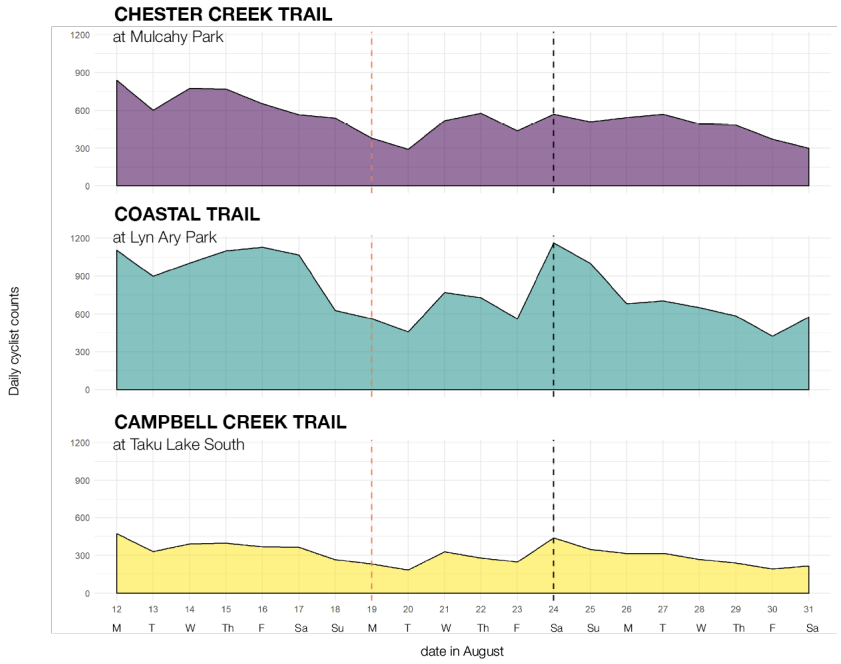


**FIGURE 9: Cyclist volumes during smoke advisory in the Anchorage Bowl, August 19 - 23, 2019**

## INFLUENTIAL FACTORS

The principal component factor analysis provides an overview of how the survey responses relate to one another. 75 variables were included in the analysis, which revealed 24 factors with Eigenvalues greater than 1. After review, 10 of these factors related to 40 variables were retained. For each factor group, variables with a score of 0.5 or above are listed (Table 3). Taken together, the 10 factor groups explain 45% of variation in the survey data. Factors are described in the list below and named based on knowledge of the Anchorage context and the greater literature review.

*FACTORS:*

1. Cycling for fun or fitness;
2. Cycling for non-commute trips and cycling at night;
3. How cyclists react to winter weather and the effort it takes to cycle in snowy and icy conditions;
4. All types of cycling trips taken on Campbell Creek Trail;
5. How frequently cyclists commute, their employment status, and what times of day they cycle;
6. How strongly wind, rain, and smoke affect a decision to cycle;
7. How cyclists perceive trail width and signage;
8. How cyclists perceive trail lighting and amenities;
9. How often cyclists use Ship Creek Trail;
10. And whether cyclists value scenic views and the mental health benefit of cycling on greenbelt trails.

## CLUSTER TYPES

The k-means cluster test was attempted with between three and six groups, but using four groups produced the most logical results (Damant-Sirois et al., 2014; Jacques et al., 2013). Nine respondents were excluded from the cluster analysis because of incomplete responses on key questions needed for the analysis. Using local knowledge and drawing on the literature, the author labeled each of the resulting four clusters based on their relationships to the 10 factors: **confident commuters, fairweather cyclists, cyclists-of-all-trades**, and **social recreationalists** (Figure 10). A description of each cluster follows with attention to how the sub-groups differ from the sample as a whole in demographics, behaviors, and preferences (Table 4). Table 4 also indicates which cross-tabulations produced significant Chi-square statistics.

*FACTORS*

Figure 10 shows us the influential factors and how respondents in their respective categories responded to the factors. **Confident commuters** (20.7% of respondents) are committed cyclists who take commute trips on Chester Creek Trail and cycle during peak times of day. They also cycle for fun and to get exercise and are not affected by weather. They use Ship Creek Trail for mixed trip purposes and Campbell Creek Trail less often. Confident commuters also value the scenic views

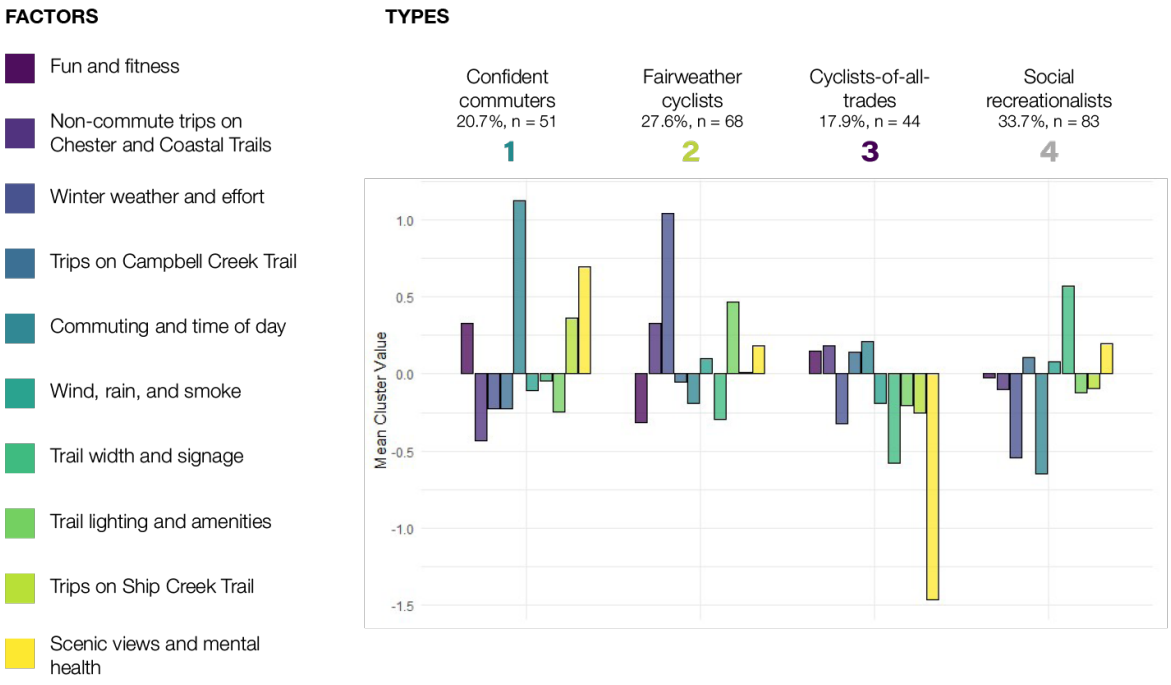


**FIGURE 10: Anchorage Trails cyclist types and influential factors (n = 246)**

**Table 3. Factors, variables, and loadings (principal component factor analysis)**

| FACTORS | SURVEY VARIABLE | | LOADING |
|---|---|---|---|
| **Fun and fitness** | From May through September, how often did you cycle for the following reasons on the Coastal Trail? | To get exercise | 0.782 |
| | | To have fun | 0.780 |
| | From May through September, how often did you cycle for the following reasons on the Chester Creek Trail? | To have fun | 0.777 |
| | | To get exercise | 0.774 |
| | From May through September, how often did you cycle for the following reasons on the Ship Creek Trail? | To get exercise | 0.732 |
| | | To have fun | 0.710 |
| **Non-commute trips on Chester Creek and Coastal Trails** | From May through September, how often did you cycle for the following reasons on the Chester Creek Trail? | To attend social activities | 0.801 |
| | | To run errands | 0.624 |
| | From May through September, how often did you cycle for the following reasons on the Coastal Trail? | To attend social activities | 0.693 |
| | | To run errands | 0.591 |
| | In the past 12 months, what times of day did you typically ride your bicycle on the trails? | After 9pm | 0.546 |
| **Winter weather and effort** | When I ride my bicycle on the trails: | I don't cycle when there is ice or snow because of the danger of slipping | 0.869 |
| | | I don't cycle when there is snow because of the effort | 0.797 |
| | | I don't cycle when it's too cold | 0.699 |
| | What do you not like about cycling on the trails? | Too much snow or ice on the trails | 0.563 |
| | In the past 12 months, which months did you ride your bicycle on the trails? | Between October and April | -0.670 |
| **Trips on Campbell Creek Trail** | From May through September, how often did you cycle for the following reasons on the Campbell Creek Trail? | To have fun | 0.761 |
| | | To get exercise | 0.753 |
| | | To run errands | 0.705 |
| | | To go to work | 0.674 |
| | | To attend social activities | 0.645 |
| **Commute trips and time of day** | From May through September, how often did you cycle for the following reasons on the Chester Creek Trail? | To go to work | 0.633 |
| | What is your employment status? | Employed full-time, part-time, or seasonally | 0.494 |
| | In the past 12 months, what times of day did you typically ride your bicycle on the trails? | Before 10am | 0.493 |
| | | Between 10am and noon | -0.552 |
| | | Between noon and 3pm | -0.637 |
| **Wind, rain, and smoke** | When I ride my bicycle on the trails: | I don't cycle when it's windy | 0.717 |
| | | I don't cycle when it's raining | 0.682 |
| | | I don't cycle when it's smoky | 0.522 |

**Table 2. Factors, variables, and loadings (continued)**

| FACTORS | SURVEY VARIABLE | | LOADING |
|---|---|---|---|
| **Trail width and signage** | What do you like about cycling on the trails? | The path is wide enough for everyone | 0.692 |
| | | The signs and maps are easy to read | 0.521 |
| | What do you not like about cycling on the trails? | The path is too narrow | -0.612 |
| **Trail lighting and amenities** | What do you not like about cycling on the trails? | Not enough lighting on the trail | 0.598 |
| | | No place to lock my bike | 0.510 |
| | | No bathrooms or water fountains | 0.475 |
| **Trips on Ship Creek Trail** | From May through September, how often did you cycle for thefollowing reasons on the Ship Creek Trail? | To run errands | 0.726 |
| | | To attend social activities | 0.702 |
| | | To go to work | 0.521 |
| **Scenic views and mental health** | What do you like about cycling on the trails? | Scenic views | 0.640 |
| | | It's good for my mental health | 0.516 |

and mental health benefits of cycling on the trails.

**Fairweather cyclists** (27.6% of respondents) are cautious trail users who are more likely to say that cold, ice, snow, wind, rain, and smoke prevent them from cycling. They take more trips on the Chester Creek and Coastal Trails to run errands and attend social activities than other groups. They are concerned about lighting, bicycle parking, and access to bathrooms and water fountains on the trail. They also value the scenic views and mental health benefits of the trails.

**Cyclists-of-all-trades** (17.9% of respondents) are a practical and versatile group, being both recreational and transport cyclists. They take trips for fun and exercise, but they also commute, run errands, and cycle to attend social activities. They are not deterred by weather events. They also use Campbell Creek Trail for recreational and transport trips. While between 90 and 100% of the other groups appreciate scenic views and use the trails to improve their mental health, only about half of cyclists-of-all-trades said they cared about mental health, and less than 20% about scenic views.

**Social recreationalists** (33.7% of respondents) are the largest portion of the sample. These cyclists exercise more frequently on the Campbell Creek and Chester Creek Trails and seem to use the Coastal Trail less often. They commute the least often out of all groups – less than 10% are commuting once a week or more in the summer. Winter weather does not deter this group but wind, rain, and smoke affect their decision to cycle.

### *DEMOGRAPHICS AND CYCLING BEHAVIOR*

Table 4 compares the demographic, cycling behavior, and trail preference variables of the whole sample to each cyclist type. **Confident commuters** stand out as a working population: all respondents except one in this group are employed full-time, part-time, or seasonally. Additionally, 44% of cyclists in this category work in Downtown Anchorage where many municipal, state, and federal offices are located. 90.2% of the group also participate in Bike to Work Day and they are more likely than the sample as a whole to have a graduate degree. Confident commuters are more likely to cycle on city streets – 88.2% of the category compared to 66.3% of the whole sample – indicating their willingness to navigate traffic to reach a destination. They are more likely to report that the trails take them where they want to go, and only 15.7% of the category felt like the trails were unsafe compared to almost one-third of the entire sample.

**Fairweather cyclists** are younger than the whole sample, with 19.1% between 19 and 30 years old and 52.9% between 31 and 44. Almost 80% of cyclists in this category are female compared to half of the entire sample. Only 38.2% of fairweather cyclists use the trails between October and April compared to

**Table 4. Demographics, cycling behavior, and trail preferences**

| VARIABLE | Total sample n = 246, 100% | Confident commuters n = 51 , 20.7% | Fairweather cyclists n = 68 , 27.6% | Cyclists-of-all-trades n = 44 , 17.9% | Social recreationalists n = 83, 33.7% |
|---|---|---|---|---|---|
| *Demographic characteristics* | | | | | |
| Female** | 51.2% | 37.2% | **79.4%** | 38.6% | 43.4% |
| Age group* | | | | | |
| 19 - 30 | 11.0% | 9.8% | **19.1%** | 9.1% | 6.0% |
| 31 - 44 | 44.3% | 41.2% | 52.9% | 43.2% | 39.8% |
| 45 - 64 | 30.5% | 41.2% | 17.6% | 34.1% | 32.5% |
| 65 + | 14.2% | 7.8% | 10.3% | 13.6% | **21.7%** |
| Employed** | 87.0% | **98.0%** | 89.7% | 88.6% | 77.1% |
| Works downtown (99501 zip code)** | 22.7% | **44.0%** | 18.0% | 19.5% | 14.3% |
| Above average household income | 73.2% | 82.4% | 72.1% | 68.2% | 71.1% |
| Graduate degree** | 46.3% | **66.7%** | 51.5% | 34.1% | 36.1% |
| White (includes multiracial) | 88.6% | 92.2% | 91.2% | 81.8% | 88.0% |
| *Cycling behavior and trail preferences* | | | | | |
| Own more than 1 bike* | 82.4% | 81.8% | 72.3% | **90.3%** | 89.1% |
| Also cycle on city streets** | 66.3% | **88.2%** | 54.4% | 68.2% | 61.4% |
| Participated in Bike to Work Day** | 68.3% | **90.2%** | 55.9% | 63.6% | 67.5% |
| Cycle between October and April** | 70.3% | 82.4% | **38.2%** | 81.8% | 83.1% |
| Don't cycle on ice or snow because of the danger of slipping** | 34.5% | 31.3% | **76.5%** | 13.6% | 13.2% |
| Dislike that the trails feel unsafe** | 32.5% | 15.7% | **45.6%** | 31.8% | 32.5% |
| Like the social aspect of the trails** | 49.2% | 47.1% | 50.0% | 18.2% | **66.3%** |
| Like that the trails take them where they want to go** | 72.4% | **90.2%** | 72.1% | 45.5% | 75.9% |

** $p < 0.01$ * $p < 0.05$

around 80% of the other categories. They are more likely to say they are worried about the danger of slipping on ice or snow when making the decision to cycle in the winter. In this group, 54.9% say they also ride their bicycles on city streets next to vehicle traffic which is the lowest rate of any category. Fairweather cyclists are also more likely to feel unsafe on the trails.

Most of respondents (90.3%) in the **cyclists-of-all-trades** group own more than one bike, possibly reflecting their commitment to various types of cycling trips. They are much less likely to say that the trails take them where they want to go than the sample as a whole – only 45.5% compared to the sample's 72.4%. Fewer cyclists-of-all-trades indicated that they enjoy the social aspect of cycling on the trails (18.2% compared to 49.2%), reflecting a more practical usage of Anchorage Trails.

In contrast to all other cyclist types, 21.7% of **social recreationalists** are more likely to be aged 65 and older and there are more retired people and stay-at-home parents in this group. Two-thirds of this group marked that the social part of cycling was something they liked about the trails, more than any other category. The majority also own more than one bicycle. 83.1% of social recreationalists use the trails between October and April – on par with all other categories except fairweather cyclists – and they are not deterred by cycling on ice or snow.

### *TRANSPORT VS. RECREATIONAL USE PATTERNS*

The four cyclist clusters form a spectrum from infrequent to frequent commuter cyclists, with social recreationalists commuting by bicycle the least often and confident commuters the most often. There are also clear differences in how frequently each trail is used for transport (Figure 11). Almost two-thirds (64.7%) of confident commuters use Chester Creek Trail to commute multiple times a week. In comparison,

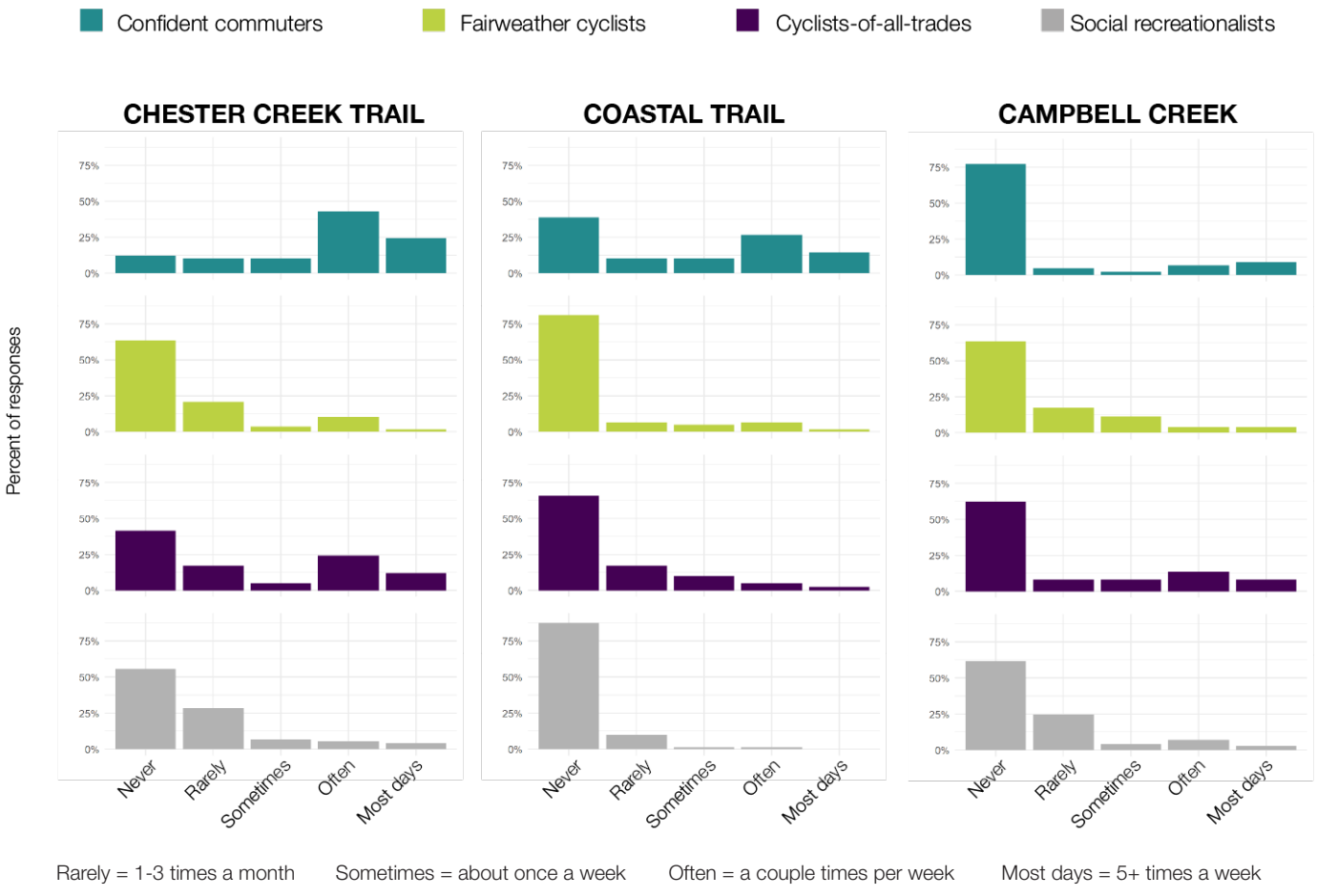


**FIGURE 11: Cycling to commute frequency by trail and cyclist type**

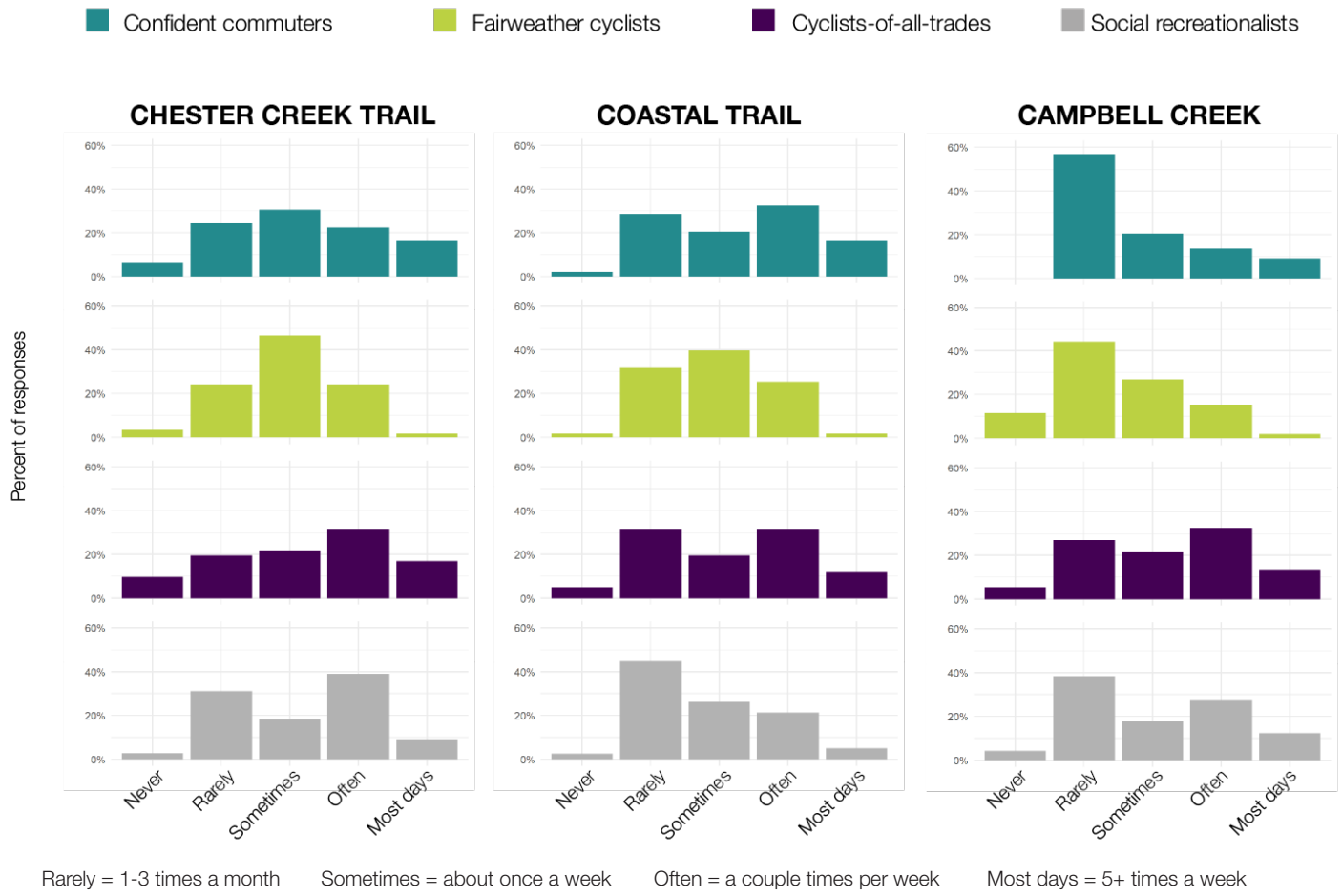


**FIGURE 12: Cycling for exercise frequency by trail and cyclist type**

39.2% of this population also commute on the Coastal Trail, and 13.7% on the Campbell Creek Trail. For cyclists-of-all-trades, 34.1% commute multiple times a week on Chester Creek Trail, 6.8% on the Coastal Trail, and 18.2% on Campbell Creek Trail. The lower use of the Coastal Trail and higher use of Campbell Creek for commuting may reflect differences in where respondents in the two groups live and work, although no significant geospatial patterns were found.

In contrast, only about 10% of fairweather cyclists and less than 10% of social recreationalists commute more than once a week on the Chester Creek Trail. Fairweather cyclists and social recreationalists together make up over 60% of the survey sample population, showing again that most cyclists in Anchorage are using the trails for non-transport reasons.

Figure 12 clearly demonstrates the increased frequency of recreational trips on Anchorage Trails, using trips for exercise as a proxy. As a whole, cyclists in all clusters are reporting more frequent trips for exercise than for commuting. Cyclist-of-all-trades seem to exercise on the trails most frequently, with over half exercising multiple times a week on all three trails during peak season. About half of confident commuters exercise multiple times a week on the Coastal Trail and half of social recreationalists exercise multiple times a week on the Chester Creek Trail. About one-quarter of Fairweather cyclists exercise with the same frequency on Chester Creek and Coastal Trails.

Looking at what times of day people said they cycled (Figure 13) shows how each cyclist typology displays different recreational and transport traffic patterns. Confident commuters show a clear spike during peak commuting hours that reflects the same trail counter peaks on the Chester Creek Trail (before 10a.m. and early evening). Social recreationalists and cyclists-of-all-trades show a recreational pattern

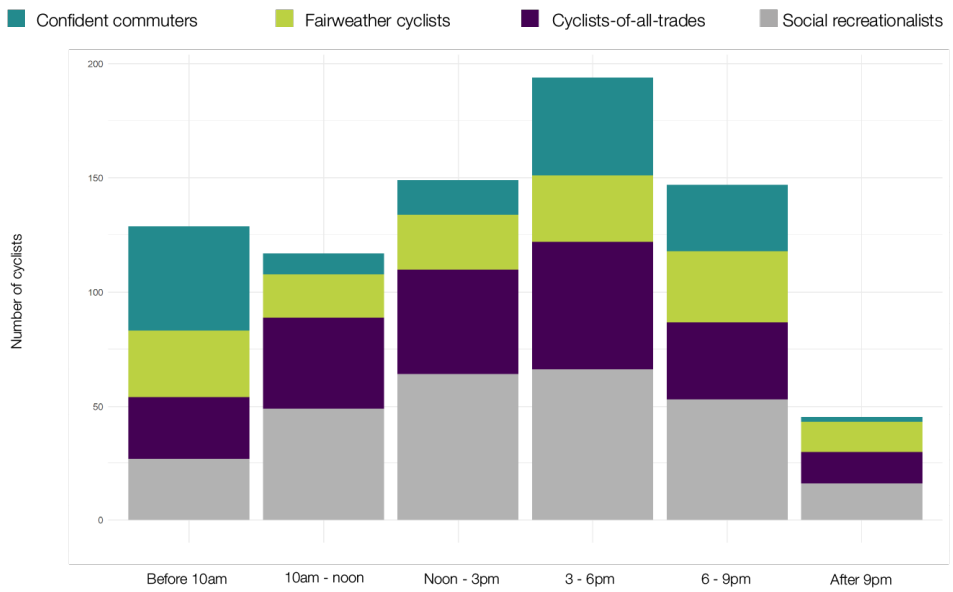


**FIGURE 13: Times of day cycled by cyclist type**

with most cyclists in these categories being out midday and early evening. Fairweather cyclists have a steadier pattern throughout the day and a less pronounced peak during commute hours. Taken as a whole, this hourly pattern reflects a mixed utilitarian cycling traffic pattern: a small morning peak followed by a climb to highest volumes in the early evening.

### *TRAIL PREFERENCES AND ATTITUDES*

When asked about their likes and dislikes, respondents' favorite aspects of the trail were being separate from vehicle traffic (96.1%), being in nature (90.2%), and that cycling on the paths is good for mental health (89.0%). People did not report as many dislikes, but the top three were that there is not enough lighting (32.5%), no bathrooms or water fountains (32.2%), and that it feels unsafe (31.8%).

When given the opportunity to share open-ended thoughts about their experience cycling on the trails, some themes arose for the entire sample and some themes show attachment to specific clusters (Figure 14). User conflicts were reported by all clusters, including conflicts with off-leash dogs and slower-moving users that create obstacles for cyclists. The most common concern brought up by all cyclist types was personal safety and the homeless camps that permeate the woods next to many parts of the trails; this was brought up 36 times, or by 14.1% of the sample. For example, someone in the social recreationalist category describes that "as a parent of 3 young girls who are on the verge of being independent users […] we hesitate to encourage them to use the trails due to safety concerns." One male respondent noted that he felt safer where sightlines had been improved along the trail by thinning brush and removing hidden corners. Another respondent concludes that "the number of homeless camps in the woods and the brazen bike thefts have made me cut back on going out alone on everything but the Coastal Trail." While there is no data available linking actual crime to the homeless camps, it is worth noting that many respondents address the two issues simultaneously. Interestingly, a lack of safe bicycle parking options also recurred in the responses as directly related to people's willingness to run errands. One fairweather cyclist described how they use a bicycle chariot to bring their kids along for rides, but that they "don't want to have it stolen, so that limits where I can bike for errands."

Another recurring theme across all clusters was Anchorage Trails as a crucial way to stay separated from drivers and reduce risk of injury. Multiple respondents reported experiences where drivers appear to intentionally scare or threaten cyclists on the road. Many noted that while Anchorage Trails are a well-developed facility, Anchorage streets lack separated bicycle lanes. Even those falling in the

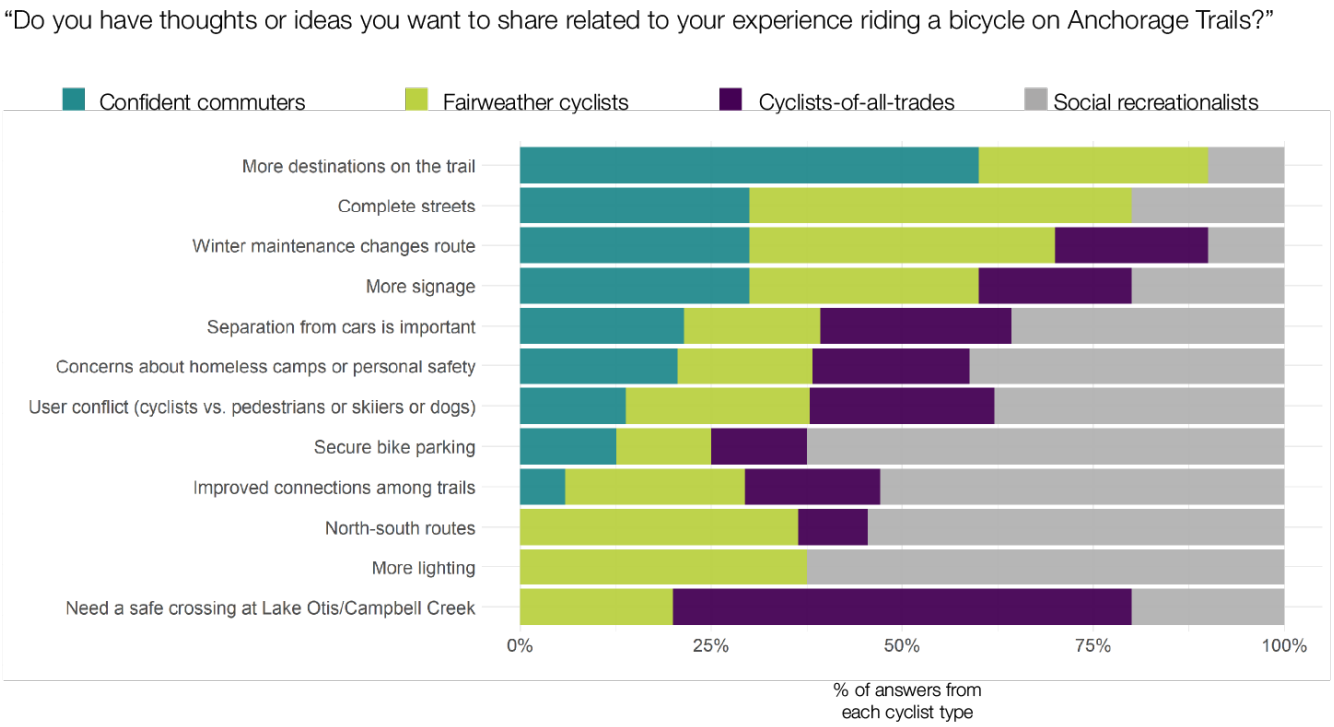


**FIGURE 14: Themes identified in open-ended responses**

confident commuter category echoed the sentiment, showing that separation from cars is desirable by all types of cyclists. One quote from a fairweather cyclist shows the lack of options for someone cycling downtown who wants to avoid traffic: "Our urban connectivity is certainly lacking […] cyclists are technically not allowed on sidewalks, but there are one-way roads and high speed traffic all over downtown, both of which are unsafe on a bike." Respondents in all clusters described Anchorage streets and sidewalks as "REALLY uncomfortable places to ride." These quotes illustrate why cyclists would be willing to use greenbelt paths for transport, even if they are not aligned with many destinations.

Cyclists are prevented from running errands because of a lack of safe connections between the trails and commercial areas. For example, confident commuters in particular wanted to see more destinations to increase the amount of cycling trips they could take: "the trails don't safely deliver me to places that I frequent (other than home and work), like: 1) the grocery store, 2) the rock gym, 3) a coffee shop. As a result, I typically drive on days that I run errands, even if it's less than a mile off the trail." While 90.4% of confident commuters reported that trails take them where they want to go, many envision a future where Anchorage Trails link to more diverse types of destinations. One respondent envisioned a future where someone could enjoy their entire weekend on the trail: "What if you could fat tire bike to Mulcahy [Park], watch a game of snowshoe softball, drink a beer and enjoy a great burger, do a little shopping, and bike home?" Essentially, this person expresses a trail system that aligns directly with a mixed-use district allowing people to run errands, dine, and attend social activities while traveling by bicycle.

Figure 14 also shows how cyclists' interests change when moving from a transport-oriented market to a recreational market. For example, social recreationalists disproportionately want to see more connections between the trails and the ability to ride a complete, cohesive loop around town. Social recreationalists and fairweather cyclists also disproportionately expressed a desire for more north-south separated bicycle infrastructure to allow for better connections across town, especially to get from South Anchorage to

Midtown or Downtown. The most prominent concern for cyclists-of-all-trades was the need for a safer crossing on the Campbell Creek Trail at Lake Otis, which is the last remaining break in the trail's continuity.

Finally, the open-ended responses revealed important themes regarding winter maintenance. For fairweather cyclists, rather than cold temperatures being the only deterrent to cycling, it appears that winter weather causes artificial breaks in an otherwise coherent route. For example, tunnels allow cyclists to pass under roads without interacting with traffic but increasing ice and rain during Anchorage winters cause the tunnels to be so slick that they are "occasionally impassable." This is a problem on and off the trails; one confident commuter described that "I often do NOT ride to work, even though I really want to, because the streets and sidewalks are often snowy & icy and the bike route is not separated from traffic." Plowing also determined where confident commuters felt comfortable cycling in winter: "There are more mornings that I use the roads to avoid the Coastal Trail than the Ship Creek Trail, because the latter is generally plowed."

## DISCUSSION

Anchorage Trails are a well-loved amenity and offer cyclists a corridor for riding bicycles separate from vehicle traffic in a scenic environment. Despite their recreational design and alignment with natural rather than urban features, survey data helps confirm that a substantial group of transport cyclists use the greenbelt trails, especially the Chester Creek Trail. The trends reported in this survey bolster the findings from the trail counter data which shows that Anchorage Trails see mixed utilitarian and mixed recreational traffic patterns. Using 246 survey responses, four types of cyclists emerge as user groups of Anchorage Trails. Each type presents unique travel habits that affect their preferences for destination access, trail connectivity, trip-end facilities, and safety. Three prominent findings inform a larger discussion on transport cycling on Anchorage Trails: limited opportunities for non-commute transportation; winter maintenance; and gender and safety.

### *LIMITED OPPORTUNITIES FOR NON-COMMUTE TRANSPORTATION*

The survey data provides nuance to the mixed count patterns seen in the bicycle volume data. While most trail users are taking trips for fun and exercise, this survey estimates that around 40% of trail users (confident commuters and cyclists-of-all-trades) are committed to bicycle commuting, undeterred by weather, and willing to use streets to connect to their workplaces. Social recreationalists and fairweather cyclists can be considered a potential market for transport cycling while cyclists-of-all-trades and confident commuters are already disposed to use their bicycles for transportation.

The transport cyclists in this study also indicate strong interest in more ability to use the Anchorage Trails as part of their commercial and economic lives. But cyclists run errands at much lower frequencies than commuting, exposing that commercial destinations are limited from the trails. Chester Creek Trail stands out in this study as most suited for transport cycling, and this aligns with previous data available from Bike to Work Day surveys. Chester Creek Trail is the closest to Midtown Anchorage (a significant commercial area), connects to Downtown directly via the Coastal Trail, links straight to the UMED employment center, and offers a number of spur trails that connect to East Anchorage neighborhoods. Transport-centric infrastructure and policy interventions focused on Chester Creek Trail could invite existing and new transport cyclists to reduce the share of trips they have to take by car.

### *WINTER MAINTENANCE*

Despite the harsh climate, a majority of Anchorage cyclists report being resilient to weather and not feeling strongly that wind, rain, snow, ice, heat, or cold affect their decisions to cycle. However, the fairweather cyclist group offers some key insights for Anchorage planners considering how to accommodate winter cycling. The danger of slipping deters over three-fourths of this group from cycling, showing that not only is cold weather a deterrent because of discomfort and effort, but also that many cyclists in Anchorage are cautious and concerned about their safety on the

trails and streets in general. Keeping the trails groomed for cross-country skiing is important to Anchorage residents, so there will likely always be snow kept well-packed on the greenbelt trails, but transport planners can consider maintenance strategies that make more people feel safe. On-street bicycle lanes that are kept plowed and free of ice could serve as important alternative routes in winter that allow more people to maintain commute habits through the winter season. Dangerously slick tunnels after rain and ice storms also have the potential to deter cyclists and suggest that new maintenance strategies be explored.

*GENDER AND SAFETY*

The relationship between gender and cycling behavior found in this study replicates findings in the existing literature that women commute to work by bicycle at lower rates than men, even after the construction of new bicycle infrastructure and implementation of social programming (Pedroso et al., 2016). Fairweather cyclists in this study were majority female, commuting at lower rates, and more likely to feel that the trails are unsafe spaces, reflecting a larger issue of personal security that disproportionately affects women. However, fairweather cyclists did run errands and cycle to attend social activities at relatively higher rates than either confident commuters or cyclists-of-all-trades. This finding suggests that while women are not averse to cycling for transport, they may be disproportionately affected by concerns about personal safety and the physical risks of cycling, especially in hazardous conditions (Krizek et al., 2005). To address this concern, municipalities can boost winter maintenance strategies and use land use policy to transform trails into more lively places where all people feel less vulnerable to crime.

While this survey did not ask if cyclists had children, transport research confirms that women are disproportionately responsible for transporting children and running errands, which may make transport cycling challenging. Certain open-ended responses from this survey confirm that to get more women on the trails for transport, making the trails safer and connecting trails to on-street bicycle infrastructure may not fully address all of the social determinants at play. A survey in Portland of cyclists on a separated bikeway showed that while men and women both shared an increased sense of safety because of the separated infrastructure, the women who were stopped were significantly less likely to have children than men (Dill et al., 2014). This makes the finding about bicycle parking and storage compelling – could improving bicycle storage help more women run errands with kids in tow? Bicycling support programs like WeBike NYC may also serve as an interesting precedent for their focus on offering social support for different demographics of women (Singleton & Goddard, 2016). Existing motivational programs for young women like Anchorage GRIT focus on recreational bicycling but could serve as a model for social programs that help women feel more comfortable and equipped to transport cycle.

# 6. CONCLUSION

## ANCHORAGE TRAILS AS TRANSPORT CORRIDORS

Given the heightened attention to increasing transport cycling in Anchorage, this study provides new and timely data about cycling populations using Anchorage Trails that can guide resource investments for planners and bicycle advocates. Despite their original design to serve recreational users and their alignment with natural rather than urban features, Anchorage Trails are significant transport corridors and offer sustainable, healthy modes for daily travel. Cyclists use Anchorage Trails for transport because of their protection from vehicle traffic and their scenic quality.

A cyclist typology with four distinct categories emerges from 246 survey responses about travel patterns and trail preferences. The typology study confirms that while most cyclists use Anchorage Trails to have fun and get exercise, the Chester Creek Trail is widely used as a commuting corridor, which is reflected in its mixed utilitarian cyclist traffic pattern. There is a notable connection between gender and cycling habits in this sample that shows the different social and external barriers that women may face to transport cycling, like being able to bring kids along and concerns about personal safety. While most Anchorage cyclists are resilient against weather events, more frequent wildfires that come with Alaska's changing climate could prevent many people from cycling more often. Additionally, winter maintenance measures such as the plowing of on-street bicycle facilities is key to accommodating cycling habits year-round.

The trails are poised to become incorporated more fluidly with a city-wide bicycle network that includes on-street infrastructure and that is maintained appropriately throughout the winter. The following list and Figure 15 describe intervention recommendations supported by the survey and typology analyses in order to make transport cycling more viable in Anchorage.

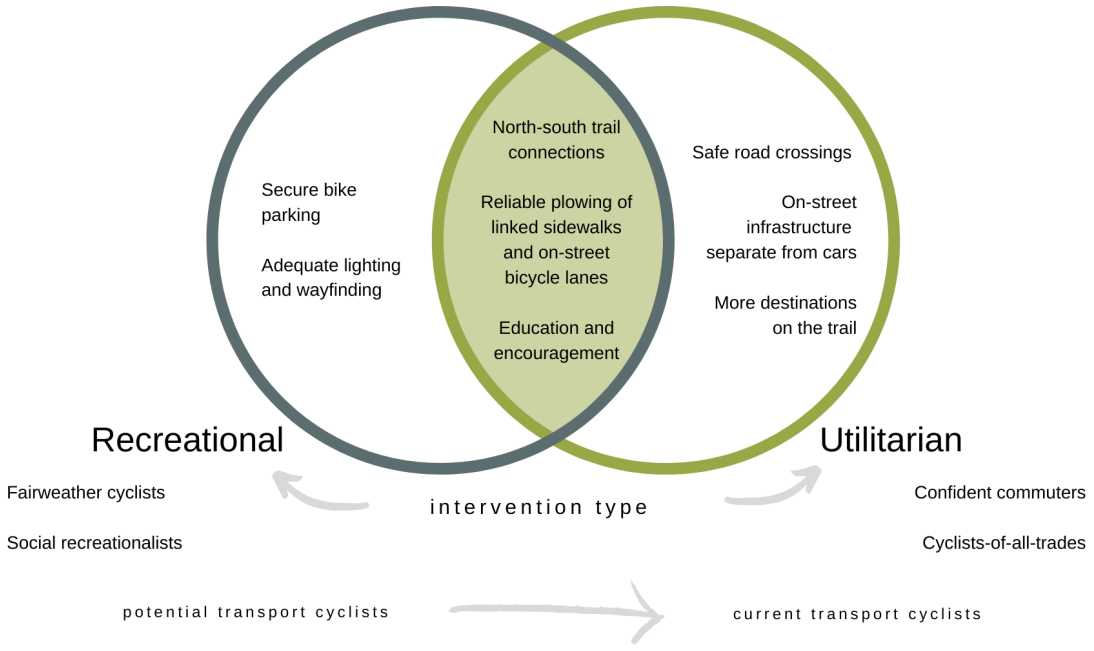


**FIGURE 15: Intervention recommendations based on Anchorage Trails cyclist typology**

## INTERVENTION RECOMMENDATIONS

- **Revitalize land use** and **promote commercial development** around the Chester Creek Trail. Connecting this greenbelt path to a vibrant mixed-use recreational district with opportunity for shopping, dining, and other recreation will make the trail safer and more useful for running errands.

- Ensure that cyclists can connect from Anchorage Trails to neighborhoods and commercial areas fluidly using **separated bicycle lanes**. Bollards may be an initial, inexpensive way to separate bicycle lanes from vehicles and draw attention to new traffic patterns, but in winter cities, using curb or grade separation (raised medians, planters, or greenery) may better accommodate snow clearing operations.

- Improve **separated bicycle infrastructure connectivity in all directions**, especially between South Anchorage and Downtown to offer safe opportunities to travel through the Midtown commercial area. Network-wide connectivity is important for encouraging more frequent transport cycling.

- Ensure that there is a **safe crossing on the Campbell Creek Trail at Lake Otis** to alleviate safety risks for frequent users.

- Encourage employers and businesses to work with their neighbors and **provide secure bicycle parking options** for employees and clients, which can allow more people to confidently run errands.

- Continue supporting cultural change by promoting bicycle commuting through **workplace partnerships, social initiatives, and education for drivers**. Programs that empower women and allow women to take leadership roles in the bicycle community should be especially emphasized.

## STRENGTHS, LIMITATIONS, AND FURTHER RESEARCH

From the data, it is clear that survey respondents are a particularly enthusiastic sample of the Anchorage cycling population, as is common in elective surveys. The sample is not representative of the city's population, which speaks to a greater challenge that trail enthusiasts in Anchorage are often socioeconomically privileged. Given Anchorage's ethnically- and linguistically-diverse population, the municipality should ensure that social initiatives and programs include raising awareness of cycling opportunities among diverse populations.

A strength of this project is directly comparing trail counter with survey data, but additional analyses to clean the data thoroughly and identify expansion factors would be a clear next step for characterizing Anchorage's trail data since 2014. Expansion factors can help the municipality extrapolate short term count data (such as those done by hand at intersections or on paths without permanent counters) and estimate

**FIGURE 16: Sunset view over the mud flats from the Coastal Trail**

the annual average daily bicycle counts, which may be less costly than investing and maintaining new counters (Miranda-Moreno et al., 2013). Additionally, it may be possible for cities with mixed recreational and mixed utilitarian patterns to conduct intercept surveys and estimate more accurate percentages of trips made for different purposes.

Another strength of this project is that it asks cyclists to define themselves, providing insights into the heterogeneity of Anchorage cyclists and how priorities change based on their personal characteristics and trip purpose. The typology presented in this paper is not intended to be the only categorization of Anchorage's cycling population, but it does provide a wealth of new data and an alternative to existing cycling typologies that may not reflect Anchorage's context. A follow-up typology study could be incorporated into future active transport planning initiatives in order to gain a wider response rate. Follow-up studies should also include more questions for the deepest understanding of people's attitudes and circumstances. For example, asking about how children affect cycling decisions for parents seems to be a determinant in Anchorage that cannot be thoroughly understood from these findings.

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# APPENDIX A: ETHICS APPROVAL AND PARTICIPANT CONSENT FORM

*Anchorage Trails Cycling Survey*

My name is Nicolette Dent, and I am a born-and-raised Alaskan and current student at the McGill School of Urban Planning. I am conducting the Anchorage Trails Cycling Survey as part of an independent course-based research project.

This survey seeks to gather information about bicycling patterns on four of Anchorage's multi-use trails: the Tony Knowles Coastal Trail, Lanie Fleischer Chester Creek Trail, Campbell Creek Trail, and Ship Creek Trail. This is important to help Anchorage continue to improve our trail system and meet the needs of local bicyclists. We are surveying adults (18+ years old) who ride bicycles on Anchorage Trails using this online form, which should take about 10 - 15 minutes to complete.

The survey is anonymous and does not ask for personal information, so your identity is not linked to the results. The research findings will be available through the McGill University library, and potentially in other forms such as a report or academic paper. By completing and submitting your survey re-sponses, you consent to take part in this research study. If you have any questions, please contact me or my faculty supervisor.

Student researcher: Nicolette Dent, Master of Urban Planning Candidate, McGill University, 907-278-3132 or nicolette.dent@mail.mcgill.ca

Research supervisor: Ahmed El-Geneidy, Professor, School of Urban Planning, McGill University, ahmed.elgeneidy@mcgill.ca

If you have any ethical concerns or complaints about your participation in this study, and want to speak with someone not on the research team, please contact the McGill Ethics Manager at 514-398-6831 or lynda.mcneil@mcgill.ca (Research Ethics Board file number 19-12-008). Since surveys are anonymous, withdrawal is not possible once you submit your response.

# APPENDIX B: SURVEY QUESTIONS

## Eligibility

*Cycling History*

In the past 12 months, have you ridden a bicycle? *

Please choose only one of the following:

○ Yes

○ No

Are you at least 18 years old? *

Please choose only one of the following:

○ Yes

○ No

Only adults are eligible to take this survey.

*Barriers to Cycling*

Why do you not ride a bicycle?
Please choose all that apply:

☐ I don't have a bicycle

☐ I don't know how to cycle

☐ I am physically unable to ride a bicycle

☐ I don't have time

☐ Because of weather (too cold, hot, rainy, snowy, icy, or windy)

☐ I am afraid of getting lost

☐ I am afraid of getting hit by a car

☐ The infrastructure is not good (i.e. the roads, paths, bicycle lanes, etc.)

☐ There is not enough bike parking

☐ There are too many other cyclists and/or people around

☐ It is too far to reach my desired destination

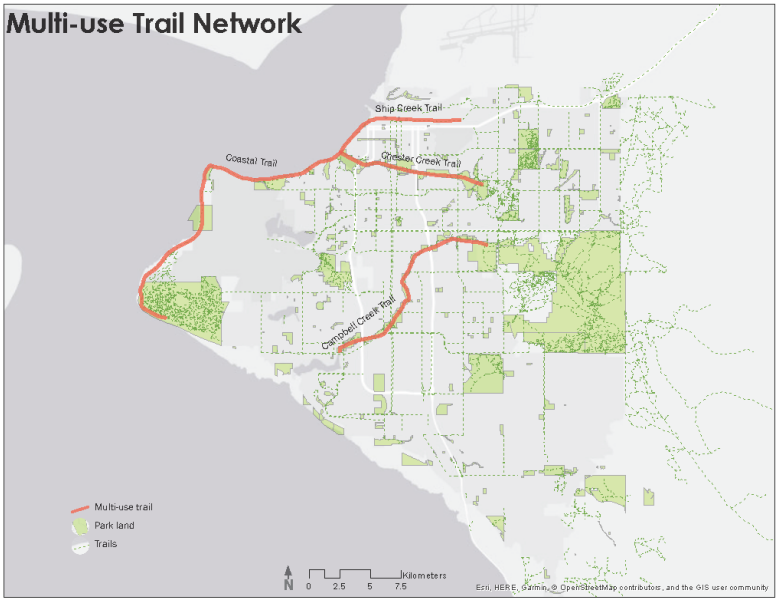
☐ I can›t afford to buy a bicycle

☐ I can't afford to buy warm clothes

☐ I can't take my children with me on trips

☐ Other:

*Cycling History*




In the past 12 months, have you ridden your bicycle on at least one of the following Anchorage Trails? Please mark the trails you used.

The map above shows the approximate location of each trail in orange. *

Please choose all that apply:

☐ Lanie Fleischer Chester Creek Trail

☐ Tony Knowles Coastal Trail

☐ Campbell Creek Trail

☐ Ship Creek Trail

☐ I did not cycle on any of these trails

*Barriers to Cycling on the Trails*

Why do you choose not to ride your bicycle on the trails?

Please choose all that apply:

☐ I don›t live near the trails

☐ I don›t know how to find the trails

☐ I don›t feel safe on the trails

☐ I don›t know where the trails go

☐ The trails don›t connect to places I need to go (job, friends, family, social activities, or errands)

☐ I don›t use the trails because of the weather

☐Other:

## Cycling Behavior

For the following questions, we ask about the times you rode your bicycle in the past 12 months using the Chester Creek, Coastal, Campbell Creek, or Ship Creek Trails.

In the past 12 months, which months did you ride your bicycle on the trails? *

Please choose all that apply:

☐ Between October and April

☐ Between May and September

In the past 12 months, what times of day did you typically ride your bicycle on the trails? *

Please choose all that apply:

☐ Before 10am

☐ Between 10am and noon

☐ Between noon and 3pm

☐ Between 3pm and 6pm

☐ Between 6pm and 9pm

☐ After 9pm

Use your best guess if you are unsure.

*Cycling Behavior - Summer*

During the months of May through September (when there is not usually snow or ice on the ground) …

From May through September, how often did you cycle for the following reasons on the Chester Creek Trail? *

| | Never | Rarely (1-3 times a month) | Sometimes (about once a week) | Often (a couple of times per week) | Most days (5+ times per week) |
|---|---|---|---|---|---|
| To go to work | ○ | ○ | ○ | ○ | ○ |
| To go to school | ○ | ○ | ○ | ○ | ○ |
| To run errands | ○ | ○ | ○ | ○ | ○ |
| To attend social activities | ○ | ○ | ○ | ○ | ○ |
| To have fun | ○ | ○ | ○ | ○ | ○ |
| To get exercise | ○ | ○ | ○ | ○ | ○ |

From May through September, how often did you cycle for the following reasons on the Coastal Trail? *

| | Never | Rarely (1-3 times a month) | Sometimes (about once a week) | Often (a couple of times per week) | Most days (5+ times per week) |
|---|---|---|---|---|---|
| To go to work | ○ | ○ | ○ | ○ | ○ |
| To go to school | ○ | ○ | ○ | ○ | ○ |
| To run errands | ○ | ○ | ○ | ○ | ○ |
| To attend social activities | ○ | ○ | ○ | ○ | ○ |
| To have fun | ○ | ○ | ○ | ○ | ○ |
| To get exercise | ○ | ○ | ○ | ○ | ○ |

From May through September, how often did you cycle for the following reasons on the Campbell Creek Trail? *

| | Never | Rarely (1-3 times a month) | Sometimes (about once a week) | Often (a couple of times per week) | Most days (5+ times per week) |
|---|---|---|---|---|---|
| To go to work | ○ | ○ | ○ | ○ | ○ |
| To go to school | ○ | ○ | ○ | ○ | ○ |
| To run errands | ○ | ○ | ○ | ○ | ○ |
| To attend social activities | ○ | ○ | ○ | ○ | ○ |
| To have fun | ○ | ○ | ○ | ○ | ○ |
| To get exercise | ○ | ○ | ○ | ○ | ○ |

From May through September, how often did you cycle for the following reasons on the Ship Creek Trail? *

| | Never | Rarely (1-3 times a month) | Sometimes (about once a week) | Often (a couple of times per week) | Most days (5+ times per week) |
|---|---|---|---|---|---|
| To go to work | ○ | ○ | ○ | ○ | ○ |
| To go to school | ○ | ○ | ○ | ○ | ○ |
| To run errands | ○ | ○ | ○ | ○ | ○ |
| To attend social activities | ○ | ○ | ○ | ○ | ○ |
| To have fun | ○ | ○ | ○ | ○ | ○ |
| To get exercise | ○ | ○ | ○ | ○ | ○ |

*Cycling Behavior - Winter*

During the months of October through April (when there is usually snow or ice on the ground) …

From October through April, how often did you cycle for the following reasons on the Chester Creek Trail? *

| | Never | Rarely (1-3 times a month) | Sometimes (about once a week) | Often (a couple of times per week) | Most days (5+ times per week) |
|---|---|---|---|---|---|
| To go to work | ○ | ○ | ○ | ○ | ○ |
| To go to school | ○ | ○ | ○ | ○ | ○ |
| To run errands | ○ | ○ | ○ | ○ | ○ |
| To attend social activities | ○ | ○ | ○ | ○ | ○ |
| To have fun | ○ | ○ | ○ | ○ | ○ |
| To get exercise | ○ | ○ | ○ | ○ | ○ |

From October through April, how often did you cycle for the following reasons on the Coastal Trail? *

| | Never | Rarely (1-3 times a month) | Sometimes (about once a week) | Often (a couple of times per week) | Most days (5+ times per week) |
|---|---|---|---|---|---|
| To go to work | ○ | ○ | ○ | ○ | ○ |
| To go to school | ○ | ○ | ○ | ○ | ○ |
| To run errands | ○ | ○ | ○ | ○ | ○ |
| To attend social activities | ○ | ○ | ○ | ○ | ○ |
| To have fun | ○ | ○ | ○ | ○ | ○ |
| To get exercise | ○ | ○ | ○ | ○ | ○ |

From October through April, how often did you cycle for the following reasons on the Campbell Creek Trail? *

| | Never | Rarely (1-3 times a month) | Sometimes (about once a week) | Often (a couple of times per week) | Most days (5+ times per week) |
|---|---|---|---|---|---|
| To go to work | ○ | ○ | ○ | ○ | ○ |
| To go to school | ○ | ○ | ○ | ○ | ○ |
| To run errands | ○ | ○ | ○ | ○ | ○ |
| To attend social activities | ○ | ○ | ○ | ○ | ○ |
| To have fun | ○ | ○ | ○ | ○ | ○ |
| To get exercise | ○ | ○ | ○ | ○ | ○ |

From October through April, how often did you cycle for the following reasons on the Ship Creek Trail?

| | Never | Rarely (1-3 times a month) | Sometimes (about once a week) | Often (a couple of times per week) | Most days (5+ times per week) |
|---|---|---|---|---|---|
| To go to work | ○ | ○ | ○ | ○ | ○ |
| To go to school | ○ | ○ | ○ | ○ | ○ |
| To run errands | ○ | ○ | ○ | ○ | ○ |
| To attend social activities | ○ | ○ | ○ | ○ | ○ |
| To have fun | ○ | ○ | ○ | ○ | ○ |
| To get exercise | ○ | ○ | ○ | ○ | ○ |

## Cycling and Weather

These questions focus on your experience cycling on the trails in different types of weather. Please indicate how well you agree with the following statements, and choose the response that reflects your behavior in the past 12 months.

When I ride my bicycle on the trails: *

| | Completely disagree | Somewhat disagree | Neutral | Somewhat agree | Completely agree |
|---|---|---|---|---|---|
| I don't cycle when it's too hot or humid | ○ | ○ | ○ | ○ | ○ |
| I don't cycle when it's too cold | ○ | ○ | ○ | ○ | ○ |
| I don't cycle when there is snow because of the additional effort | ○ | ○ | ○ | ○ | ○ |
| I don't cycle when there is ice or snow because of the danger of slipping | ○ | ○ | ○ | ○ | ○ |
| I choose my route based on where the snow has been plowed | ○ | ○ | ○ | ○ | ○ |
| I don't cycle when it's raining | ○ | ○ | ○ | ○ | ○ |
| I don't cycle when it's windy | ○ | ○ | ○ | ○ | ○ |
| I don't cycle when it's smoky | ○ | ○ | ○ | ○ | ○ |

## Trail Likes and Dislikes

What do you like about cycling on the trails? *
Please choose all that apply:

- ☐ The path is wide enough for everyone
- ☐ The signs and maps are easy to read
- ☐ The trails are well-lit
- ☐ Being in nature
- ☐ Scenic views
- ☐ The trails take me places I want to go
- ☐ I like being separate from vehicle traffic
- ☐ It helps me use my car less often
- ☐ It's good for my mental health
- ☐ It is a good way to get exercise
- ☐ I enjoy the social aspect of cycling on the trails
- ☐ Other:

What do you not like about cycling on the trails? *

Please choose all that apply:

- ☐ The path is too narrow
- ☐ The signs or maps are not helpful and it is easy to get lost
- ☐ Not enough lighting on the trail
- ☐ The trails don't take me places I want to go
- ☐ No bathrooms or water fountains
- ☐ No place to warm up when it is cold
- ☐ No place to lock my bike
- ☐ Too many other people around
- ☐ It feels unsafe
- ☐ Too many people with dogs
- ☐ Too much snow or ice on the trails
- ☐ I'm scared of seeing a moose or wild animal
- ☐ Other:

Do you also ride your bicycle on streets in the city (next to car traffic)? *
Please choose only one of the following:

- ○ Never
- ○ Rarely
- ○ Sometimes

○ Often

○ Always

Do you have thoughts or ideas you want to share related to your experience riding a bicycle on Anchorage Trails? Please write them below.

## Personal Profile

The final section will help us better understand who rides their bicycle on the trails in Anchorage.

How many bicycles do you own for yourself?

Please choose only one of the following:

○ None

○ 1

○ 2

○ 3

○ 4

○ More than 4

Do you own a winter bicycle (i.e. fat tire bike) or special winter tires (i.e. studded tires) for your bicycle?

Please choose all that apply:

☐ Winter bicycle

☐ Winter tires

☐ Neither

☐ Other:

Do you participate in local bicycle-related events or races?
Please choose all that apply:

☐ Bike to Work Day (every year in May)

☐ Winter Bike to Work Day (every year in February)

☐ Road cycling races

☐ Mountain biking races

☐ I do not participate in bicycle-related events or races

☐ Other:

When you moved into your current home, how important were the following factors in your decision?

| | Not important | Somewhat important | Very important |
|---|---|---|---|
| Being close to work / school | ○ | ○ | ○ |
| Being close to the bicycle path network | ○ | ○ | ○ |
| Being close to grocery stores, shopping, and basic services | ○ | ○ | ○ |
| Being close to family or friends | ○ | ○ | ○ |
| Affordability | ○ | ○ | ○ |
| Having enough space | ○ | ○ | ○ |

How many motor vehicles are in your household?
Please choose only one of the following:

- ○ None
- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5
- ○ More than 5

You identify as: (Please choose only one of the following)

- ○ Female
- ○ Male
- ○ Gender non-binary / non-conforming
- ○ Prefer not to answer
- ○ Other

What year were you born? _____

What is your employment status? Please choose only one of the following:

- ○ Employed full-time
- ○ Employed part-time
- ○ Employed seasonally
- ○ Unemployed
- ○ Full-time student

- ○ Part-time student
- ○ Employed and in school
- ○ Retired
- ○ Other

Please mark on the map your approximate home location, or the intersection closest to your home. *

Please mark on the map your approximate work location, or the intersection closest to your place of work (if you are a student, use school location). *

What is your household income in the past 12 months?

Please choose only one of the following:

- ○ $33,000 or less
- ○ Between $33,000 - $50,000
- ○ Between $50,001 - $70,000
- ○ Between $70,001 - $90,000
- ○ Between $90,001 - $110,000
- ○ More than $110,000

What is the highest level of education that you have completed?

Please choose only one of the following:

- ○ No formal education
- ○ Elementary school
- ○ High school diploma
- ○ Undergraduate degree
- ○ Graduate degree
- ○ Other

Which categories describe you?

Please choose all that apply:

- ☐ White
- ☐ Hispanic, Latino, or Spanish origin
- ☐ Black or African American
- ☐ Asian
- ☐ American Indian or Alaska Native
- ☐ Middle Eastern or North African
- ☐ Native Hawaiian or Other Pacific Islander

☐ Prefer not to answer

☐Other:

Thank you for your time! Please reach out to Nicolette Dent if you have feedback or questions about the survey.

nicolette.dent@mail.mcgill.ca

(907) 278-3132

Thank you for completing this survey.