

STARK PARKS TRAIL AND USER STUDY

March 2025

PROJECT TEAM

STARK PARKS

Dan Moeglin, P.E., Executive Director

Sarah Buell, Capital Projects and Planning Manager

William Meismer, Capital Projects and Planning Coordinator

Angela Palomba, Community Engagement Manager

Mary Grueber, Development Manager

STARK COUNTY REGIONAL PLANNING COMMISSION

Dan Slicker, P.E., Technical Director

Karl Lucas, Senior Planner

Jeffrey Brown, Principal Planner

Spencer Gibbs, Transportation Planner

Jaret Cole, Regional Planner

TOOLE DESIGN

Katie Sieb, AICP, Project Manager

Kenneth Harvey, Data Analyst

Theja Putta, PhD, Analyst III

Lucy Gibson, PE, Principal Engineer

Julie Walcoff, Senior Planner

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OVERVIEW



OVERVIEW

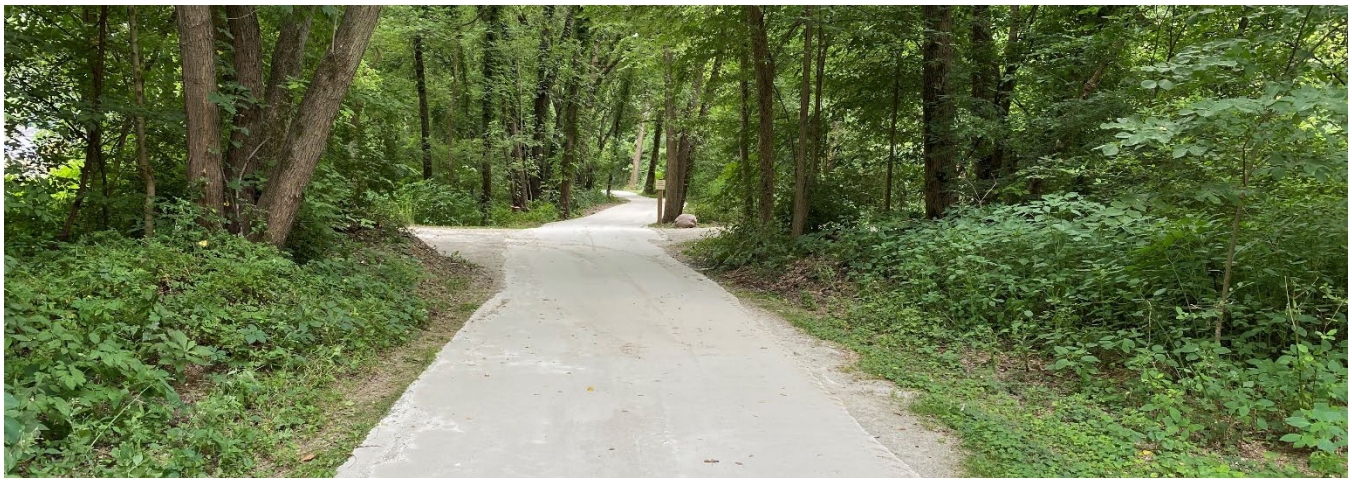
Between June and November 2024, the project team consisting of Stark County Area Transportation Study (SCATS), Stark Parks, and Toole Design Group analyzed various options to count trail users, develop seasonal estimates, and explore other data relevant to Stark Parks' needs. Stark Parks' began this study by identifying key questions that would advance planning, maintenance, and operations of the trail system. The key questions this study addresses are:

1. How many people visit Stark Parks' trails?
2. How does visitation change in the winter?
3. Where are counts needed to gather future data?
4. How can Stark Parks estimate future trail visitation for new trails?
5. How can trails and parks be the most comfortable for those with accessibility needs, and where should upgrades be prioritized?

This memo documents key findings and recommendations for the first four questions above. The fifth question, related to accessibility, is dependent on a public survey and will be addressed in a subsequent memo. The following topics are included in this memorandum:

- Trail use
    - Methodology and data options
    - StreetLight results
    - Winter use
- Planning Tools
    - Regional active transportation trips (StreetLight)
    - Active transportation trip potential (Replica)
    - Trail counting recommendations (Strava Metro)
    - Guidance on Use Cases

TRAIL USE



TRAIL USE

METHODOLOGY

To understand trail use patterns, the project team began by researching three emerging data sources (Placer.AI, Replica, and StreetLight). Ultimately, StreetLight was selected as the most relevant data source for the bulk of the trail analysis, as it was the only dataset that accounted for recreational trips in its location-based counts. The factors analyzed include criteria in Table 1.

Topic	Capabilities of Streetlight Data	Capabilities of Replica	Capabilities of Placer.ai
Usage numbers for trails and park entrances	Yes, through drawing of custom polygons encompassing a trail section or entrance. This is relevant only for 2019 through 2021. In mid-2022, StreetLight's data sourcing changed and eliminated location-based count capabilities.	No, data that is determined to be a recreational trip is excluded. Only "purposeful" (non-looping, leading to a destination) usage numbers are available.	Partial, data is available for visits of at least a 7-minutes in length, making the data relevant for park facilities but not for trails and transportation trips.
Seasonal usage	Monthly data is available for custom polygons by month for 2019 through 2021.	See above. Transportation trip data can be categorized by Fall and Spring seasons. Summer and Winter may be planned for future data.	See above. Visitation data is available by season.
Information on ADA-users and seniors	Indirectly, through inference of Census information applied to home locations	Indirectly, demographics information for the area is applied to modeled visitors	Yes, demographic information is available for visitors

Table 1. Capabilities of StreetLight, Replica, and Placer.ai

STREETLIGHT COUNT RESULTS

To estimate trail use, the project team relied on 2019-2021 trail visitation data from StreetLight following the below steps:

- Determine representative and ideal locations to draw polygons in StreetLight for data collection
- Download count information for weekend, weekday, monthly, and annual totals from StreetLight
- Analyze the impact of COVID-19 and determine an adequate average period.
- Summarize the count data to estimate annual usage.

CHOOSING TRAILS FOR DATA COLLECTION

Choosing quality locations for data collection depends on many factors, starting with the intended use of the count information. Stark Parks is seeking to use trail count data to:

- Understand trail usage and capacity. Many trails are eight feet wide today but could be prioritized to widen to 10-feet in the future.
- Determine ideal locations to prioritize for paving and winter maintenance.
- Support grant applications and public campaigns for trail expansions, by showcasing the popularity of the trails.
- Identify comparison points that should be measured every few years to track progress on the above concerns.
- Help inform future trail projects.

The context of each trail in the Stark Park system, its relevance to the above uses, and its practicality for having high-quality counts in StreetLight were all considered. Some desired locations were unable to be counted, either because of a high margin of error, a lack of data in StreetLight, or insufficient locations to draw acceptable polygons for data extraction. Other practical concerns for choosing ideal count locations are described more in the future count program recommendations section of this memo. Below is the list of trails prioritized for data collection:

ID	Name
1	Towpath at Lock 4 Trailhead
2	Towpath at Lake Avenue Trailhead
3	Towpath at Craig Pittman Trailhead
4	Petros Lake Trail
5	Campus Trail
6	West Branch Trail
7	Hoover Trail - High School
8	Hoover Trail - Ballfields
9	Middle Branch Trail - Tunnel
10	Middle Branch Trail - 55th St Trailhead

ID	Name
11	Pioneer Trail
12	Stark Electric Railway
13	Nickel Plate Trail - Metzger
14	Sandy Valley Trail
15	Walborn Reserve
16	Deer Creek / Mahoning Valley Trail
17	Iron Horse Trail
18	Minerva Connector Trail
19	Nickel Plate Trail - Crowl St
20	Sippo Lake Trail
21	Sippo Valley Trail- Skyland Ave Trailhead

Figure 1 shows the count locations, with StreetLight count data shown in Table 2.

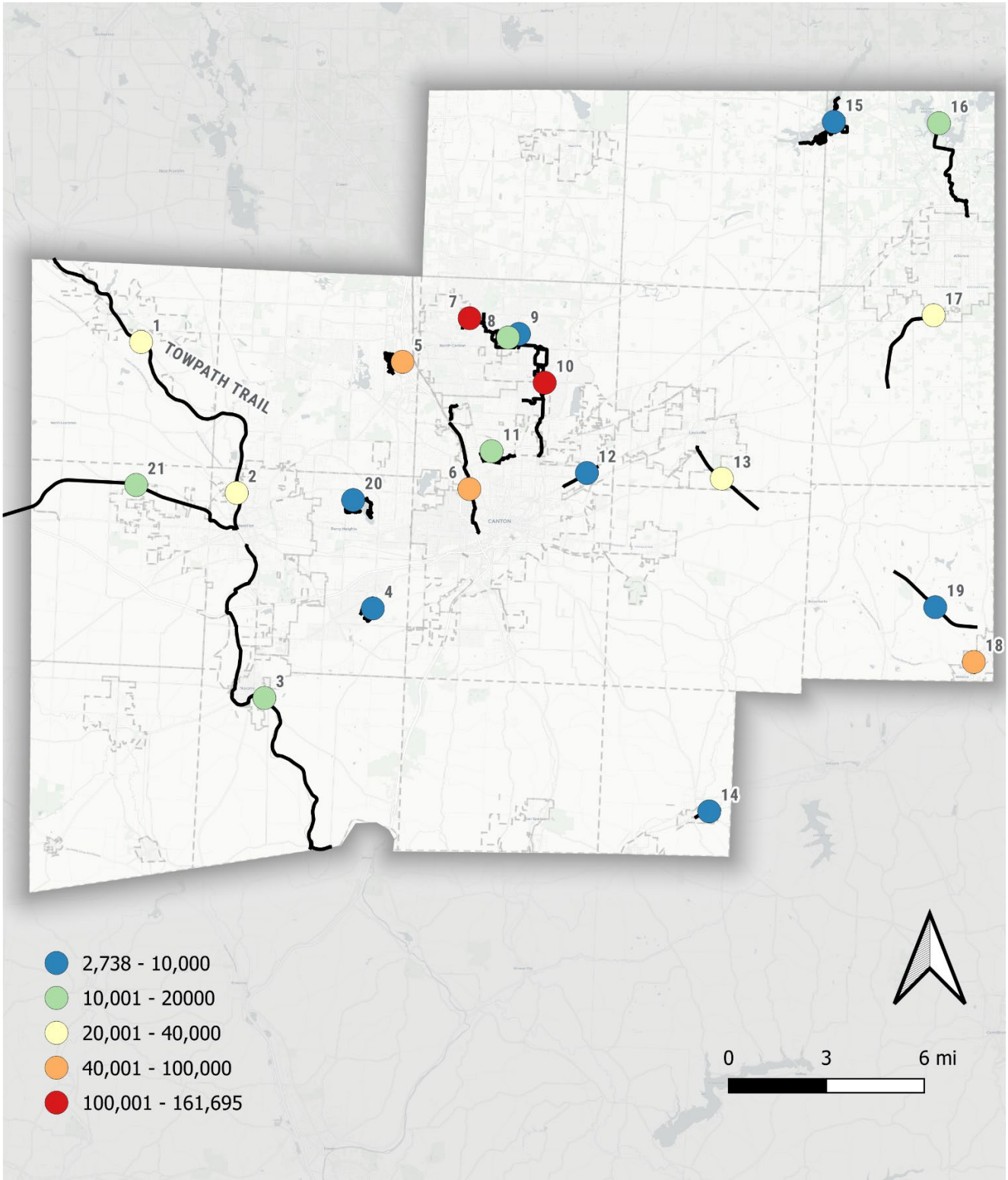


Figure 1. StreetLight Trail Count Locations

ANNUAL AVERAGES

The majority of trail locations analyzed saw an increase in usage from 2019 to 2020, during the onset of the COVID-19 pandemic. A potential cause for this trend is the increase in work from home encouraging residents to explore the local trails more often for physical activity. Another explanation for certain trail segments studied is that the segments did not exist or have been significantly improved since 2019. When comparing the usage from 2021 to 2019, some trails saw a decrease in usage while others saw increases over the same time period. A potential explanation of this is the shifting of trail choice as new trails come online or other trails are improved over time.

Table 2 shows the annual averages for each location, and Table 3 shows the percent change in travel across the years analyzed.

ID	Name	2019	2020	2021	Average
1	Towpath at Lock 4 Trailhead	31,755	52,195	36,500	40,150
2	Towpath at Lake Avenue Trailhead	19,345	25,915	20,075	21,778
3	Towpath at Craig Pittman Trailhead	14,965	25,915	14,600	18,493
4	Petros Lake Trail	5,840	9,490	5,110	6,813
5	Campus Trail	70,080	38,325	40,150	49,518
6	West Branch Trail	29,930	35,405	42,705	36,013
7	Hoover Trail - High School	75,920	133,955	101,835	103,903
8	Hoover Trail - Ballfields	10,950	15,695	11,680	12,775
9	Middle Branch Trail - Tunnel	1,825	6,935	7,665	5,475
10	Middle Branch Trail - 55th St Trailhead	139,795	200,020	115,340	151,718
11	Pioneer Trail	8,760	27,010	33,580	23,117
12	Stark Electric Railway	7,300	3,650	5,475	5,475
13	Nickel Plate Trail - Metzger	10,220	28,104	18,980	19,102
14	Sandy Valley Trail	5,840	14,600	3,650	8,030
15	Walborn Reserve	1,825	4,380	3,285	3,163
16	Deer Creek / Mahoning Valley Trail	8,760	25,185	13,870	15,938
17	Iron Horse Trail	15,330	29,200	20,075	21,535
18	Minerva Connector Trail	37,960	47,815	40,515	42,097
19	Nickel Plate Trail - Crowl St	2,920	2,920	2,555	2,798
20	Sippo Lake Trail	5,475	8,395	1,825	5,232
21	Sippo Valley Trail- Skyland Ave Trailhead	8,760	20,075	13,140	13,992

Table 2. StreetLight Trail Counts, Annual Averages 2019-2021

ID	Name	Annual Average (2019-2021)	Percent Change, 2019-2020	Percent Change, 2019-2021
1	Towpath at Lock 4 Trailhead	40,150	64%	15%
2	Towpath at Lake Avenue Trailhead	21,778	34%	4%
3	Towpath at Craig Pittman Trailhead	18,493	73%	-2%
4	Petros Lake Trail	6,813	63%	-13%
5	Campus Trail	49,518	-45%	-43%
6	West Branch Trail	36,013	18%	43%
7	Hoover Trail - High School	103,903	76%	34%
8	Hoover Trail - Ballfields	12,775	43%	7%
9	Middle Branch Trail - Tunnel	5,475	280%	320%
10	Middle Branch Trail – 55th St Trailhead	151,718	43%	-17%
11	Pioneer Trail	23,117	208%	283%
12	Stark Electric Railway	5,475	-50%	-25%
13	Nickel Plate Trail - Metzger	19,102	175%	86%
14	Sandy Valley Trail	8,030	150%	-38%
15	Walborn Reserve	3,163	140%	80%
16	Deer Creek / Mahoning Valley Trail	15,938	188%	58%
17	Iron Horse Trail	21,535	90%	31%
18	Minerva Connector Trail	42,097	26%	7%
19	Nickel Plate Trail - Crowl St	2,798	0%	-13%
20	Sippo Lake Trail	5,232	53%	-67%
21	Sippo Valley Trail - Skyland Ave Trailhead	13,992	129%	50%

Table 3. StreetLight Counts, 2019-2021

WEEKDAY VS. WEEKEND AVERAGES

An analysis of day-of-week travel patterns was also done to inform count duration and set up, and to analyze why some known popular locations (like the Towpath) may appear to have lower-than-expected use. The StreetLight data showed a range of weekly patterns. Most trails have higher weekend use. The exceptions are the trails near schools or universities, such as the Campus Trail (Kent State University), Hoover Trail Ballfields location (Walsh University), Pioneer Trail (Malone University), Minerva Connector Trail (Elementary and Middle Schools) and Nickel Plate Trail (Louisville Middle School). The Walborn Reservoir and Lock 4 Trailhead had the highest relative rate of weekend use, which is expected as these trails are further from residential neighborhoods that would generate weekday use. Figure 2 shows the resulting comparison of weekday, Friday, and weekend day counts.

In order to capture the full range of trail usage, a count program that covers both weekdays and weekend days is recommended to provide sufficient data for projecting annual counts.

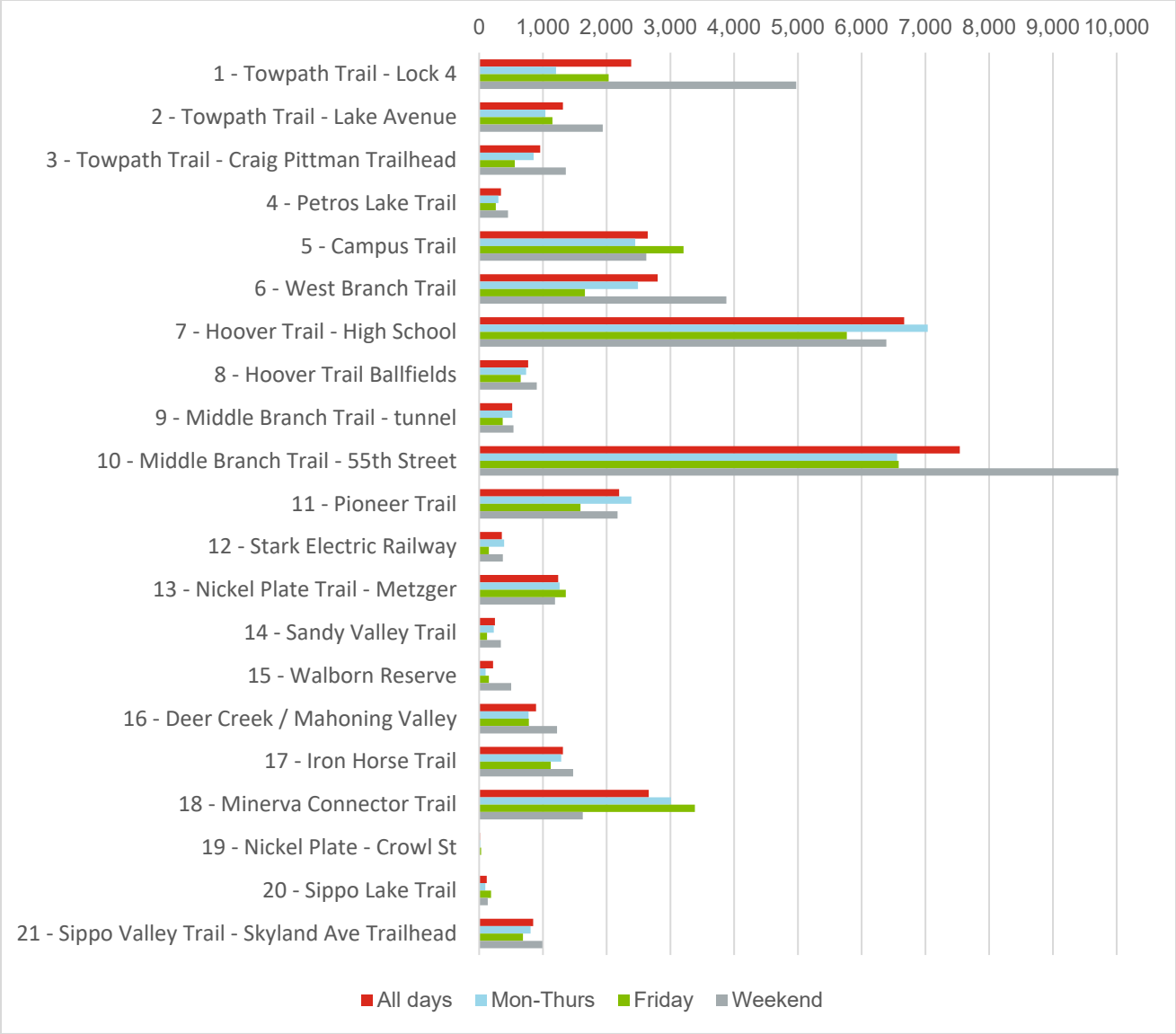


Figure 2. Day of Week Variations for StreetLight Average Counts, 2019-2021

The StreetLight results show that many of the trails in populated areas and near school campuses have higher use than popular recreational trails, including the Towpath. This is partly because the weekday travel is consistent on these trails, while the Towpath attracts many of its trips on the weekend. Hoover Trail, for example, is near a high school and has particularly high usage, supporting the anecdotal evidence that track teams, student commuters, and gym classes regularly use the trail.

Some locations have data findings that need further exploration and validation. For example, the Middle Branch Trail at 55th Street had limited options for how and where to place the polygon necessary to extract data from StreetLight. As a result, the section of trail selected was very close in proximity to two local businesses on either side of the trail. It is possible that either or a mix of both a) StreetLight associated data in/near the businesses with the trail, and improperly assigned counts to the trail or b) patrons or employees of the local businesses visit the trail in large numbers. Because the reason for the high trail use is unclear but may be attributed to genuine trail usage, the project team kept this location in the analysis. Other locations were excluded when a location on the

trail could not be identified that was far enough away from other roads or destinations to be sure trail trips were accurately counted.

Another issue that requires further exploration are trail like the Sippo Lake Trail system, that have multiple trails in one general area. In these locations, StreetLight may not be accurately dividing trips between one trail and parallel sections of a nearby trail. To avoid double counting trail users (ie., trail trips that start and end in a loop) by drawing a larger polygon for data capture, the project team opted to underestimate trail use by selecting small sections of trails in these areas.

COMPARISON TO 2015 COUNTS

StreetLight's calibration tool allows for analysts to upload observed, actual counts for particular locations. The tool then calibrates the StreetLight data to incorporate these observed counts in its calculations. Stark Parks provided annual trail usage estimates for selected trails from 2015, the most recent year of available data. The counts were obtained from volunteer observational counts of an unknown duration on various days.

The 2015 counts were provided as annual estimates without significant detail about how the annual adjustment factors were obtained. The project team compared the 2015 estimates to the uncalibrated StreetLight data for years 2019-2021 and partial data from 2022 in order to determine if they would be useful for calibration of StreetLight data.

As shown in Figure 3, for most locations, the 2015 estimates were generally in the same order of magnitude as the StreetLight data, but not particularly highly correlated. One location, the Middle Branch Trail at 55th Street, showed significantly higher usage in the StreetLight data than the 2015 estimates. One possible explanation is that the trail was still relatively recently constructed in 2015. As Stark Parks' trail network has grown and become more accessible to more people, usage of the trail has grown. Another possible explanation, as described earlier, is that StreetLight overestimates counts in this location by assigning trips to nearby businesses to the trail.

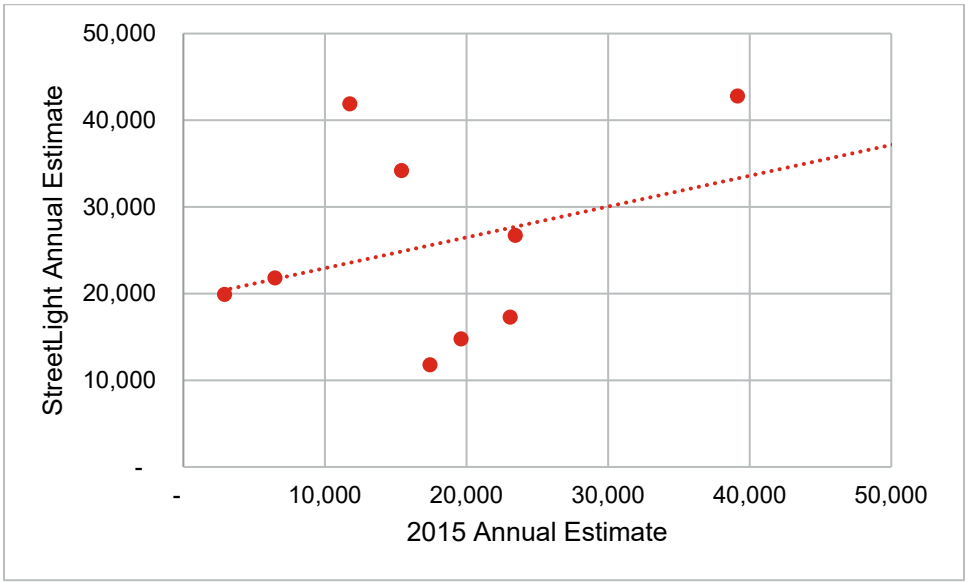


Figure 3. 2015 Annual Usage Estimates Compared to 2019-2022 StreetLight Estimates

The conclusion from this comparison is that the 2015 count-based estimates do not provide sufficient data to calibrate StreetLight, and that StreetLight data provides the best available source of data to inform the development of a count program.

WINTER USE

StreetLight's location-based data is available for years 2019, 2020, and 2021 by month. After this point, StreetLight's underlying data sources changed and subsequent years are unavailable in this format. After reviewing the monthly data, the project team opted to use only 2021 as early years had less reliable information and high margins of error. The seasonal use patterns available in the 2021 data are useful to Stark Parks as they look to identify trails for winter maintenance, expand winter programming, and gain a sense of how trail use changes during the off-season. For future active transportation planning work, including seeking funding, information on winter transportation and recreation use of trails is also important. The regional estimates available to communities today are not based on localized data and include cities that are much colder, with more snow, than Northeast Ohio. Developing local seasonal adjustment curves will also help Stark Parks to gather counts at any time of year and have the ability to adjust the data to result in an annual estimate.

The winter trail use patterns are shown in Figure 4. In general, trails near schools and populated areas have higher winter use. This may also correlate with parks or other facilities that have winter programming and events.

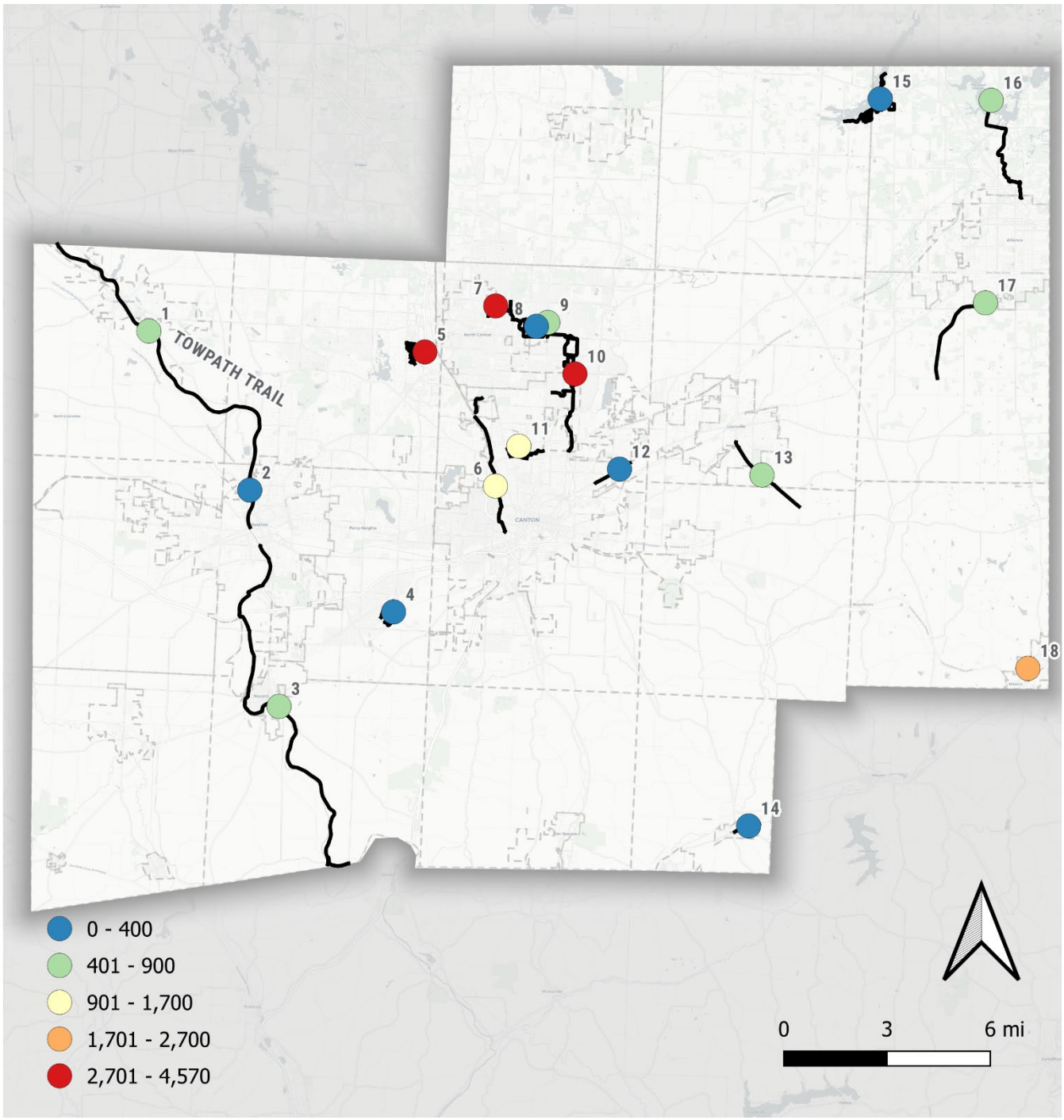


Figure 4. Winter Trail Use Average Counts of January, February, December 2021

ID	Name	January 2021	February 2021	December 2021	Season Average
1	Lock 4 Trailhead	960	210	600	590
2	Lake Avenue Trailhead	540	60	540	380
3	Craig Pittman Trailhead	480	780	540	600
4	Petros Lake Trail	120	60	150	110
5	Campus Trail	2,340	2,580	3,240	2,720
6	West Branch Trail	900	990	1,620	1,170
7	Hoover Trail - High School	6,000	3,210	4,500	4,570
8	Hoover Trail Ballfields	390	210	120	240
9	Middle Branch Trail - Tunnel	270	120	1,980	790
10	Middle Branch Trail - 55th St	6,720	2,400	2,370	3,830
11	Pioneer Trail	1,770	1,890	1,410	1,690
12	Stark Electric Railway	60	150	285	165
13	Nickel Plate Trail - Metzger	1,080	930	90	700
14	Sandy Valley Trail	270	60	90	140
15	Walborn Reserve	120	390	120	210
16	Deer Creek / Mahoning Valley Trail	420	1,440	690	850
17	Iron Horse Trail	990	630	990	870
18	Minerva Connector Trail	2,130	2,340	2,520	2,330

Table 4. StreetLight Winter Counts, 2021

SEASONAL ADJUSTMENT FACTORS

Stark Parks has the opportunity to partner with the Stark County Area Transportation Study (SCATS) to conduct one-week, temporary trail counts with Miovision Cameras. This study focused on identifying locations that will be good to either corroborate StreetLight data or to build new data into Stark Parks' program. Regardless of purpose, the use of monthly adjustment factors will allow for trail counts conducted during any month of the year to be useful for developing annual estimates, which are especially useful for planning purposes and grant funding applications.

Developing Seasonal Adjustment Factor

The first step to developing monthly adjustment factors was to develop a set of StreetLight counts for a representative selection of trails. From the trails listed earlier and mapped in Figure 1, all but two had reliable winter data are were included in the analysis.

Figure 5 shows the average daily usage for each month of the year 2021 from all the trails in Table 4 combined. Trail use peaks in the spring and summer and is lowest in December. However, all months of the year have an average daily use of at least 500 users.

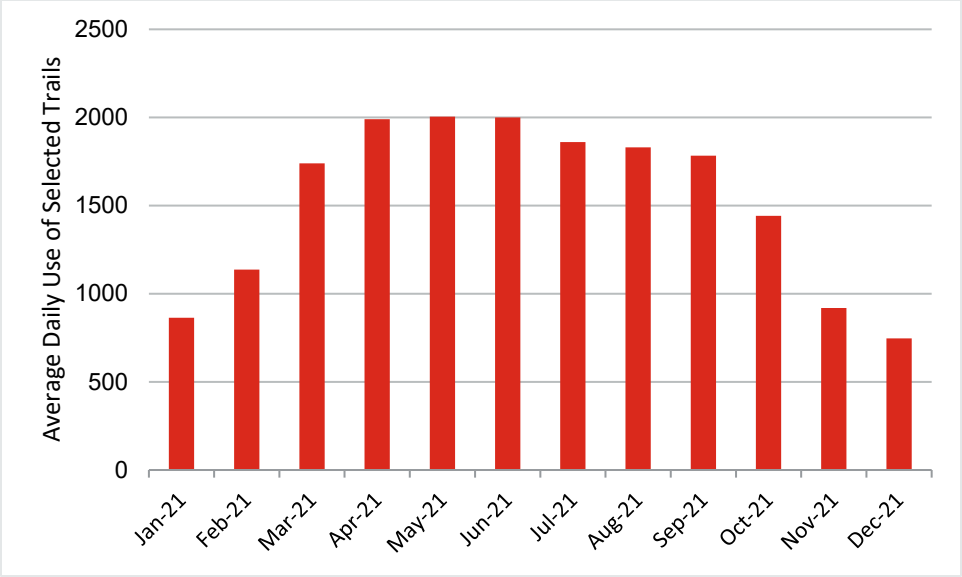


Figure 5. Average Combined Daily Use of Selected Trails

It is likely that the seasonal usage will vary on trails that are paved and cleared of snow in the winter compared to trails that are unpaved and/or not cleared during winter months. Before the data can be subdivided based on pavement type or other conditions, more data should be added and this information should be validated with Miovision counts. With additional counts, the seasonal usage patterns could be further evaluated.

Table 5 shows the resulting monthly adjustment factors, to be applied to monthly count estimates:

- "Monthly Usage Factor" shows the monthly usage of that month compared to the average month of the year.
- "Annual Count Adjustment" is used to adjust a raw monthly count to the annual average usage

Month	Monthly Usage Factor	Annual Count Adjustment
January	0.57	21.20
February	0.75	16.11
March	1.14	10.53
April	1.30	9.20
May	1.31	9.14
June	1.31	9.16
July	1.22	9.85
August	1.20	10.01
September	1.17	10.27
October	0.94	12.71
November	0.60	19.92
December	0.49	24.54

Table 5. Seasonal Count Adjustment Factors

Applying the Seasonal Adjustment Factor – Example

In early November, 2024, SCATS collected data at two locations to initiate the trail user data collection program. The count days and locations are as follows:

- Hoover Trail – High School – November 8-10, 2024
- Middle Branch Trail – 55th Street – November 2, 2024

With only a single day collected at the Middle Branch Trail, an example of applying a seasonal adjustment factor to the Hoover Trail count will be done.

Day	Pedestrians	Bicyclists	Total
Friday, Nov 8	99	46	145
Saturday, Nov 9	159	25	184
Sunday, Nov 10	23	5	28

Table 6. Count Results at Hoover Trail-Ballfields

Table 6 shows that the number of users greatly decreased on Sunday, compared to Friday and Saturday. This is likely due to poor weather conditions on Sunday, November 10th and typical weather conditions on Friday and Saturday. For this reason, we recommend that we only use the Saturday data to capture weekend conditions, for the basis of this example. Ideally in the future, more count data will be collected to support the annual estimate.

In this example, the total volume on Friday, November 8 represents the average weekday count, and the total volume on Saturday, November 9 represents the average weekend day count. Each of these are factored into an estimate of annual usage, assuming that the average month has 21.7 weekdays and 8.7 weekend days, as shown in Table 7.

	Daily Count	Adjustment Factor *(Daily to Monthly Conversion)*	Total Monthly Users
Average November Weekday	145	21.7 weekdays per month	3,147
Average November Weekend Day	184	8.7 weekend days per month	1,601
Month of November Total			**4,747**

Table 7. Monthly Calculations from Daily Counts

With the total monthly users for the month of the November now estimated, an annual trail user estimate is calculated using the Monthly Adjustment Factor, as shown in Table 8. The annual estimate derived from the Miovision counts is within 10% of the StreetLight Estimate, indicating reasonable agreement between these two methods. As additional Miovision counts are collected, the accuracy of the StreetLight count estimates can be more accurately assessed.

Line 1	Total November Monthly Users (From Table 7)	4,747
Line 2	Monthly Adjustment (From Table 5)	19.92
	Annual estimate of Trail Users (Line 1 x Line 2)	94,560
	StreetLight estimate, for comparison	103,903

Table 8. Adjustment from Seasonal Monthly Use to Annual Use

PLANNING TOOLS



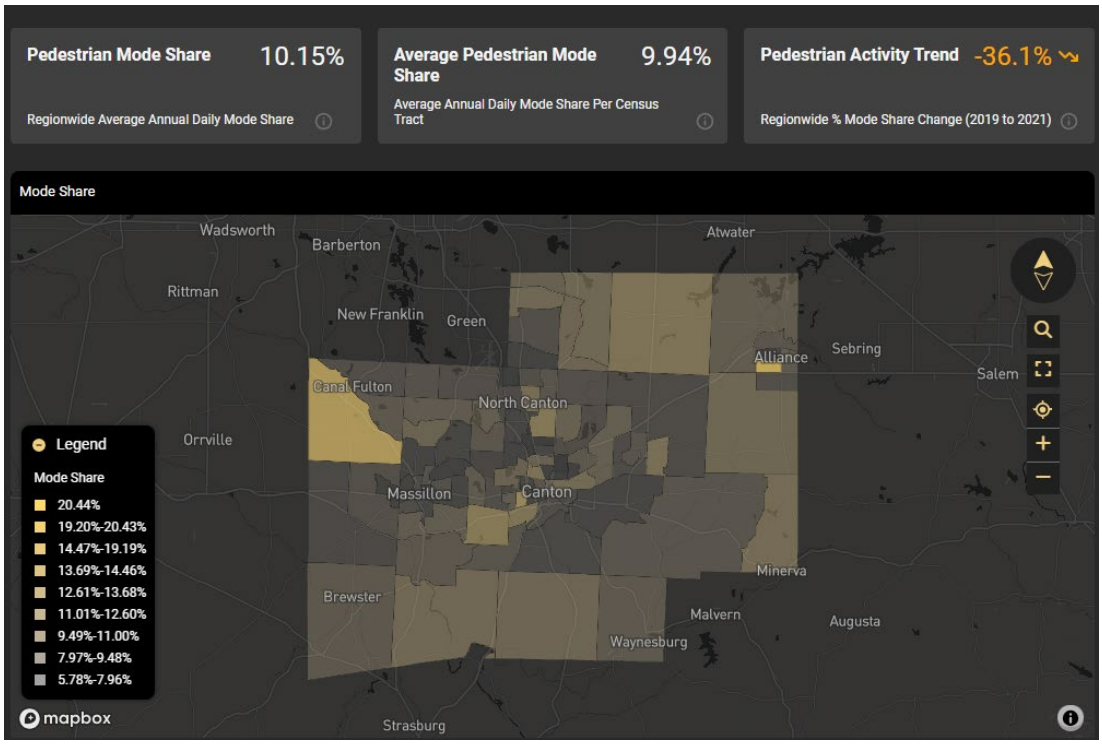
PLANNING TOOLS

The data gathered during this study can be used to help Stark Parks and SCATS plan for active transportation in the region. StreetLight's active transportation trip data, Replica's short trip maps, and tools like Strava can help public agencies plan for where to expect more active transportation users if trails are constructed and to support existing users. This section outlines these tools and resources and provides detailed information on possible directions for Stark Parks' and SCATS future trail counting programs.

REGIONAL ACTIVE TRANSPORTATION TRIPS (STREETLIGHT)

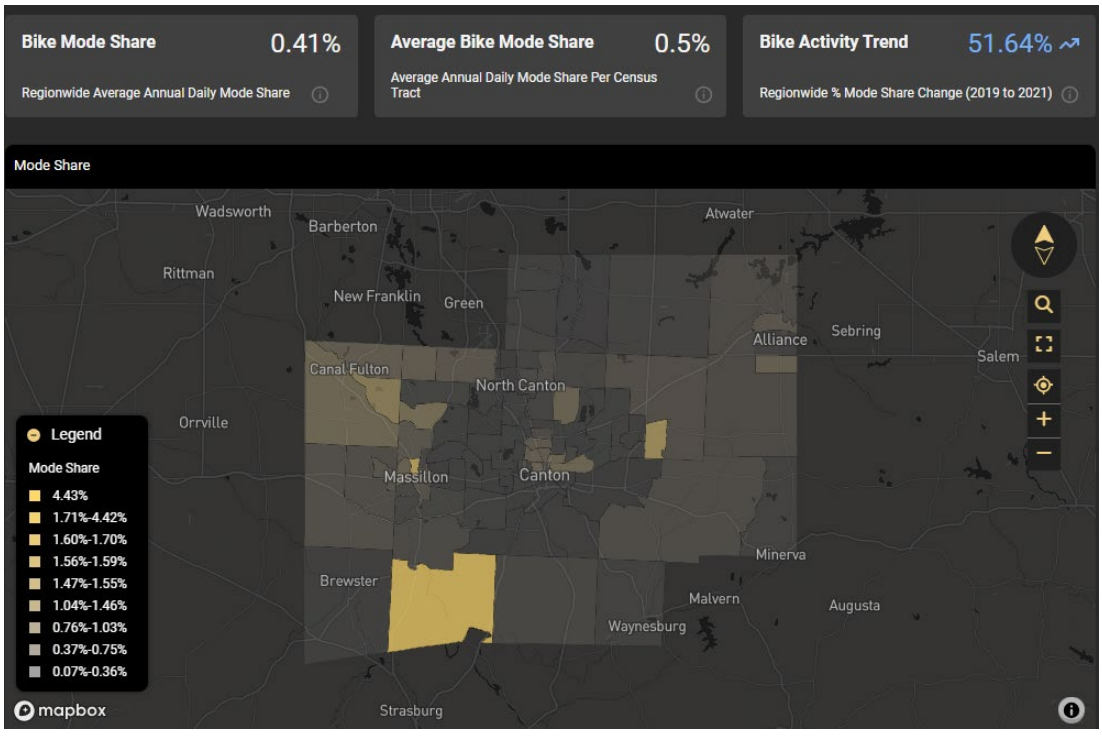
StreetLight provides estimates of active transportation mode share at the Census Tract level. This information is based on StreetLight's location-based data and model and can serve as a baseline to understand where in the region higher concentrations of people are taking trips using active modes like biking and walking. The data produced at the Census Tract level by StreetLight may have a higher margin of error than location-based data used to determine trail counts, and results should be verified against local data in the future where possible, but serve as an interesting starting point to assess current conditions. Figure 6 shows the Census Tracts in Stark County by the percent of trips taken by walking, and Figure 7 shows corresponding bike trips. Together, this information highlights several interesting trends:

- Areas along the Towpath (central west of the County) tend to have higher mode shares of active transportation
- Rural areas, which may have less trips overall, also have higher mode shares of active transportation.
- Tracts in populated areas like downtown Canton, Massillon, and Alliance, which likely have more trips overall, have pockets with greater active transportation mode share.



Source: StreetLight Data

Figure 6. Regional Pedestrian Mode Share, by Census Tract, 2019-2021



Source: StreetLight Data

Figure 7. Regional Bike Mode Share, by Census Tract, 2019-2021

ACTIVE TRANSPORTATION TRIP POTENTIAL

Replica, which is a subscription-based national dataset, uses a model to estimate traffic patterns that is calibrated with LBS, demographic and economic data. While some active transportation trips are included in the model, recreational trips are excluded, and Replica was not used to generate trail counts for this study. However, Replica's traffic model is a useful tool in highlighting where people drive for short distances today, as these trips may be good candidates for active transportation trips if safe, comfortable, and accessible infrastructure was provided.

Figure 8 shows the Stark County region by where short vehicle trips are concentrated. A short trip is defined as under 3 miles.

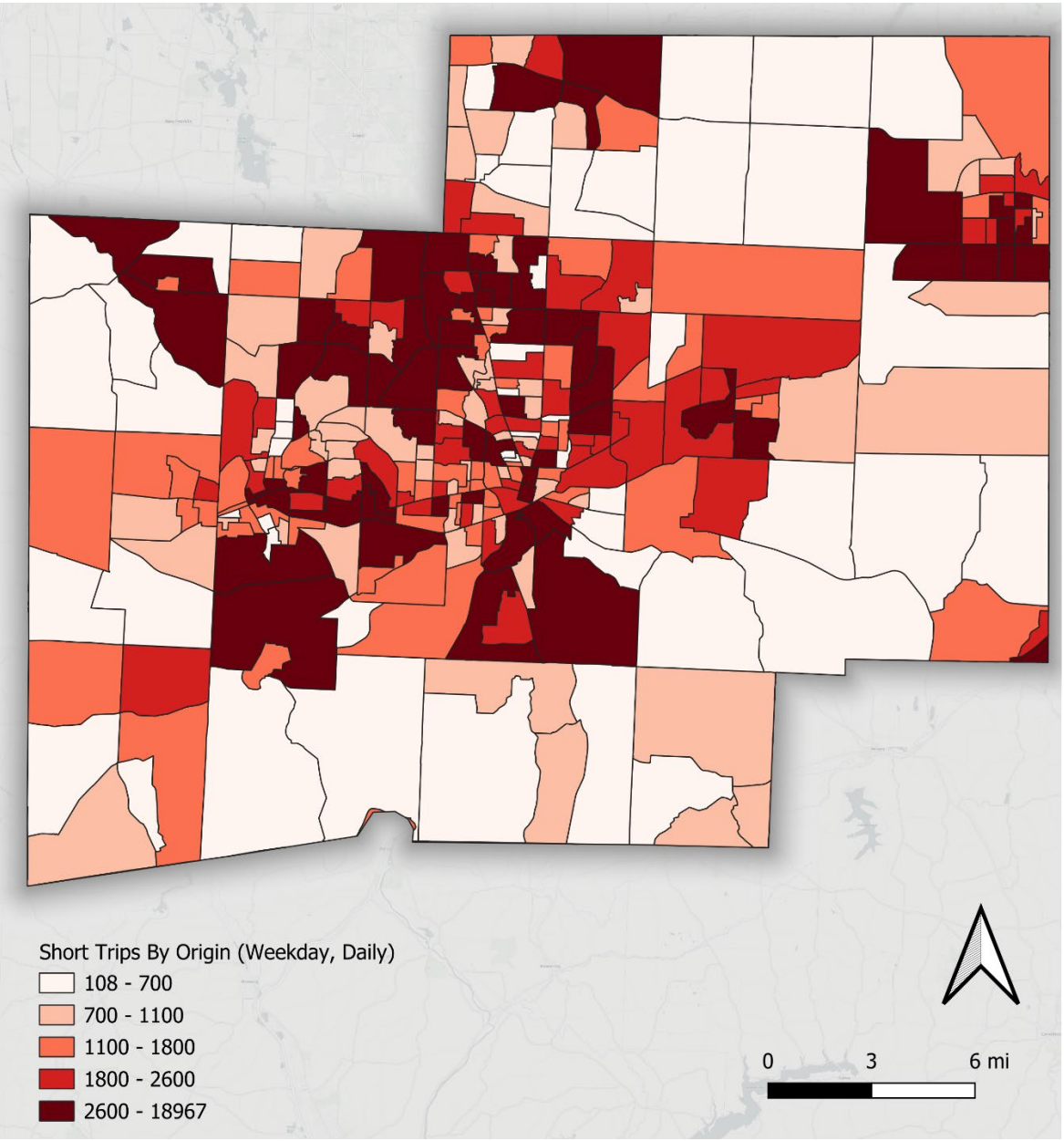


Figure 8. Short Vehicle Trips (under 3 Miles) by originating census tract in Stark County

TRAIL COUNT PROGRAM RECOMMENDATIONS

The following sections recommend actions for Stark Parks to continue with the trail counting program using temporary count equipment, such as Miovision Scout counters provided by SCATS. Another way to inform the selection of count locations is to examine Strava Metro data, which shows individual routes and patterns of trail use.

Stark Parks is beginning a trail count program for several purposes, with the primary goals being to plan and prioritize trail improvements such as widening and resurfacing, and to improve the agency's ability to estimate trail usage for grant applications, and base projections of future trail users on actual counts.

WHERE TO COUNT – CANDIDATE TRAIL COUNT LOCATIONS

Trail counts should cover the most popular trails, and trails with the most extensive network of connections. Additionally, trails that are likely to meet a transportation need, in addition to recreational opportunities, should also be priorities. The trails included in the StreetLight analysis (Figure 1) are good candidates for future Miovision counts.

SCATS is able to provide Miovision camera equipment that can be installed for a short duration and moved to new locations weekly, to capture data at around four locations per year. If the count program gathered data at four unique locations over the course of three to four years and then repeated, this would result in a substantial log of data that can be useful to the work of Stark Parks and to other transportation planning initiatives.

Specific recommendations to consider for trail counts follow for each trail, based on a desktop review and the use of Strava, a national recreational app that allows users to log their recreational routes. Actual field conditions may warrant selecting a different location. General principles for trail count locations include:

- Locate counts far enough from the trail access so that persons counted are using the trail rather than lingering in the trail head access area.
- Locate trail near junctions to get highest counts of users, to expand understanding of trail use.
- Small spur trails are unlikely to generated sufficient use to warrant the expense of trail counts.
- Prioritize count locations that will provide useful information to Stark Parks, such as trail networks where future expansions are planned or recently completed.
- The Towpath Trail should be prioritized given the high use and recreational significance.
- "Everyday" trails near residential neighborhoods, such as the Middle Branch and Western Branch Trails, should also be prioritized, and likely to provide different usage patterns than the Towpath Trail.
- Count periods of 5 to 7 days are desirable, and should include both weekend days. One or two weekdays can be used as "transfer" days to relocate the counter. Holiday weeks or periods with special events or construction should be avoided when selecting count dates.

The following sections review each trail and propose count locations and considerations. Strava heat maps are included to show typical trail usage patterns, which can be useful for determining optimal count locations. Stark Parks can apply as partner to gain access to Strava Metro GIS data.[1]

[1] https://metro.strava.com/

1. Towpath at Lock 4 Trailhead

- StreetLight Average Use = 40150
- Higher weekend usage compared to regional average
- Typical seasonal variation compared to regional average



2. Towpath at Lake Avenue Trailhead

- StreetLight Average Use = 21,778
- Higher weekend usage compared to regional average
- Higher seasonal variation compared to regional average



3. Towpath at Craig Pittman Trailhead

- StreetLight Average Use = 18,493
- Very high weekend usage compared to regional average
- Typical seasonal variation compared to regional average



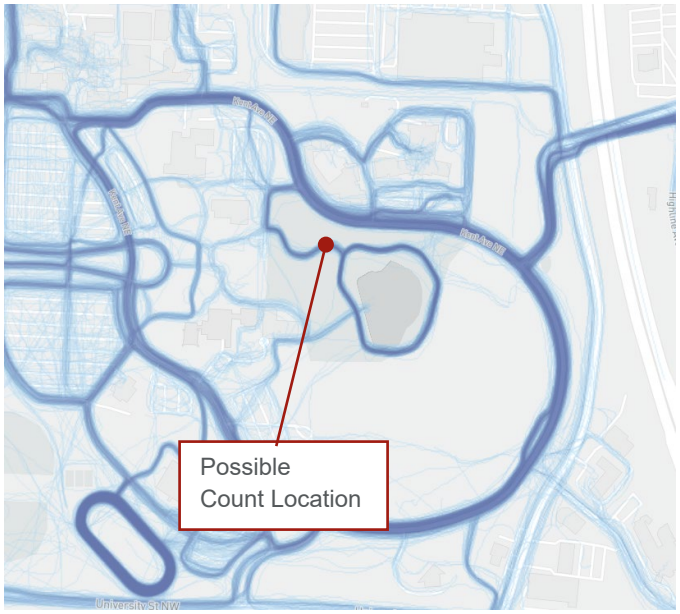
4. Petros Lake Trail

- StreetLight Average Use = 6,813
- Typical weekend usage compared to regional average
- Higher seasonal variation compared to regional average


Longview St SW
Genoa Ave SW
Westview
Navel St SW
Navarre Rd SW
Possible Count Location
Hancock St SW
Benjamin St SW
Navarre Rd SW
Brecksville Rd SW
Brecksville Rd
Brecksville Rd SW
Brecksville Rd
Brecksville Rd SW
Brecksville Rd

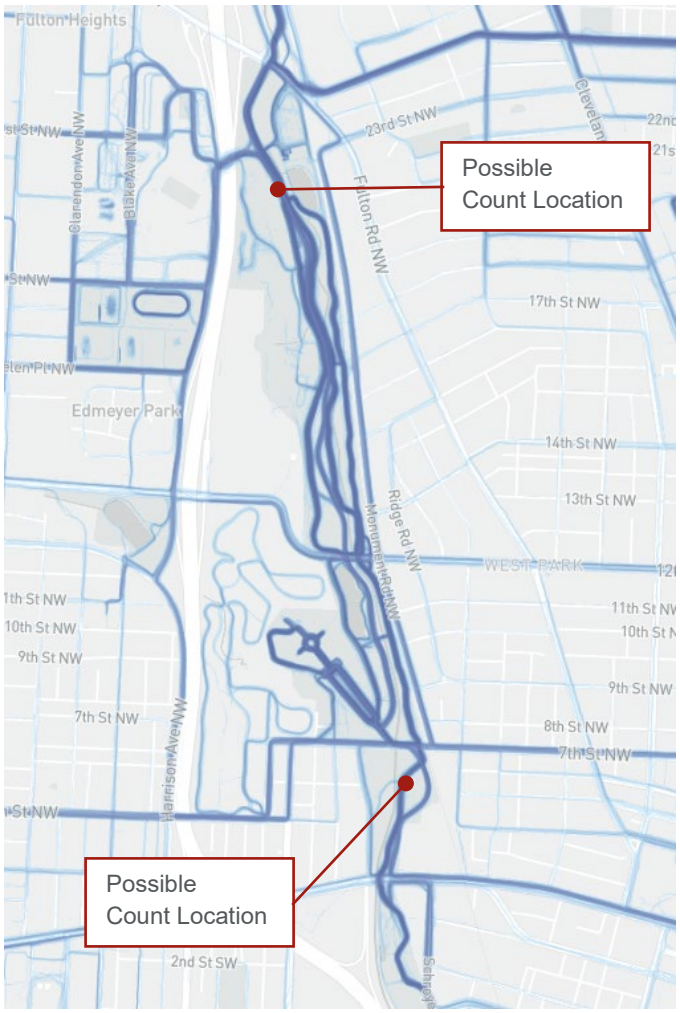
5. Campus Trail

- StreetLight Average Use = 49,518
- Higher weekday usage compared to regional average
- Lower seasonal variation compared to regional average



6. West Branch Trail

- StreetLight Average Use = 36,013
- Higher weekend usage compared to regional average
- Typical seasonal variation compared to regional average



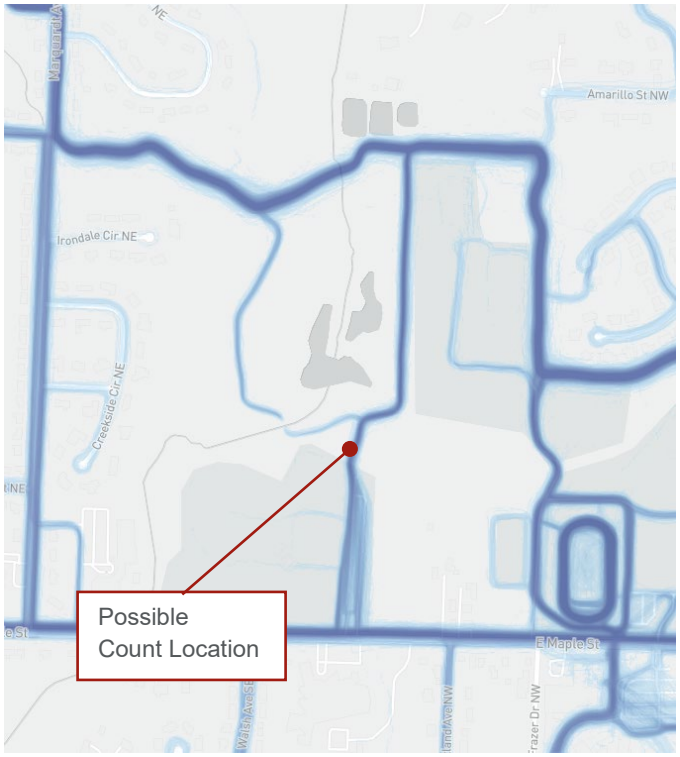
7. Hoover Trail – High School

- StreetLight Average Use = 103,903
- Typical weekend usage compared to regional average
- Lower seasonal variation compared to regional average



8. Hoover Trail – Ballfields

- StreetLight Average Use = 12,775
- Typical weekend usage compared to regional average
- Higher seasonal variation compared to regional average
- Srava shows dispersed pattern of use as trail approaches East Maple Street, so optimal counting would be further to north



9. Middle Branch Trail Tunnel

- StreetLight Average Use = 5,475
- Lower weekend usage compared to regional average
- Higher seasonal variation compared to regional average



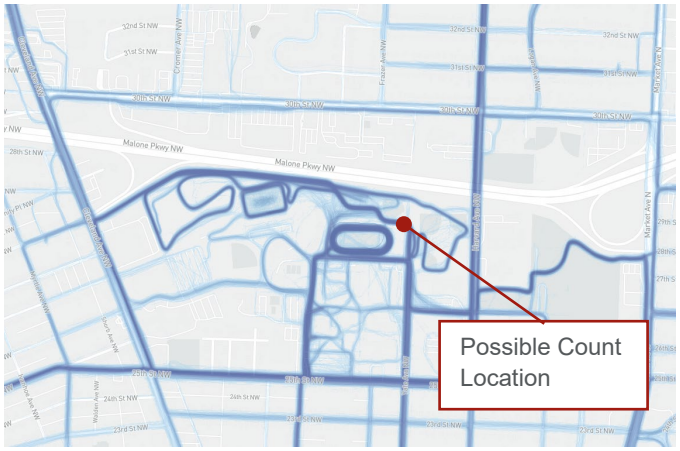
10. Middle Branch Trail at 55th Street

- StreetLight Average Use = 151,718
- Higher weekend usage compared to regional average
- Higher seasonal variation compared to regional average
- Trailhead connects to parking area of local businesses; should locate counter further from the businesses.



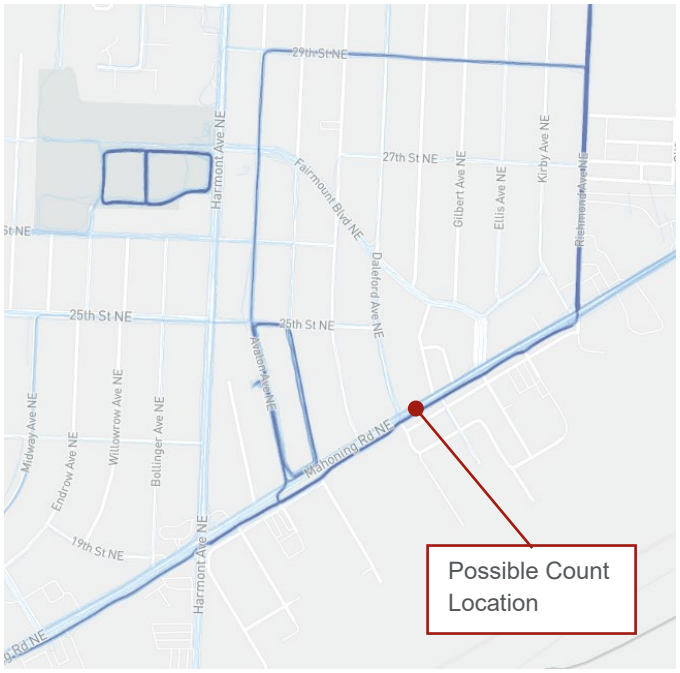
11. Pioneer Trail

- StreetLight Average Use = 23,117
- Lower weekend usage compared to regional average
- Less seasonal variation compared to regional average



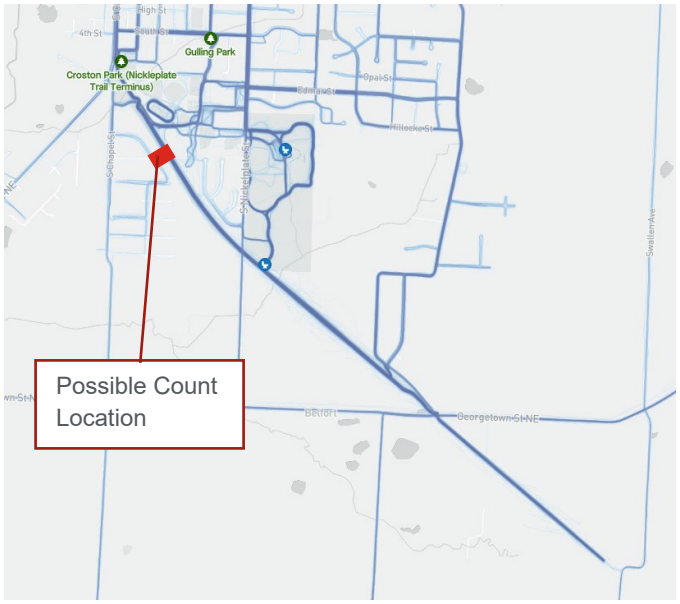
12. Stark Electric Railway Trail

- StreetLight Average Use = 5,475
- Lower weekend usage compared to regional average
- Typical seasonal variation, similar to regional average



13. Nickel Plate Trail at Metzger

- StreetLight Average Use = 19,100
- Lower weekend usage compared to regional average
- Typical seasonal variation, similar to regional average



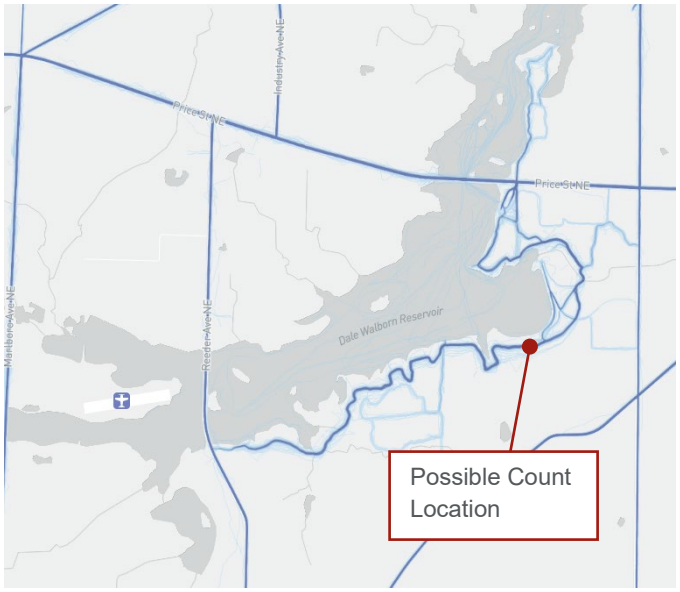
14. Sandy Valley Trail

- StreetLight Average Use = 8,030
- Higher weekend usage compared to regional average
- Higher seasonal variation, compared to regional average



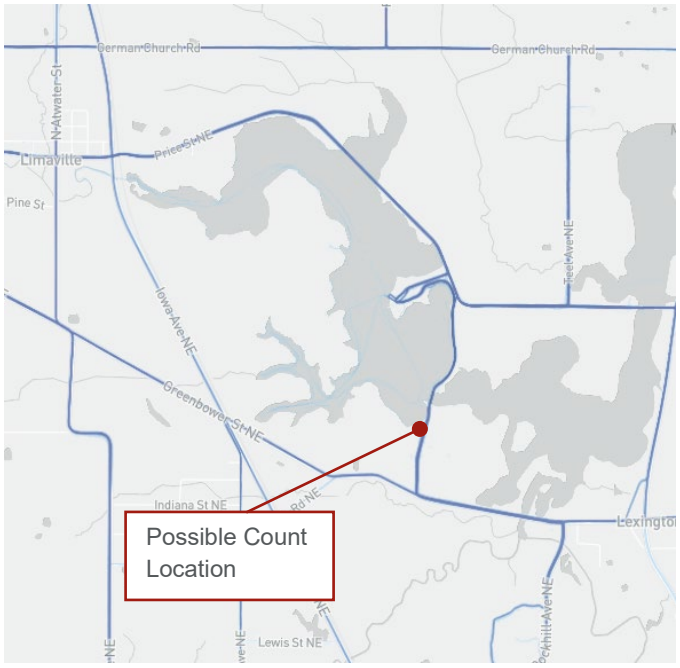
15. Walborn Reservoir Trail

- StreetLight Average Use = 3,163
- Very high weekend usage compared to regional average
- Typical seasonal variation, similar to regional average



16. Deer Creek/Mahoning Valley Trail

- StreetLight Average Use = 15,983
- Higher weekend usage compared to regional average
- Typical seasonal variation, similar to regional average



17. Iron Horse Trail

- StreetLight Average Use = 21,535
- Slightly higher weekend usage compared to regional average
- Lower seasonal variation compared to regional average



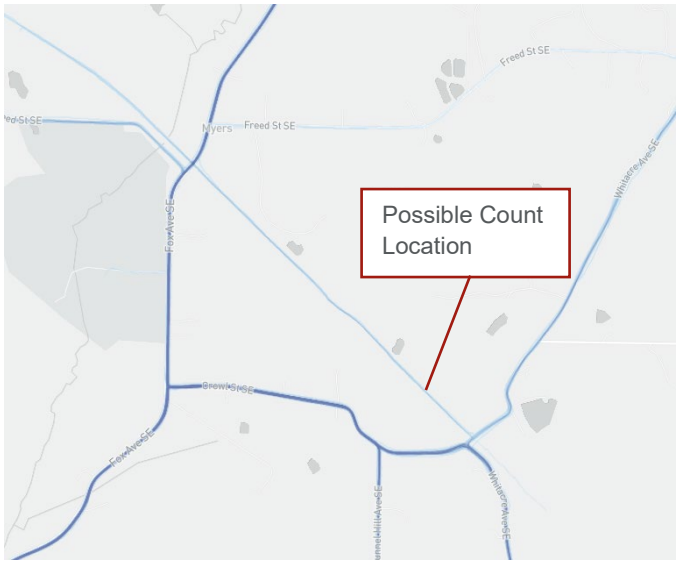
18. Minerva Connector Trail

- StreetLight Average Use = 42,097
- Higher weekday usage patterns compared to regional average, likely due to school proximity
- Low seasonal variation compared to regional average, likely due to school proximity



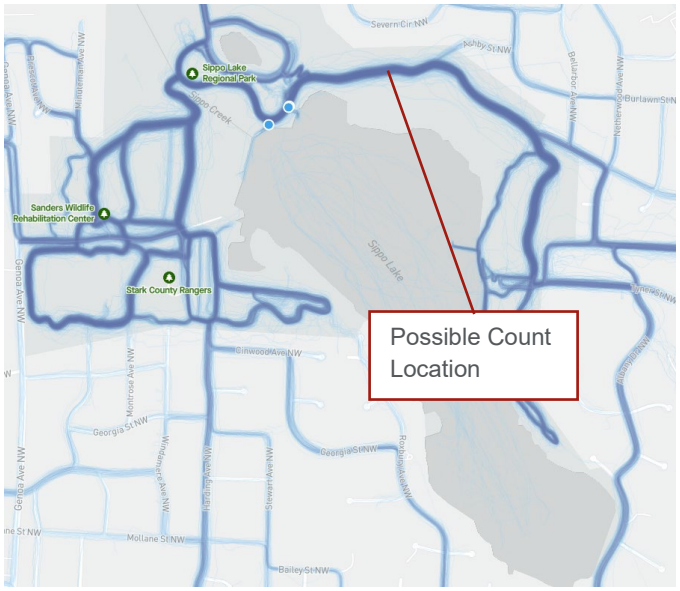
19. Nickel Plate Trail – Crowl Street

- StreetLight Average Use = 2,798
- Data on monthly and weekday use was limited so patterns were not clear



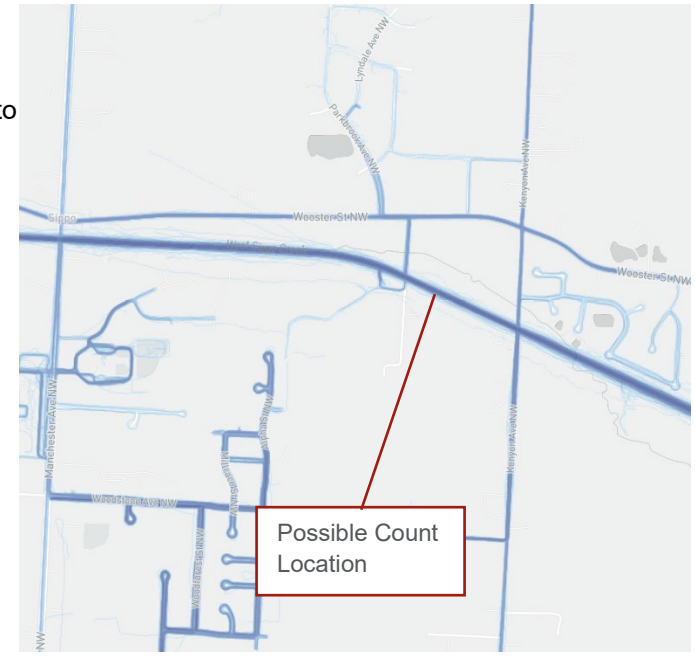
20. Sippo Lake Trail

- StreetLight Average Use = 5,232
- Data on monthly and weekday use was limited so patterns were not clear



21. Sippo Valley Trail – Skyland Ave Trailhead

- StreetLight Average Use = 13,992
- Typical weekend usage patterns compared to regional average
- Very high seasonal variation compared to regional average



HOW TO COUNT - PERMANENT TRAIL COUNTER EQUIPMENT

Permanent trail counting programs consist of physical counters and the data that they produce. This is another option for SCATS and Stark Parks to consider as the trail counting program develops. A program requires agency investment in infrastructure, maintenance, data management, and staff training. Permanent trail counter data can serve a range of purposes and complement temporary or intermittent counts, such as justifying funding, documenting benefits of a trail, and understanding influences on active transportation. Consistent and standardized count programs can support the economic, recreational, and public health benefits associated with trail use. Specific purposes of count programs can include:

- Monitoring active transportation use by time of day, day of week, season, or weather condition.
- Evaluating changes in use before/after project implementation or development.
- Understanding variations in active travel by land use, facility type, and other contextual factors.
- Providing evidence and justification for current and future trail planning.
- Existing permanent trail counts can be used to estimate future trail usage in similar contexts.

Permanent Trail Counting Strategies

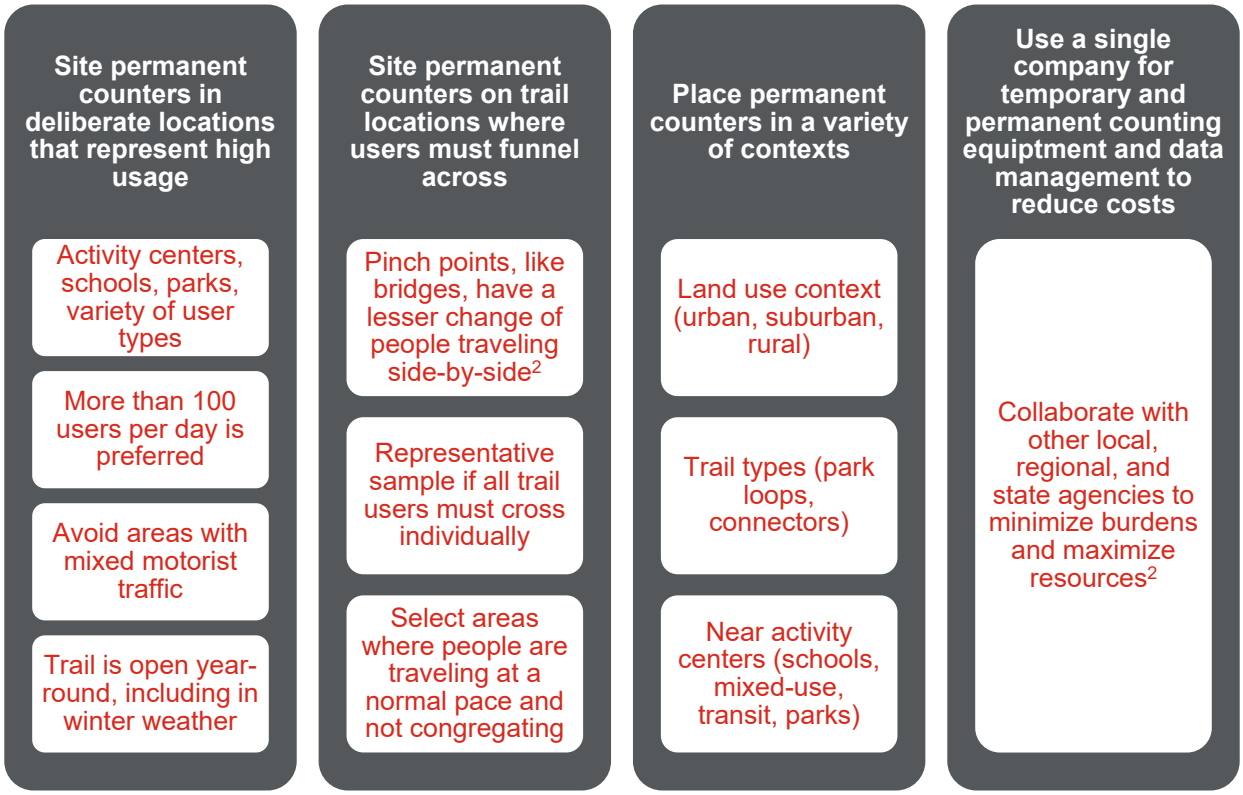


Figure 9. Permanent Counter Siting Strategies

Beyond these strategies, agencies must consider potential challenges associated with permanent trail counters. For example, unhoused populations can trigger counters repeatedly and overestimate count data. Winter weather may prompt trail closures and prompt motorized vehicles like snowmobiles to be used on the trails, skewing count data.

Permanent Trail Counting Equipment

Upfront costs, ongoing costs, equipment type, staff resources, data management are important considerations when deciding on permanent trail counting equipment. Automated counting equipment permanently installed on trails range in resource intensity and cost. Passive and active infrared sensors require the least amount of agency resources (technical capacity, data retrieval) and relatively low upfront and ongoing costs. Inductive loops require more resources because of the ground installation as well as higher costs. Automated video equipment is also resource intensive during the video cleaning process and is also high cost.

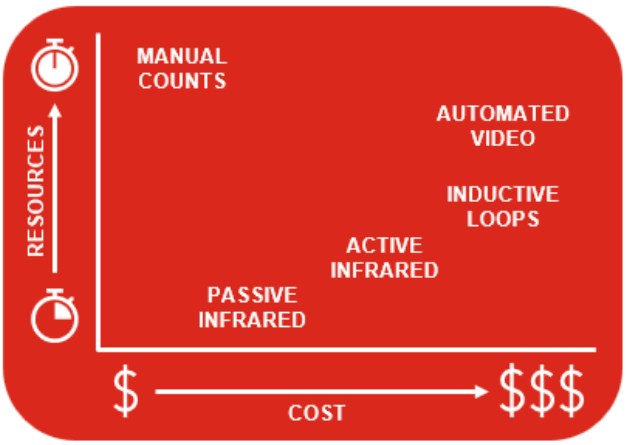


Figure 10. Permanent Counter Options

Manual counts are a cost-effective supplement to trail count data collected by permanent counting equipment. Manual observation is time-consuming for agency staff; however, this approach can collect other behavior and attribute data, such as age, gender, helmet use, and the

use of assistive devices. Resources to complete a manual count and methods to model demand can be found through the National Bicycle and Pedestrian Documentation Project.[2]

QUANTITATIVE APPROACHES

There are several prominent providers for permanent trail counting equipment and data management across transportation agencies in the U.S. that vary in technological approach and cost. Both options in Table 9 are permanent counters designed for shared-use trails.

	Counter Type	Equipment Costs*	Data Management Methods and Costs	Takeaways	Use Cases
Nature MULTI Evo by Eco-Counter	Inductive loops and passive infrared lens	$5250/counter for a 10ft path	Manual data collection with Bluetooth: $180/year/counter Cellular subscription: $540/year/counter or $720/year/counter with public website and API	Automated data retrieval to online data portal Bi-directional trail counts	Ohio DOT**, District DOT (Washington, D.C.), Minnesota DOT, City of Austin, Acadia National Park, City of New Orleans, City of St. Louis, Los Angeles Department of Recreation and Parks
TRAFx	Infrared trail counter	$2490 for three counters, dock to download counter data in the field, and three-year DataNet subscription $590 for each additional counter, and $500 for each additional three-year subscription renewal		Manual data retrieval through dock Cannot distinguish between trail user types Cost effective	Columbus and Franklin County Metropolitan Park District, Great Parks of Hamilton County, Illinois Department of Natural Resources

*Equipment costs do not include installation costs.
**The Ohio Department of Transportation has informally supported subscription fees for Eco-Counter products throughout the state.

Table 9. Permanent Counting Equipment Details

PERMANENT COUNTER EQUIPMENT CONSIDERATIONS

Eco-Counter is a widely implemented permanent counter with automated data collection through cellular service to reduce the need for agency staff to manually retrieve data in the field. With the support provided by ODOT and coordinated planning efforts, Eco-Counter is a less resource-intensive choice for permanent trail counting equipment in Ohio. Stark Parks continued collaboration with ODOT will ensure trail count programs are used to support planning processes and justify future budget considerations. TRAFx will require agency staff to manually retrieve counts from equipment in the field; however, it is more cost-effective for purchasing, installation, and data management.

GUIDANCE ON USE CASES

The data produced in this study can complement active and multimodal transportation planning and programming already underway at Stark Parks. This section offers guidance on how and why to use trail count data within local, regional, and decision-making contexts.

[2] https://bikepeddocumentation.org/

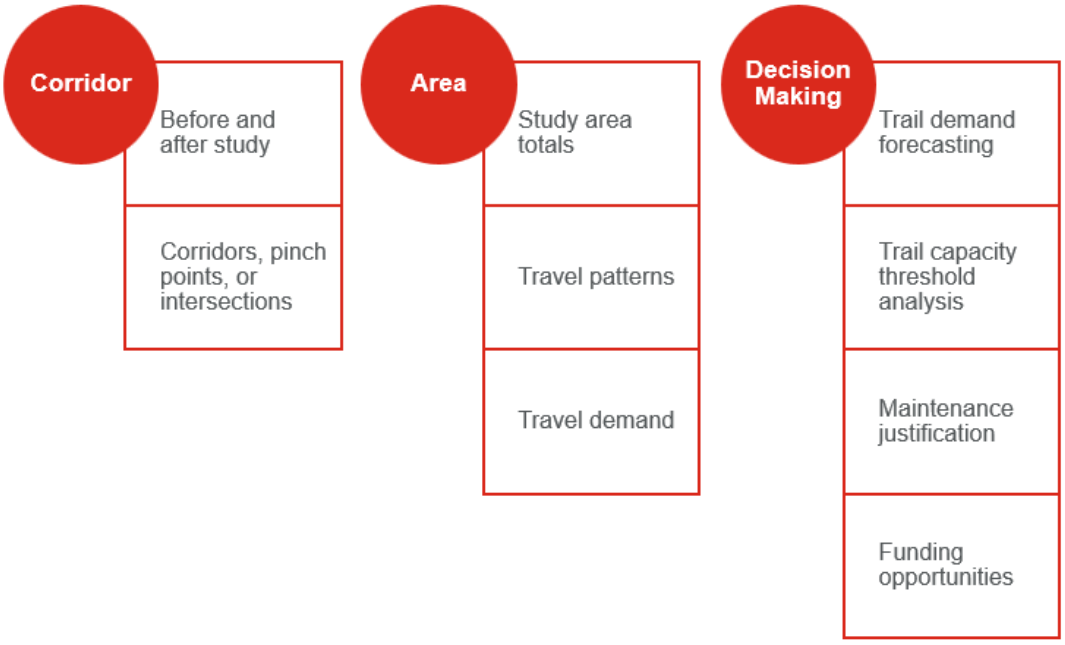


Figure 11. Uses for Trail Counts

CORRIDOR CONTEXT

Collecting trail count data at a single location or within a trail corridor can illustrate growth or change over time. This level of evaluation is useful for before and after studies of trail investments or projects related to corridor design, pinch points, or intersections. This data may also include characteristics about trail users, including gender, trip purpose, travel mode, and more. More detailed reporting of trail counts can also identify locations with the highest use levels, feeding into larger-scale planning processes like project prioritization or needs assessments. Collecting corridor-level data is the foundation of both area and decision-making uses.

AREA CONTEXT

When trail counts are collected across a region or study area, generalizations about travel patterns and travel demand are feasible. Combining data from multiple trails, corridors, or facilities allows for tracking changes over time, documenting usage changes, and understanding how demand fluctuates across seasons or weather conditions. Understanding non-motorized commute and recreational activity patterns, including routes, demand, and performance measurement, are key uses of regional trail count data. For example, annual average daily trail traffic and trail miles traveled are two performance measures that can be calculated at this scale.[3]

Another use of area-wide trail count data is to help calibrate other datasets, including Replica and Streetlight. Calibrating these tools can improve the accuracy of their outputs and improve sensitivity to the local context. Trail count data in a regionwide context can also support recommendations to establish additional monitoring stations in different locations, where non-motorized counts may vary due to land use, community culture, topography, etc.[4]

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[3] Lindsey, G., Singer-Berk, L., Wilson, J. S., Oberg, E., & Hadden-Loh, T. (2018). Challenges in Monitoring Regional Trail Traffic. Transportation Research Record, 2672(43), 98-109. https://doi.org/10.1177/0361198118787996

[4] Lindsey, G., Nordstrom, T., Wu, X., Wu, C., Ciabotti, J., Woods, B. B., Eldridge, R. J., Payton, S., Hull, T., & Edwards, R. (2015). The Impacts of Central Ohio Trails. *Mid-Ohio Regional Planning Commission*.

DECISION-MAKING CONTEXT

Count data can directly inform planning, management, and maintenance of trails. It can also support the identification of safety interventions and modal conflicts. Trail count data that is collected should be summarized and analyzed to help inform the public and decision-makers about how and why trails are being used. The trends that are revealed can inform decisions that impact active transportation planning, design, evaluation, and funding.

Trail Demand Forecasting

The data produced by this study can assist Stark Parks and SCATS in planning for future trail expansions through demand forecasting. Demand forecasting estimates the likely number of users a planned trail might attract if constructed. This data is necessary for a number of federal grants in order to complete a required Benefit Cost Analysis. It is also helpful information to share with the public and stakeholders and can help trail planners determine the various benefits of multiple project options or alignments. An overview of the methods most used in recent, successful Benefit Cost Analyses with StreetLight and/or count data is included for reference in Appendix B. Additionally, trail counts can be combined with non-motorized count data on roadways to predict where new trails could be constructed. In areas with high non-motorized street user activity, trails can complement the existing transportation network and provide a safe environment for both recreation and commuter travel.

Trail Capacity Threshold Analysis

Decisions about current and future trail capacities and widths can be informed by current trail count data. Trails need to be widened when the mix of users exceeds the available physical space. For example, separating pedestrians from higher speed cyclists may be important to improve the comfort and safety of all trail users as the trails grow in popularity. There are several ways to forecast trail capacity and determine threshold widths. Using current trail count data, agencies can calculate future use using the anticipated population density with a half mile of planned and existing trails. Outputs of this method include categorizing trails into those with high, medium, or low-capacity needs in the future. This approach has been used in San Antonio's 2018 Trail Design Strategy and in Austin's 2023 Urban Trails Plan.

Another option is to use the FHWA SUPLOS calculator, which helps with trail width selection using existing data as well as anticipated user volumes and mixes. This method was used to identify and prioritize trails for widening for the Northern Virginia Regional Park Authority along the 45-mile Washington and Old Dominion Trail. Both methods provide guidance on trail widths and selecting dual track urban trails, which is recommended where space permits to improve comfort and safety.

Maintenance Justification

Trail counts can be leveraged as an indication of trail use and can demonstrate improvement needs due to high use or in the future, where capacity might be exceeded. Counts can also be used to identify trails with unexpectedly low use and ask the public or trail operators why this is occurring. Specifically in winter weather, understanding the baseline and changes in trail usage from count data can improve snow removal priorities. Adding more trail counts or improving the quality or detail of trail counts improves coordination, use, and opportunities for funding. Trail count programs also need proper maintenance, programming, and evaluation to be successful in the long term. Positive user experiences, including safety and high usage rates, require proper maintenance and upkeep. It is important for maintenance agreements to be in place before trail count programs begin to ensure interagency coordination. In addition, trail maintenance is more cost effective if local jurisdictions can coordinate logistically.

Funding Opportunities

Trail counts can help capture the value of investing in trails and non-motorized transportation systems. Count data can be summarized to inform the public, local government officials and decision makers, regional stakeholders, and to support funding opportunities. Having baseline data or data trends over time can identify needs and future opportunities to expand or fill gaps in the existing trail network.

APPENDICES

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APPENDIX A: DATA INVENTORY

Toole Design reviewed the capabilities, possible uses, and limitations of three emerging datasets: Placer.ai, Replica, and StreetLight. This memo summarizes the main findings of this review and provides overall context for each of the three tools. During upcoming meetings with the project team, we will further explore the possibility of using each data source to answer key questions about Stark Parks trails and facilities.

PLACER.AI

Placer.ai provides foot traffic data, trends, and metrics on visitors to a specified point or area. Placer.ai's service is informed predominantly by location data obtained from mobile devices such as smartphones. This location data is then enriched with U.S. Census demographic data (including topics like age, gender, and race of users); geospatial data such as land use; and economic activity data. The resulting product offers aggregated visitor metrics and potential market demographics of visitors to a defined point or area of interest. Placer.ai also provides the average dwell time of visitors, visit frequency, and the assumed location of visitors before and after they reach the point or area of interest. Non-profit or public organizations with a mission to promote economic activity have used Placer.ai for plans and research, including Downtown DC, Downtown Austin Alliance, and the Pittsburgh Downtown Partnership.

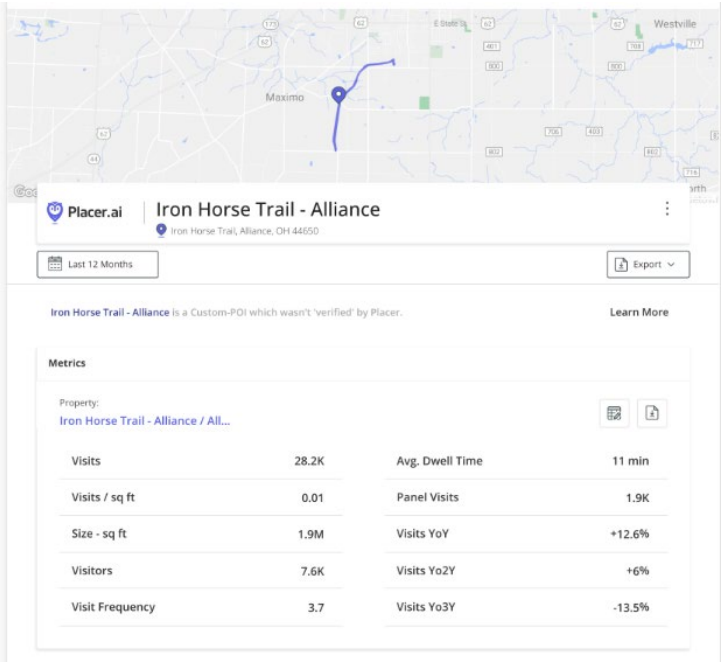


Figure A1. The Iron Horse Trail in Alliance is available for analysis in Placer.ai. In the past 12 months, 7.6k unique visitors have been to the trail, and each visitor came to the park an average of 3.7 times.

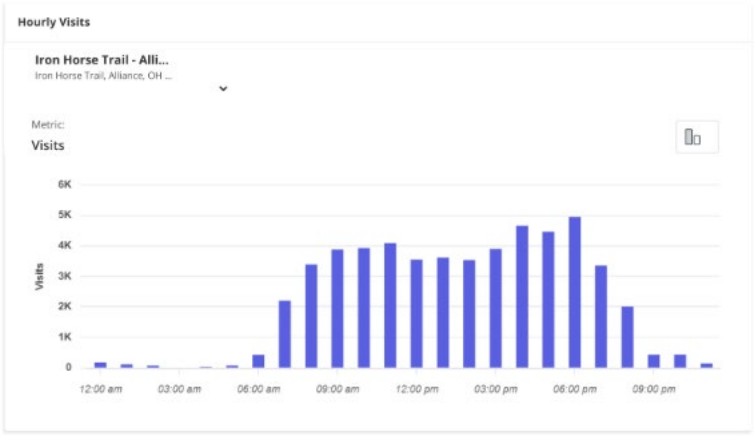


Figure A2. Placer.ai shows that the Iron Horse Trail in Alliance has most visits around 6:00PM on a typical weekday.

APPLICATIONS

Placer.ai can be used to estimate the number of visitors to at least some of Stark Parks' parks and trails. It can also provide demographic estimates of visitors including race, income, age, and gender, in addition to visitor travel behavior. Placer.ai allows for custom points or areas of interest to be generated, meaning that trail segments, parks, trailheads, and park entrances can generally be analyzed.

Placer.ai is well suited to answer the following:

- How many people visit Stark Parks' parks and trails that stay for at least seven minutes?
- What are the demographic characteristics of Stark Park's visitors?
- Where do visitors to Stark Parks comes from before visiting a park or trail? What is their destination after leaving?
- How long do visitors remain at a Stark Park facility, beyond the 7-minute dwell-time minimum?
- What days and times are people most likely to visit?

LIMITATIONS

- Placer.ai is oriented towards firms or organizations with paying customers. The outputs of Placer.ai predominantly capture the economic trends of customers.
- Placer.ai does not provide information on visitor mode of travel.
- The outputs of Placer.ai are generated based on various data sources, rather than on actual visitor counts to a particular location. Placer.ai claims that its results are 92% accurate.

REPLICA

DESCRIPTION

REPLICA

Replica is a service that provides large-scale modeling of travel behavior. Replica's modeled information is built using mobile location data such as from smartphones, resident demographic data from the U.S. Census Bureau (including age, race, and gender of users), spatial data such as land uses, economic activity data, and Replica's own collected "ground truth" data. Trips are approximated in part using cellphone data; there does not appear to be a minimum time requirement in the area of interest used in the definition of a trip. These data sources are used to produce a synthetic population model that simulates the travel behavior and demographics of individuals and households, down to the Census Block Group level.

Replica can also produce results for custom geographies and network links, including certain trail segments. Custom geographies must be at a Census Block Group level or larger or contain at least 100 residences.

For the selected geography, Replica provides trip origins and destinations, mode of travel of visitors or residents, trip purpose, trip duration, trip distance, land use of origin and destination, and demographic information (including age, race, and gender of users). Replica is used by many public agencies including state Departments of Transportation in California, Illinois, and Texas, and cities like Seattle and Ann Arbor.

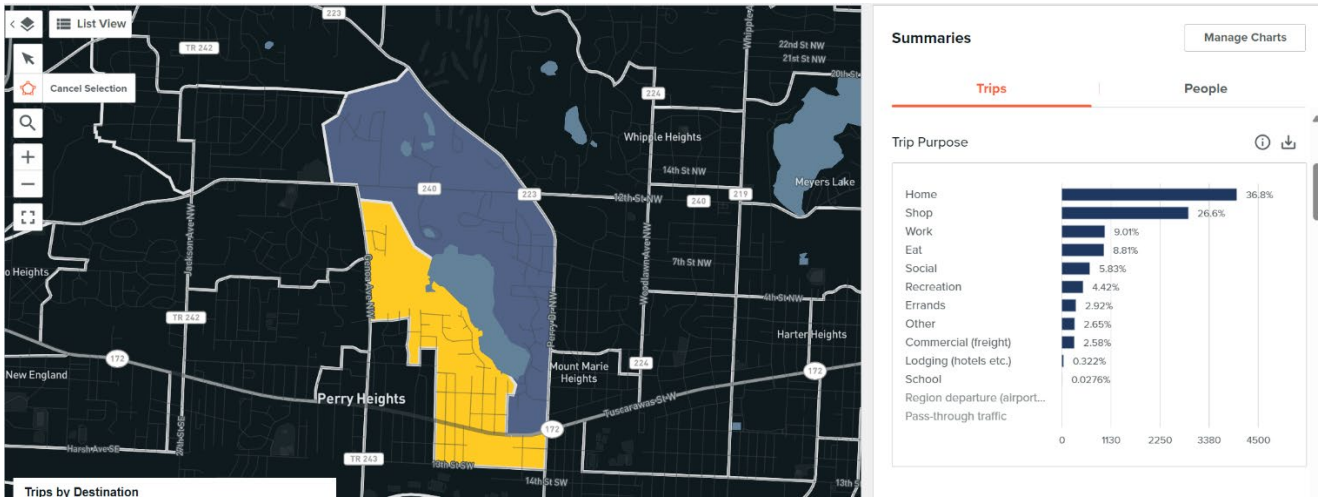


Figure A3. Replica shows that in the Census Block Groups around Sippo Lake, most trips are homebound, and 4.42% of trips are for recreation.

APPLICATIONS

Individual parks cannot be selected for analysis in Replica, but the Census Block including a park can be. The results for a Census Block can be filtered by land use, including parks. Additionally, some individual trails are available for analysis. Once a geography is selected, Replica can be used to estimate the number of travelers and their trip patterns, modes, and demographics.

Replica is well suited to answer the following:

- How many trips and visits occur in the area of interest? What is the race, gender, age, income, home location, and occupation of visitors?
- Which modes are used in the area of interest?
- Where did visitors come from before arriving at the area of interest?
- How do visitor trends change depending on the season?
- How do visitor trends change from typical weekdays to typical weekends?

LIMITATIONS

- Replica's data is generated, meaning that the visits and demographics are assumed based on their model inputs, instead of actual counts.
- It is unclear if the model is adjusted based on land use contexts in Ohio, or if the data inputs are at the national scale.

- Because Replica's granularity is limited to either a Census Block Group or to a custom geography, it is difficult to obtain information for only a park or trail without including nearby homes or businesses. This can be mitigated through some filtering of the obtained data by the land use type of a visited location.
- Replica's link level trip counts may not be available for all trail links, as the available trail links appear to be limited to what is available in OpenStreetMaps.

STREETLIGHT DATA

DESCRIPTION

StreetLight Data is a service that provides large scale transportation metrics. The data model draws primarily from mobile location data from smartphones; GPS information from vehicles; connected vehicle information such as transit vehicles, existing vehicle and pedestrian counts; and U.S. Census demographic data (including age, race, and gender of users). Trips are approximated in part using cellphone data; there does not appear to be a minimum time requirement in the area of interest used in the definition of a trip. Streetlight Data generates metrics such as total trips, mode share, AADT, Origin-Destination flows, turning movement counts, prevalent travel routes, inferred demographic information at the neighborhood level, and inferred trip purposes. Many metrics are only available at the Census Tract level. At the Census Tract level, StreetLight will readily provide the number of bike and pedestrian trips and whether trips are increasing or decreasing. Customized areas of interest and select trail links are also available for analysis and provide similar metrics, though the margin of error may be wider. Custom shapefiles can be uploaded for use as polygons to define analysis area. Data in StreetLight is available in many timeframes, including the selection of particular days in the past, years, or multiple years.

Streetlight Data is used by both private firms and public sector Departments of Transportation for services such as measuring trip volumes for use in congestion studies, corridor planning, and demand management. Notably, access to StreetLight is provided free of charge to public agencies in Ohio through the Ohio Department of Transportation.

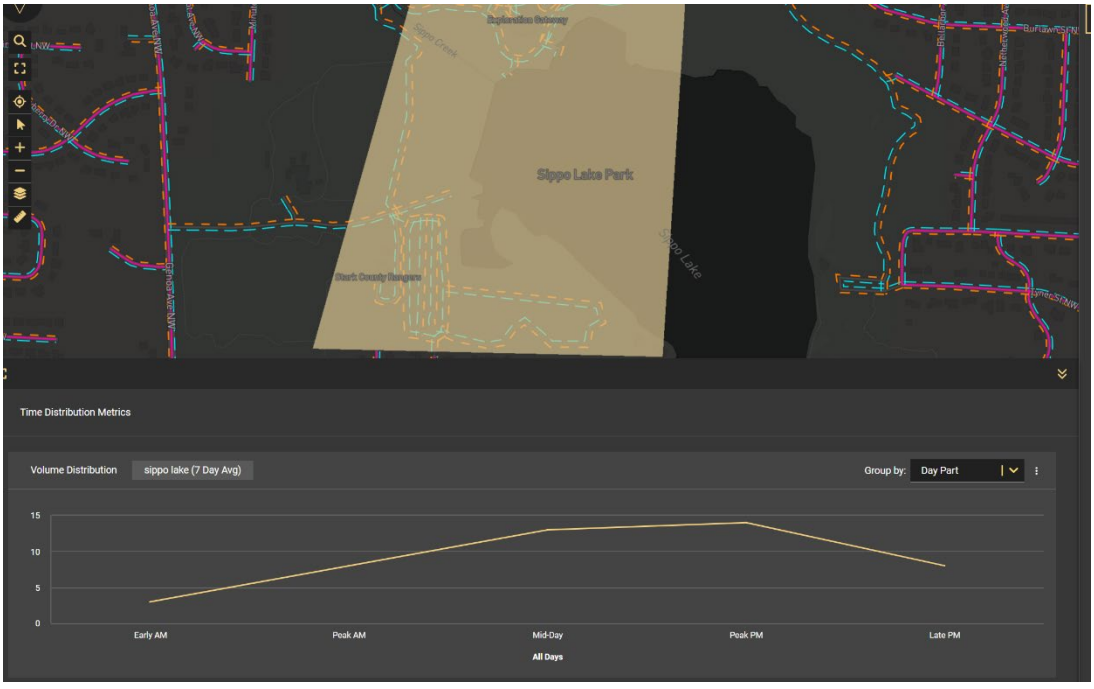


Figure A4. StreetLight Data shows for a small section of Sippo Lake's paths, the visitor counts are at their highest in the peak PM timeframe.

APPLICATIONS

Streetlight Data generates transportation metrics for a specified area of interest. Because it provides estimates of bicycle and pedestrian activity for areas and particular trail segments, StreetLight can be useful in estimating current active transportation demand. StreetLight allows for the definition of the area of interest of any size, as well as a specified time window. Once a geography is selected, StreetLight provides information like average trip speed, duration, purpose of trip, and other metrics.

StreetLight Data is well suited to answer the following:

- Who is traveling to, from, and through the Census Tracts containing Stark County Parks and trails?
- What routes do visitors use to get to and from the Census Tracts containing Stark Parks and trails?
- How many active transportation users did a particular area see on a given day or timeframe?
- What percentage of trips occur by mode, and what is the estimated trip volume?

LIMITATIONS

- StreetLight provides trip estimates along trail segments in two ways: first, by drawing a line over the trail that serves as a custom “area” for analysis and second, by directly selecting some trail segments that are available for analysis. The first approach may come with quality concerns and be time-consuming to gather. The second approach only allows for some Stark Park trails to be analyzed, like those mapped in OpenStreetMaps. Streetlight Data relies on various data sources, but not actual counts. This means the trip characteristics and demographic information is assumed and does not represent specific visitors.
- Customized geographies or short timeframes for analysis are likely to have higher margins of error than large geographies and long timeframes.

APPENDIX B: TRAIL DEMAND FORECASTING

Active Transportation Demand Estimation- Streetlight Example

Stark Parks – February 2025

Demand Estimation for Linden Greenline

- Current mode split in the study area → *Use to find the percentage of people that are walking and biking in the study area now*
- Facility use along a similar segment of existing trail in another part of the city → *Use to find the percentage of existing active transportation trips we can expect to shift to the project*
- Volume of short vehicle trips in the study area → *Use to find the number of vehicle trips that we can expect to shift to active transportation trips on the project*

# of annual active transportation trips on the Linden Greenline after construction through 2057

StreetLight Data

- Self-serve software with data available for vehicle, bicycle, and pedestrian travel
- Available to any public agency in Ohio through ODOT
- To create a new account email Hayleigh.Coppenger@dot.ohio.gov

TOOLE DESIGN

Current Study Area Mode Split for Linden Greenline

Geography: Census tracts in the study area (1 mile buffer from project)

Timeframe: 2022

StreetLight Data ↓

205,600 total daily trips originiating in the study area	x	*4.5% of all daily trips were walking trips*	=	*9,252 daily walking trips*
	x	*0.82% of all daily trips were biking trips*	=	*1,694 daily biking trips*

TOOLE DESIGN

Demand Estimation for Linden Greenline

- Current mode split in the study area
- Facility use along a similar segment of existing trail in another part of the city
- Volume of short vehicle trips in the study area

→ ***9,252 daily walking trips***

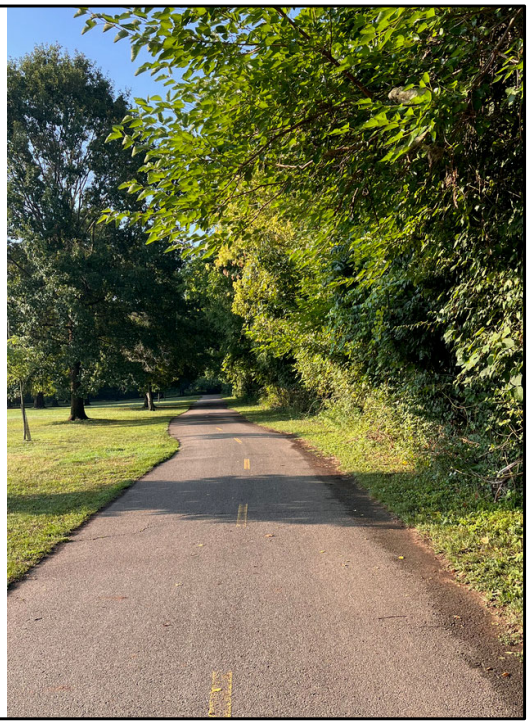
1,694 daily biking trips

TOOLE DESIGN

Expected Facility Shift for Linden Greenline

- Looked at a segment of comparable existing trail: Alum Creek Trail
  - Timeframe: 2021
  - Total trail length: 25 miles
  - Study area for comparison: 1.6 miles
  - Buffer area: 1 mile

TOOLE DESIGN



To estimate this number of trips, StreetLight data for Alum Creek Greenway, a comparable trail in Columbus, was used. Alum Creek Trail is a greenway that has neighborhood connections in the City of Columbus, and shares a number of characteristics with the proposed Linden Greenline. At the time of this analysis, recent trail counts were not available for the BCA on the Alum Creek Trail or any regional trails. Instead, the team used StreetLight data to estimate the share of trips in the Census Tracts near the trail that use the trail over the course of a year.

The team evaluated the 1.6-mile section of the Alum Creek Greenway available for analysis in StreetLight and used a buffer area of 1 mile.

Expected Facility Shift for Linden Greenline

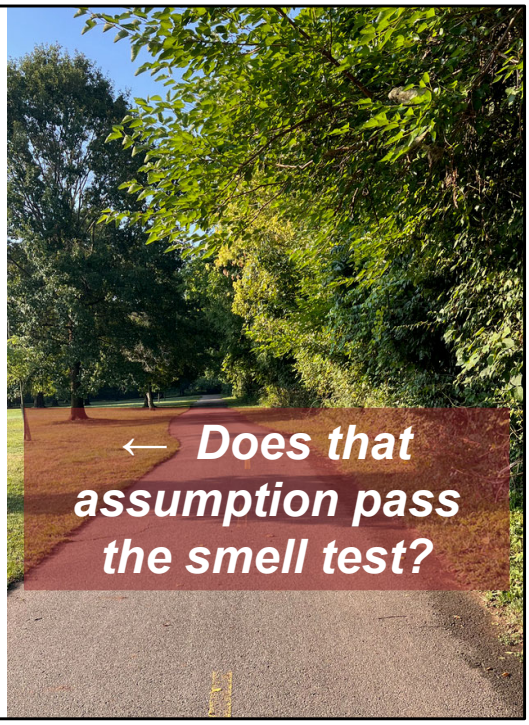
StreetLight Data ↓

152 pedestrian trips on most used segment of Alum Creek Trail study area

14 pedestrian trips on least used segment of Alum Creek Trail study area

That means 1 – 10% of all pedestrian trips within 1 mile of Alum Creek Trail study area occurred on the trail itself, ***assuming all observed trips started within the study area***

TOOLE DESIGN



Data for the 1.6-mile study area was available in smaller segments. The team looked at the trail pedestrian volume data and compared that to overall pedestrian volumes in the 1-mile buffer around Alum Creek trail during the same time period. To get a range, they looked at the most used segment and the least used segment along the 1.6 miles of the trail.

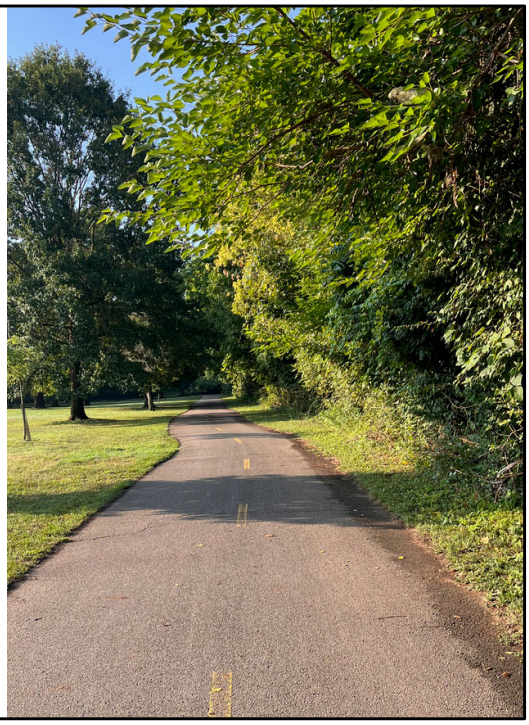
They found that 1 to 10% of pedestrian trips within 1 mile of Alum Creek Trail study area occurred on the trail itself, assuming all observed trips started within the study area. But is that a defensible assumption?

The entire length of the Alum Creek trail is 25 miles – therefore it is reasonable that there would be long pedestrian trips occurring that originated outside of the study area. So we need to determine and document a different assumption for this methodology that passes the smell test.

Expected Facility Shift for Linden Greenline

Added an assumption: Only trips ***up to 3 miles in length*** are likely to have originated within the 1-mile buffer around the Alum Creek Trail

TOOLE DESIGN



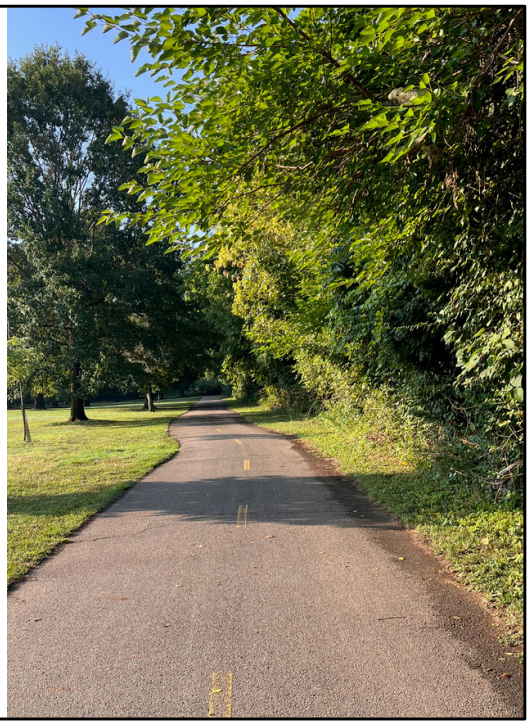
Expected Facility Shift for Linden Green Line

104 pedestrian trips of 3 miles or less on most used segment of Alum Creek Trail study area

14 pedestrian trips of 3 miles or less on least used segment of Alum Creek Trail study area

That equals **1 – 7%** of all pedestrian trips within 1 mile of Alum Creek Trail study area occurred on the trail itself, ***assuming trips under 3 miles started within the study area***

TOOLE DESIGN



Expected Facility Shift for Linden Greenline

	Pedestrian Trips	Bicyclist Trips
Alum Creek Trail Local Use Estimate (Range)	1% to 7%	5% to 12%
Daily Active Trips near Linden Green Line	9,252	1,694
Estimated Daily Use of the Linden Green Line	92 to 648	85 to 203

= 177 to 851 anticipated active transportation trips per day on the Linden Green Line (using 2021 population)

TOOLE DESIGN

The project team selected the high estimate of 851 anticipated daily users based on the justification of:

- The study area of the LGL is significantly larger than the Alum Creek Greenway Trail study area, and has significant and dedicated access to schools, high-density housing (mobile home park, apartments, and traditional neighborhoods), parks, and businesses.
- American Community Survey 2018-2022 5-year estimates show that there are 780 commuters that bike or walk to work without the use of the LGL. It seems likely that due to the lack of comfortable bike and pedestrian facilities on parallel North-South roads, and the new East-West connectivity the trail creates, many of these commuters will divert at least part of their trip to the Linden Green Line

Demand Forecasting for Linden Greenline

For purpose of benefit and cost calculations, assumed **851 daily active transportation trips** because of:

- Project length in comparison to Alum Creek Trail
- Nearby housing density and land uses
- Census data walk/bike commutes to work
- Lack of safe and comfortable parallel facilities

TOOLE DESIGN

Linden Green Line study area is larger than Alum Creek Trail study area
Linden Green Line study area has more high-density housing than Alum Creek Trail study area (mobile home park, apartments, etc.)
2018-2022 Census data shows that there are currently 780 people in the study area that commute to work by walking or biking
There is a lack of comfortable bike and pedestrian facilities on parallel roads, meaning many of the 780 existing commuters may shift to the Linden Green Line after construction

Demand Estimation for Linden Greenline

- Current mode split in the study area → ***9,252 daily walking trips***
  1,694 daily biking trips
- Facility use along a similar segment of existing trail in another part of the city → ***851 expected daily active transportation users***
- Volume of short vehicle trips in the study area

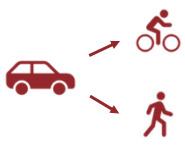
TOOLE DESIGN

Mode Shift Estimation for Linden Greenline

Assumption: We can quantify the number of current vehicle trips that will convert to active transportation trips after the Linden Greenline is built.

Justification: The project is a transportation-focused facility in an urban area.

Methodology: Evaluate the volume of short vehicle trips on three nearby parallel roadways. Utilize data from the National Household Travel Survey 2022 to estimate trip diversion percentages based on characteristics of peer regions and percentage of the roadway that is parallel to the Linden Greenline.



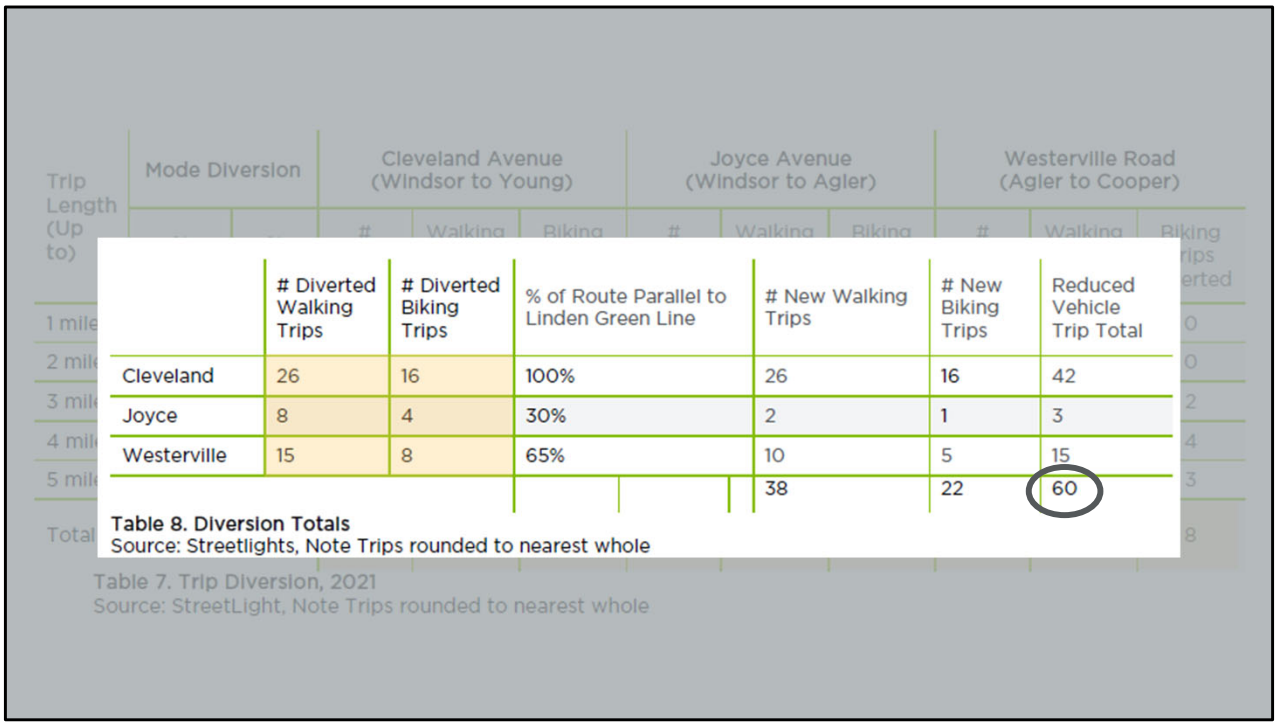
TOOLE DESIGN

StreetLight Data

Trip Length (Up to)	Mode Diversion		Cleveland Avenue (Windsor to Young)			Joyce Avenue (Windsor to Agler)			Westerville Road (Agler to Cooper)		
	% Walking	% Biking	# Vehicle trips	Walking Trips Diverted	Biking Trips Diverted	# Vehicle trips	Walking Trips Diverted	Biking Trips Diverted	# Vehicle trips	Walking Trips Diverted	Biking Trips Diverted
1 mile	10.10%	0.70%	91	9	1	26	3	0	41	4	0
2 miles	1.80%	0.00%	484	9	0	174	3	0	355	6	0
3 miles	0.20%	0.30%	1,134	2	3	300	1	1	519	1	2
4 miles	0.20%	0.50%	1,451	3	7	363	1	2	751	2	4
5 miles	0.20%	0.30%	1,527	3	5	479	1	1	902	2	3
Total Trips Diverted				26	16		8	4		15	8

Table 7. Trip Diversion, 2021
Source: StreetLight, Note Trips rounded to nearest whole

StreetLight data was used to evaluate vehicle trip volumes based on trip length.



Trip Length (Up to)	Mode Diversion	Cleveland Avenue (Windsor to Young)			Joyce Avenue (Windsor to Agler)			Westerville Road (Agler to Cooper)		
		#	Walking	Biking	#	Walking	Biking	#	Walking	Biking
1 mile										
2 mile										
3 mile										
4 mile										
5 mile										
Total										

Table 7. Trip Diversion, 2021
Source: StreetLight, Note Trips rounded to nearest whole

	# Diverted Walking Trips	# Diverted Biking Trips	% of Route Parallel to Linden Green Line	# New Walking Trips	# New Biking Trips	Reduced Vehicle Trip Total
Cleveland	26	16	100%	26	16	42
Joyce	8	4	30%	2	1	3
Westerville	15	8	65%	10	5	15
				38	22	60

Table 8. Diversion Totals
Source: Streetlights, Note Trips rounded to nearest whole

Take the total number of diverted trips for each corridor and multiply the percentage of the route that is parallel. Add it all up and you get a quantified estimate of diverted trips.

Demand Estimation for Linden Greenline

- Current mode split in the study area → ***9,252 daily walking trips***
  1,694 daily biking trips
- Facility use along a similar segment of existing trail in another part of the city → ***851 expected daily active transportation users***
- Volume of short vehicle trips in the study area → ***60 daily vehicle trips diverted to active transportation***

TOOLE DESIGN

Demand Estimation for Linden Greenline

How many daily active transportation trips can be expected on the Linden Greenline (in 2021 population numbers)?

851 *Expected daily active transportation users* **+** **60** *Daily vehicle trips converted to active transportation* **=** **911** *Daily active transportation trips on the Linden Greenline (in 2021 population)*

TOOLE DESIGN

Next Step: Apply annual population growth rates 2021 - 2057

Population Forecasts for Linden Greenline

Timeline used: **2021 – 2057**

Population forecasts available in 5-year increments through **2050** in census tracts geography

Interpolate 2049 – 2050 population growth rate

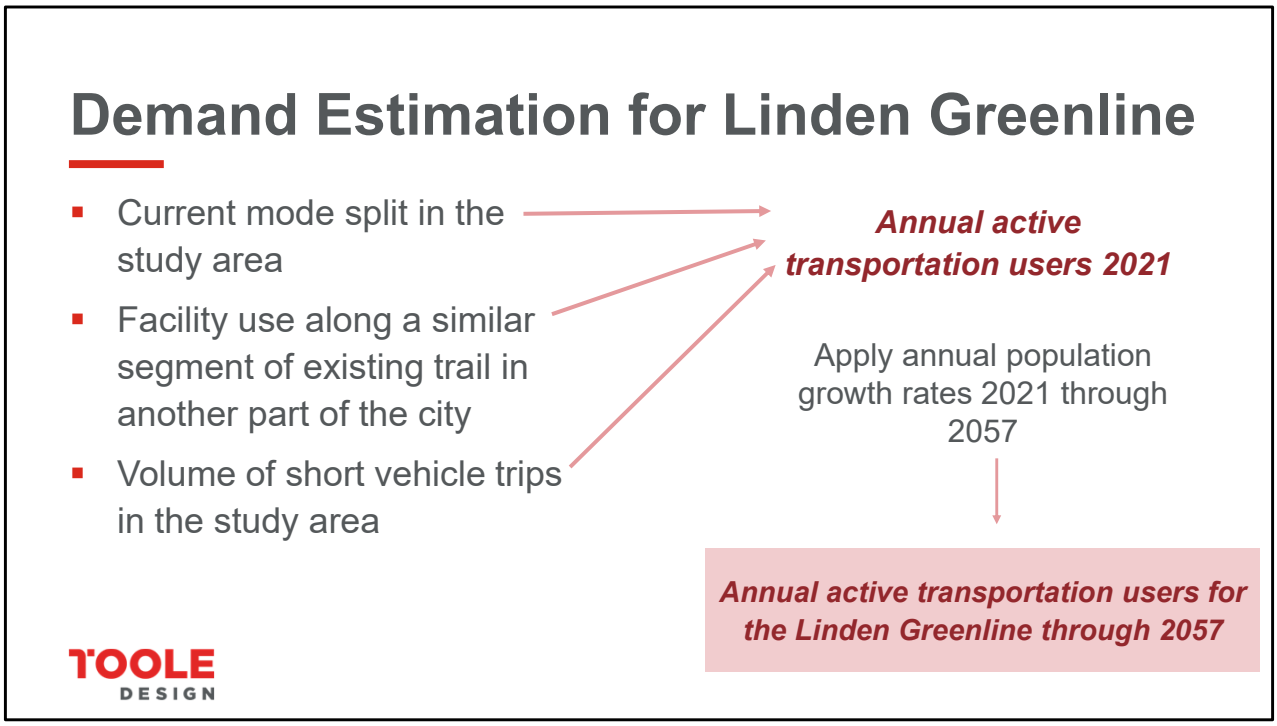
Apply growth rate to 2051 – 2057 to get

↓

Forecasted annual population for 2021 – 2057

TOOLE DESIGN

The Mid-Ohio Regional Planning Commission had population forecasts available through 2050, but the analysis period for the Linden Greenline was through 2057. The project team interpolated the population growth rate from 2049 to 2050 and applied it to the years 2051 through 2057. That gives the project team an annual population forecast for each year 2021 through 2057. We can then use that to get an annual population growth rate.



Seasonality was captured by multiplying the daily maximum mode shift increase by 250 days per year, in accordance with the approximate number of appropriate weather days for short walking and biking trips in Columbus. Seasonality is already captured in StreetLight's average daily active transportation trip data, as the number of daily trips in the study area in 2022 was captured based on actual usage (fluctuations due to seasonality are reflected). So, the number of trips expected to divert from various facilities was multiplied by 365 to create an annual estimate. Combined, these values equal daily expected trail trips. The increase each year from year to year was based on the regional population growth estimate (provided by MORPC) for trips due to facility shift. For trips based on mode shift, the increase from year to year was based on the projected rate of increase in VMT (provided by MORPC), because the mode shift calculation is based on traffic on parallel roads.

APPENDIX C: SURVEY RESULTS

TOOLE DESIGN

20 EAST BROAD STREET
SUITE 400
COLUMBUS, OH 43215

614.407.9122
TOOLEDESIGN.COM

STARK PARKS ACCESSIBILITY SURVEY RESULTS

March 14, 2025

To: Stark Parks and Stark County Area Transportation Study (SCATS) Team
From: Toole Design (Katie Sieb, Julie Walcoff, Abby Link, and Nasir Meatchem)

Re: Stark Parks Accessibility Survey Results

Introduction

Stark Parks' trails are a vital resource for the community, offering opportunities for recreation, transportation, and nature exploration. To better understand accessibility preferences, the project team released a survey targeted to seniors, people with disabilities, young families, and others with limited mobility. The survey was hosted online from October 7, 2024, to November 18, 2024. The survey was promoted on social media and during events. With 179 responses, the survey is not statistically significant, but the results provide valuable insights about popular activities, seasonal usage, and accessibility concerns. The survey results can also guide decisions about future enhancements.

Trail Use

More than three-quarters of the 179 survey respondents (79%) visit Stark Parks' trails at least a few times a month, while only a little over one percent (1%) have not visited yet. Figure 1 shows that most respondents have direct experience with Stark Parks' trails.

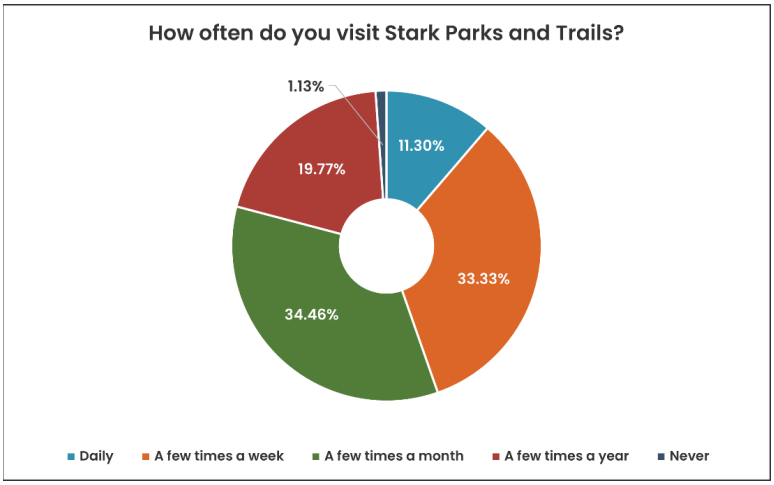


Figure 1. How often do you visit Stark Parks and trails?

Respondents were asked to select any applicable reasons they visit trails today. Figure 2 illustrates that most people visit, at least in part, to connect with nature and for recreation or fitness. This helps us understand that trails are primarily used for recreation and wellness today, and there may be potential to convert some trails to serve transportation functions, like commuting or running errands. Write-in responses included activities like dog walking, people watching, and photography.

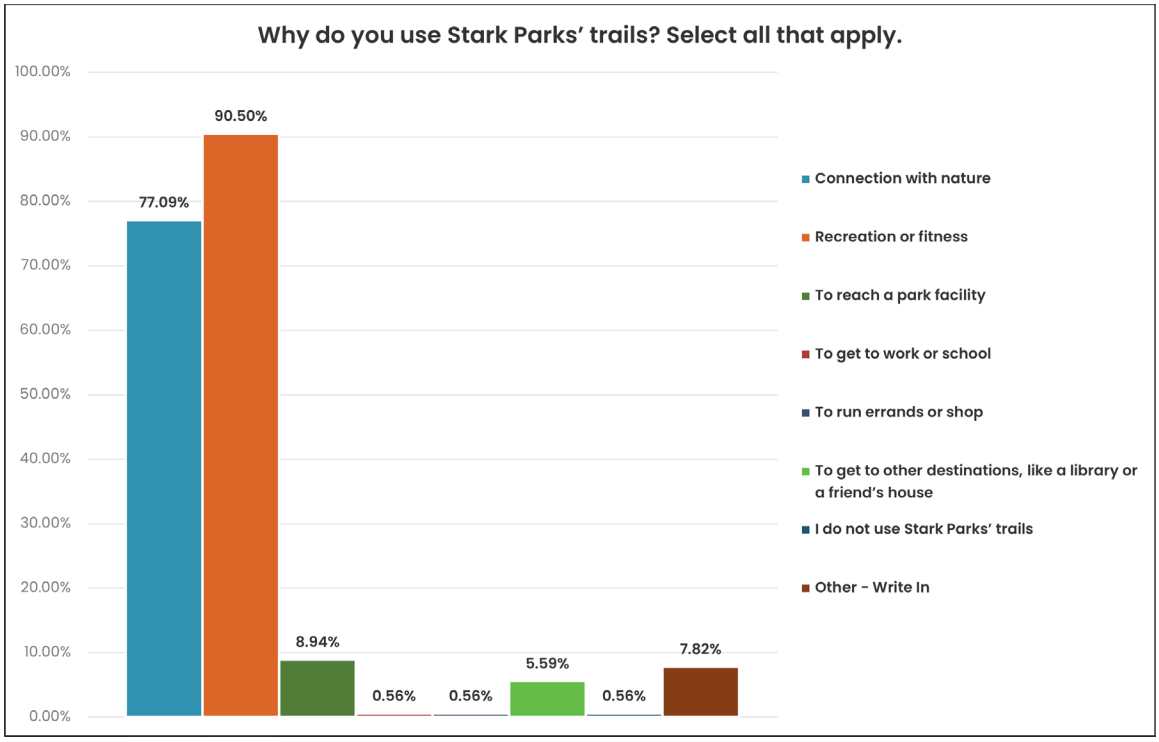


Figure 2. Why do you use Stark Parks' trails? Select all that apply.

Additionally, respondents were asked what activities they participate in when visiting Stark Parks and its trails. Respondents could choose as many activities as apply. Figure 3 shows that seventy-nine percent (79%) of respondents use trails to walk or run, followed closely by hiking (63%), and birding or nature watching (43%). Less popular activities include boating, equestrian, and renting facilities.

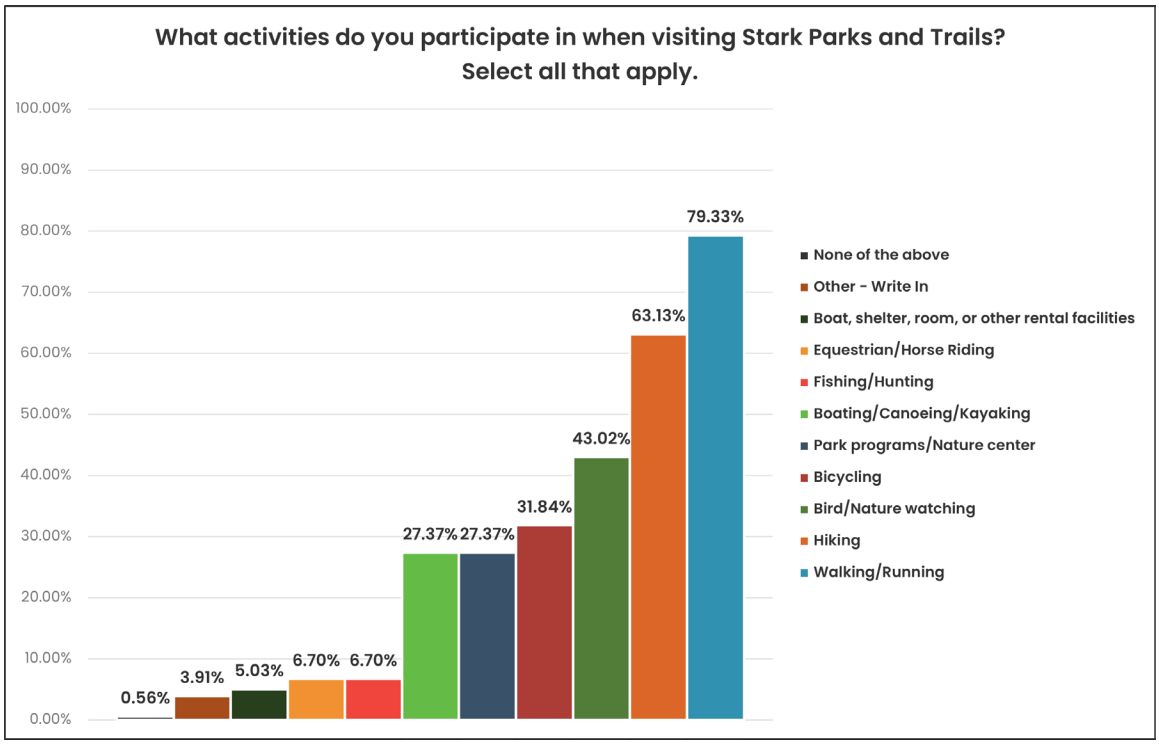


Figure 3. What activities do you participate in when visiting Stark Parks and trails? Select all that apply.

Nearly all respondents visit Stark Parks' trails during fall, summer, and spring as shown in Figure 4. Over half of respondents use trails in the winter months (63%).

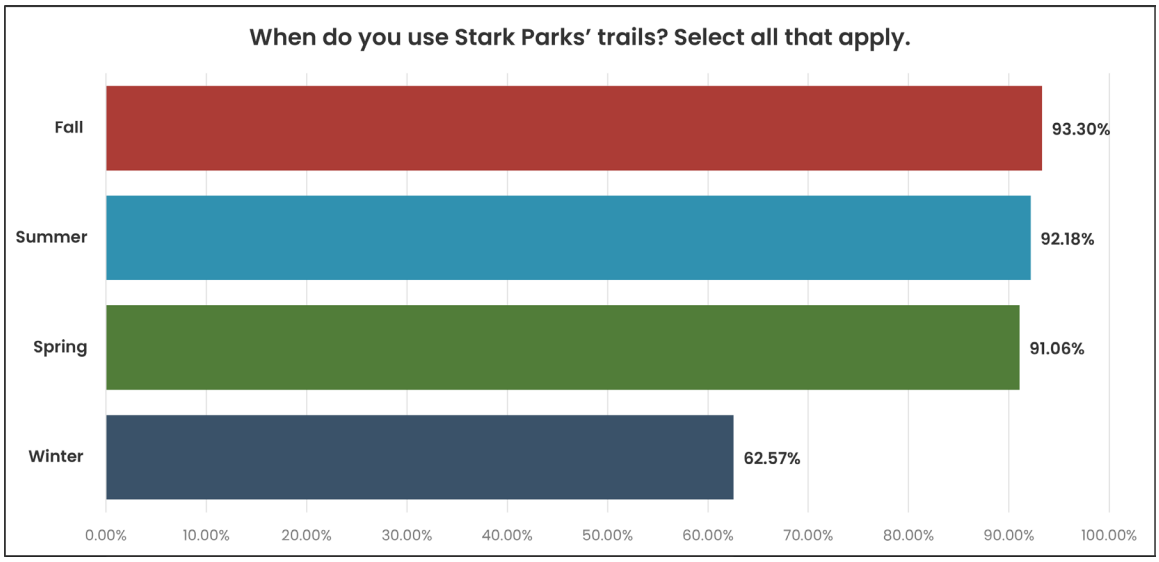


Figure 4. When do you use Stark Parks' trails? Select all that apply.

Trail Users

Figure 4 shows that most survey respondents were adults, and nearly 30% were aged 61 to 70. Another 10% of respondents were age 71 to 80. Because this survey was focused on accessibility needs, it is helpful that a strong number of seniors responded.

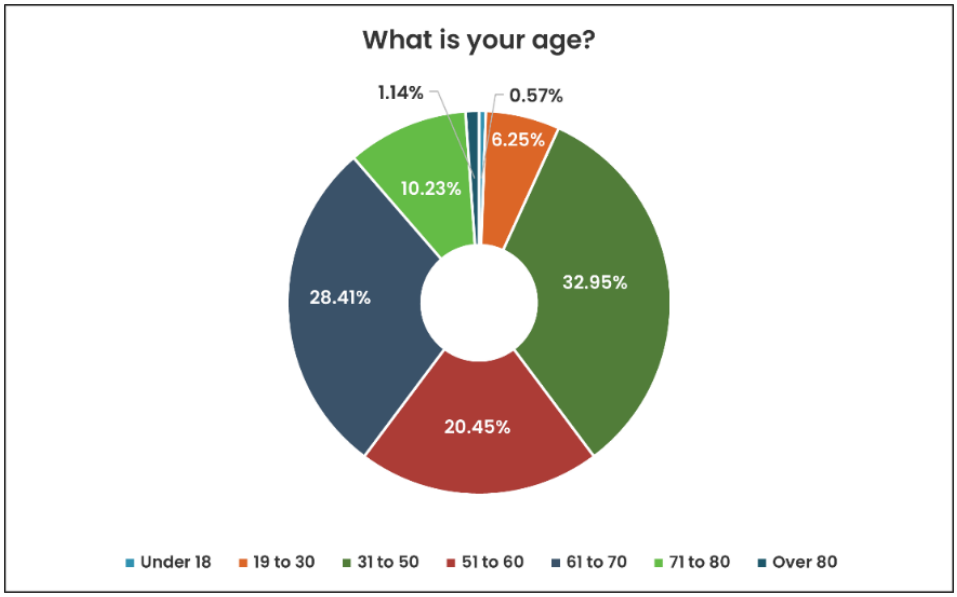


Figure 5. What is your age?

For nearly half of the respondents (49%), the nearest trail was between one and five miles from home, as shown in Figure 5. Approximately thirty-one percent (31%) said the nearest trail was less than one mile, which for many people is a walkable or bikeable distance.

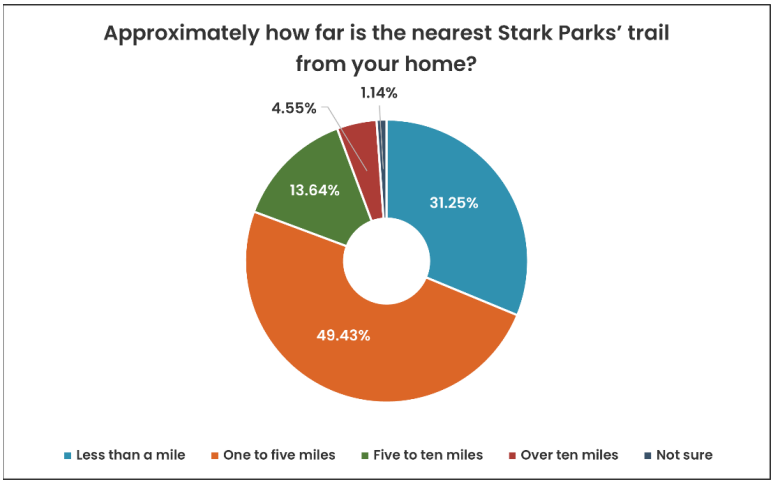


Figure 6. Approximately how far is the nearest Stark Parks' trail from your home?

Access and Comfort

The majority of respondents (71%) indicated that neither they nor a person they care for use any of the listed mobility devices in Figure 7. However, of those who do use mobility devices, about an equal number of respondents use a wheelchair, stroller, cane, walk, or unlisted device. A small number of respondents use a scooter or other powered device.

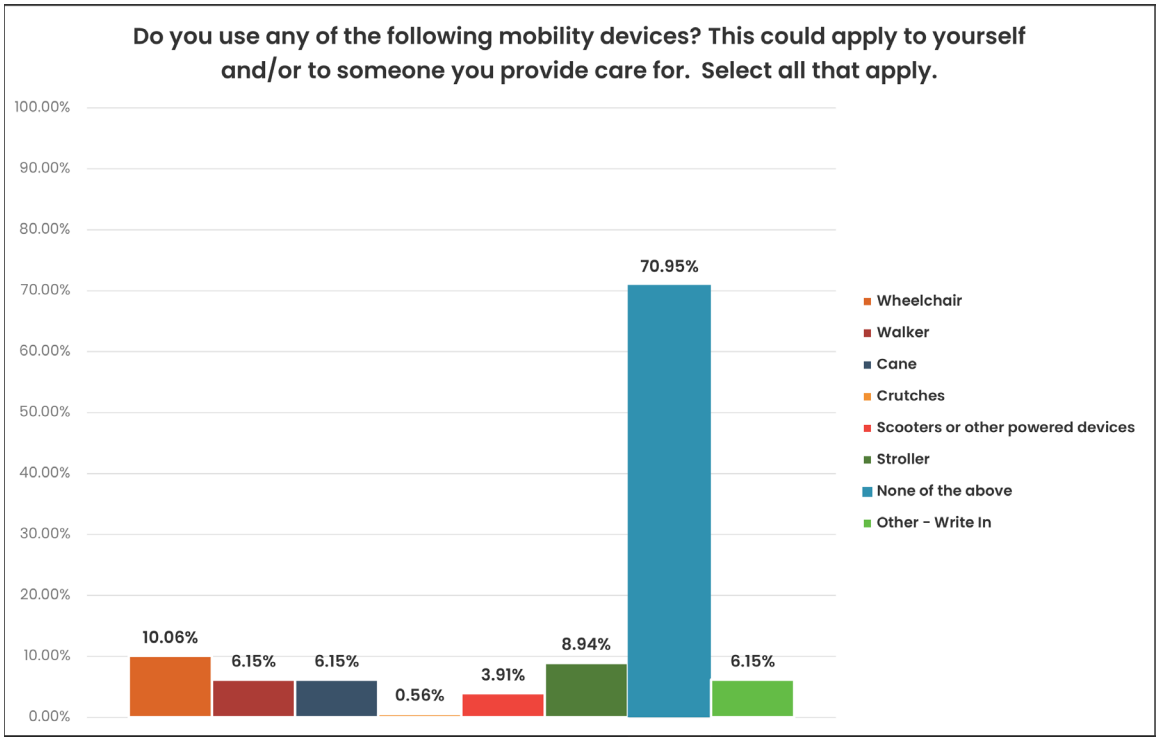


Figure 7. Do you use any of the following mobility devices? This could apply to yourself and/or to someone you provide care for. Select all that apply.

Most people indicated that they feel comfortable or very comfortable using the trails today, as shown in Figure 8. Just five percent (5%) of respondents said they are uncomfortable, and one percent (1%) were very uncomfortable.

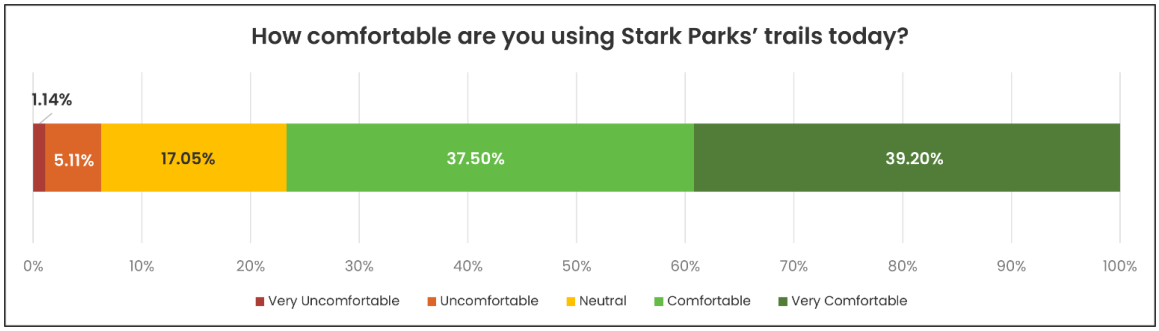


Figure 8. How comfortable are you using Stark Parks' trails today?

Desired Changes

The survey asked respondents if they would use trails more often if they were more accessible. Figure 6 shows that out of 175 respondents, over half (62%) stated they would use the trails more if they were more accessible; meanwhile, thirty-eight percent (38%) stated they would not.

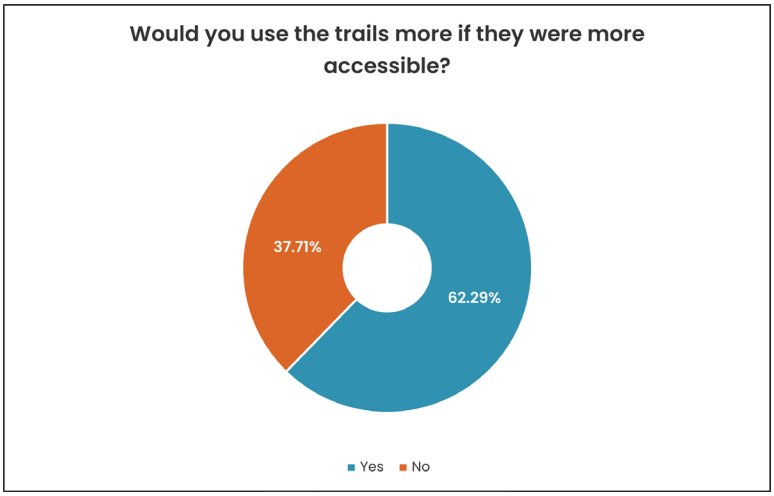


Figure 9. Would you use the trails more if they were more accessible?

Figure 10 shows features that may make it easier to use Stark Parks and its trails. Nearly half (48%) of respondents indicated that more accessible restrooms and water fountains would make trails easier to use. About one-third (31%) answered that smoother trail surfaces and more places to sit or rest would make the trails easier to use. Smaller numbers of respondents selected improved maintenance, parking, and other amenities. Write-in answers included better signage and maps, improved maintenance, and more connectivity.

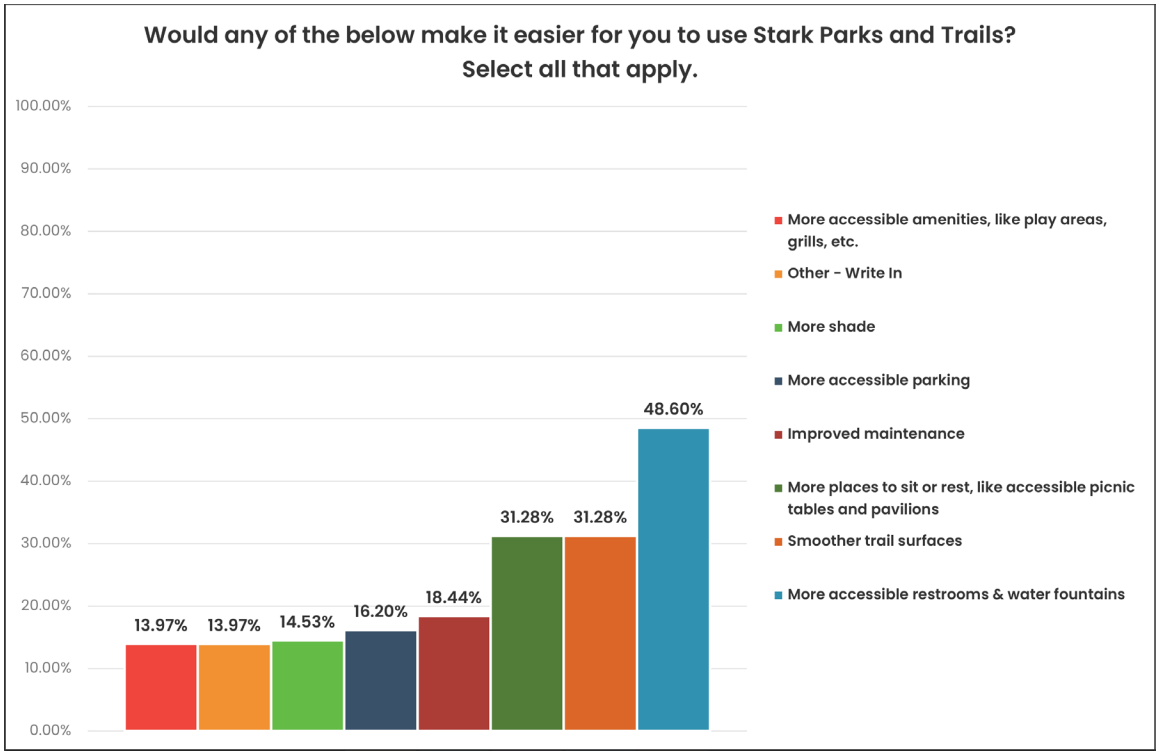


Figure 10. Would any of the below make it easier for you to use Stark Parks and trails? Select all that apply.

Respondents were asked how frequently they would prefer a bench or resting area along a trail, as shown in Figure 11. In general, every mile (or about every 30 minutes of walking) was the most popular response, followed by every half-mile. Write-in responses included benches every two miles, or benches that specifically benefit seniors, while some preferred that trails have no benches or resting areas.

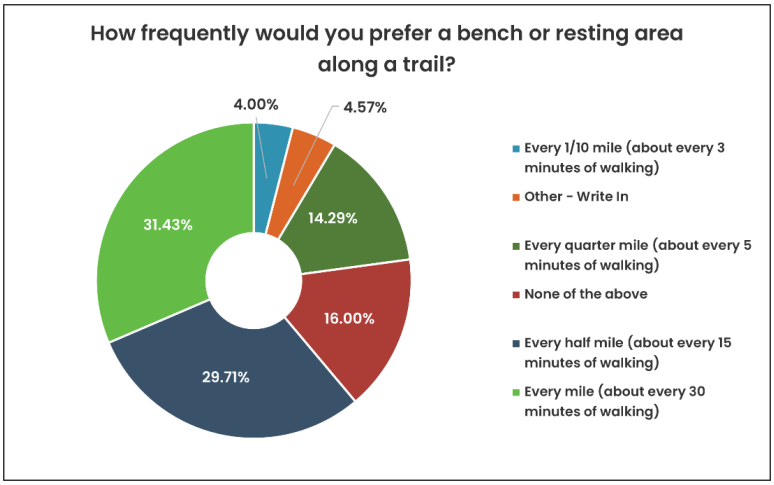


Figure 11. How frequently would you prefer a bench or resting area along a trail?

Respondents were asked to rank various trail surface types from easiest to most difficult to walk or bike on as shown in Figure 12. Paving, either with asphalt (ranked first by 19% of respondents) or concrete (11%), was the most popular choice followed by chip and sealed surfaces. The three most difficult trail surfaces were mowed grass, dirt, and limestone or gravel.

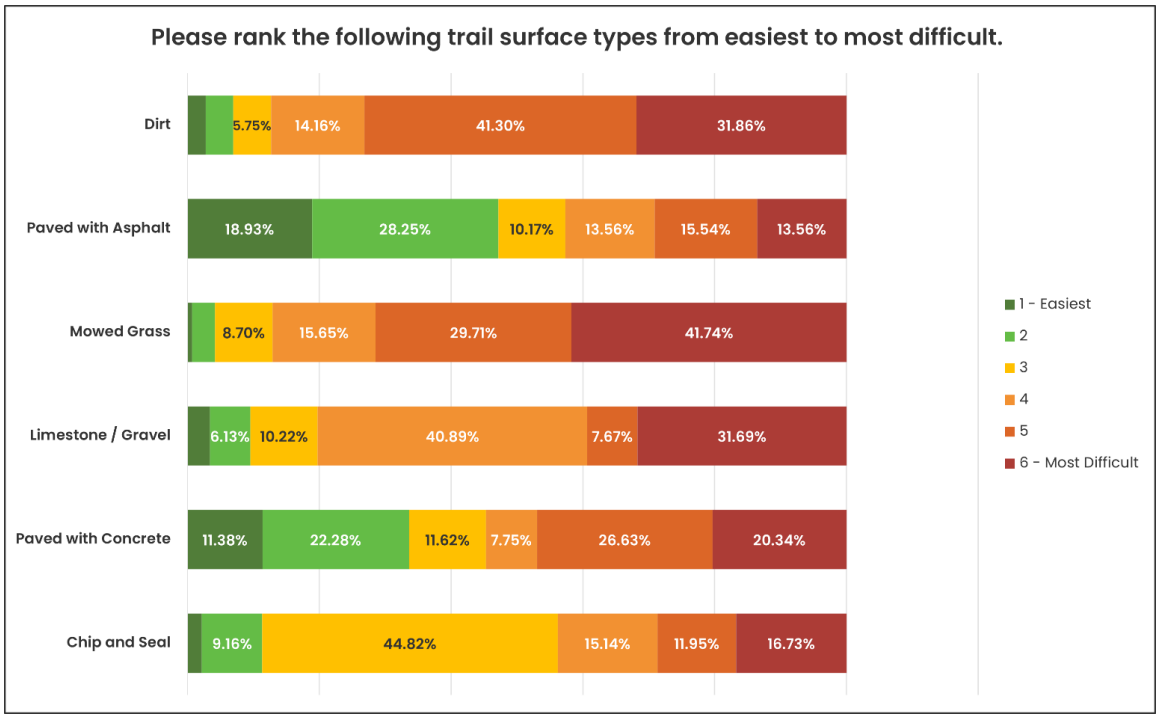


Figure 12. Please rank the following trail surface types from easiest to most difficult.

Open-Ended Responses

There were two open-ended response questions on the survey. The first asked respondents to list barriers that prevent them from using the trails more often. Responses described challenges finding the time to visit, feeling unsafe on isolated trails, or facing difficulties due to uneven surfaces and lack of wheelchair- or stroller-friendly paths. Poor conditions like mud, erosion, and overgrowth deter some users, especially in winter. Connectivity is another issue with many needing to drive to or between trails.

The second open-ended response question asked if there was a location in need of improved accessibility. Responses included Hoover Trail, Quail Hollow, Towpath Trail, Middlebranch Trail, Sippo Lake Trail, and Petros Park. These trails had frequent mentions of accessibility, maintenance, and parking challenges.

Conclusion

Survey results confirm that Stark Parks' trails are a well-used and valued resource, but they also highlight opportunities for improvement. Addressing accessibility challenges, enhancing maintenance, and expanding amenities like seating and restrooms could encourage more frequent use. By prioritizing these needs, Stark Parks can continue to provide safe, enjoyable, and inclusive outdoor spaces for all community members.