Multi-Modal Travel in Yosemite Valley

September 2022

A Report from the National Center for Sustainable Transportation

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16. Abstract
This study examined traffic volumes and patterns in Yosemite Valley, the heart of Yosemite National Park. The purpose of this analysis was to understand which destinations attract the most visitors and to analyze how visitors move around the park on foot, by bike, and by car. Aggregated cell phone location data accessed through the StreetLight Data platform was used to produce vehicle volumes and indexes of bicycle and pedestrian volumes. This analysis reveals noteworthy patterns of travel for each mode with respect to weekdays versus weekends and times of day. An analysis of trip origins and destinations for each mode shows that drivers generally make longer trips than visitors who walk or bike, but that many driving trips are relatively short. Vehicle counts are higher in the core area of the valley than on the roads into and out of the valley, suggesting that most drivers circulate between valley destinations rather than parking and using other modes. Short distance trips by car could be a target for efforts to replace driving with walking and bicycling. This analysis can help to inform transportation planning in Yosemite Valley, particularly with respect to the bicycle network and potential changes to and expansion of the bikeshare service overseen by the Yosemite Conservancy. As a follow-up to this analysis, the authors plan to conduct an intercept survey of visitors to Yosemite Valley to better understand their choices about travel within the valley, especially their choices about bicycling.

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Disclaimer

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EXECUTIVE SUMMARY

In this study, we examined travel within Yosemite Valley across travel modes using cell-phone based location data from Streetlight Data for the period from May through early Labor Day weekend in 2019. We first looked at travel between major zones of the valley as well as travel on each road and path within the park by mode. We examined roadways throughout the east side of the valley, focusing especially on roads used by the park's shuttles and those designated for bicyclists and pedestrians only. We also focused on the locations used by bike share stations and for bike rentals.

Among these zones, the Yosemite Village area was found to have the highest volume of trips within Yosemite Valley. This is true for all modes of travel, including car, bike, and walking. The trip volume for each start and end point for each zone, derived from an analysis of the origins and destinations of all trips, shows that drivers more often traveled to non-neighboring zones than did users of other modes. Bicyclists and pedestrians most commonly went to nearby zones, for example, from Curry Village to the Mist Trail or from Yosemite Lodge to the Lower Falls or Yosemite Village. Although driving trips tend to be longer than walking and bicycling trips, they are often short enough to potentially be walkable or bikeable.

During the time-period examined for the study, little difference was observed in trip volumes between weekends and weekdays. However, there was a clear and consistent pattern in travel demand by time of day. Trips begin to occur around 6 AM, ramp up slowly, then quickly reach a plateau around 1 PM. A small increase in travel is seen from 1 PM to the peak at 3 PM. After 3 PM, trips decrease rapidly, with the decline slowing after 6 PM, eventually dropping to near zero by 10 PM. The exact shape of the time-of-day patterns varies by location and by mode, but the general pattern is the same.

An examination of vehicle volumes on individual routes shows that vehicle traffic is much higher around Yosemite Village than on the roads in and out of the valley. This indicates that, on average, visitors travel around the loop near the village more than once, a pattern attributable to drivers looking for parking and moving between different parts of the valley. For individual roads, the differences between trips on different days of the week becomes clearer. The data suggest that Saturday and Sunday have higher numbers of trips, with a peak around noon; weekdays have nearly as high volumes (~90-95% of weekends) but tend to peak later in the day at around 2-3 PM. The pattern varies by road but we analyzed the time variance only on the major roads. Bicycle traffic is also slightly higher and peaks earlier in the day on the weekends, but the reason for this is not clear.

As a follow-up to this analysis, we plan to conduct an intercept survey of visitors to Yosemite Valley to better understand their choices about travel within the valley, especially their choices about bicycling.

Introduction

Many of the most popular destinations in Yosemite National Park are located in Yosemite Valley, a narrow, glacier-carved canyon surrounded by granite cliffs. Mainly accessed by private car, the valley funnels vehicles to various trails, shops, and natural attractions on a one-way loop road, aptly named Northside Road on the northern portion of the loop and Southside Road on the southern portion. Maintaining traffic flow on this loop, as it is the only way in and out of the valley, is important to the quality of the visitor experience. Yosemite provides a free shuttle system operating at high frequency that allows visitors to park once and then travel around the valley via the shuttles. This system was closed during the COVID-19 pandemic as a safety precaution. During this time, visitors were allowed to drive in the bus-only lanes and park in no-parking areas, leading to much more chaotic traffic conditions.

Another strategy to minimize traffic in the valley has been to provide a large network of walking and biking trails which connect throughout the park. In line with this strategy, Yosemite has long offered bike rentals as a concession to visitors who seek to use bicycles while visiting Yosemite Valley. To further increase bicycle access, the Yosemite Conservancy launched a free pilot bike-share program in 2019 operated by a private vendor with 50 bikes accessed via a cellphone app. Since its introduction, the bikeshare operator has moved station locations toward the center of the valley given poor cell service in locations deeper into the valley that limits the ability of potential users to unlock bikes. Yosemite Conservancy is now considering both changes to and an expansion of the bikeshare system as the valley returns to more normal visitation patterns following Covid.

In this study, we examine the travel patterns of visitors in the Yosemite Valley in the summer of 2019, after the launch of the bikeshare system but prior to the pandemic disruption. The analysis uses data from Streetlight Data for the period from May through early Labor Day weekend in 2019. We look at travel between major zones of the valley, travel on each road and path within the park, and patterns of travel by weekend versus weekday and by time of day by mode.

The results of the analysis can inform bicycling planning in the valley, including future adjustments to the location of bikeshare stations as well as improvements to the bicycle network. Such improvements might be roadway-based, such as the addition of shared-used bike paths, or destination-based, such as providing new secure locations for bicycle parking, or technology-based, such as adding signals for cyclists and pedestrians. These improvements could synergize with existing programs like the bike rental program to offer better access by bike to all areas of the valley with the goal of encouraging bicycling a replacement for driving in the park.

As a follow-up to this analysis, we plan to conduct an intercept survey of visitors to Yosemite Valley to better understand their choices about travel within the valley, especially their choices about bicycling. The survey is intended to shed light on who is and isn't bicycling in the valley and provide a deeper understanding of the patterns discussed in this report. The draft survey and survey methodology, now under review by the National Park Service, are included in

Appendix A: Intercept Survey Instrument. Future work should also include analysis of any available data on the use of the shuttle service, particularly data on boardings and alightings at shuttle bus stops.

Methodology

This study examines trip volumes by driving, walking, and bicycling in major destinations and major corridors within Yosemite Valley. The data for this study originates from Streetlight Data. Their software analyzes thousands of datapoints at all times of day from cell-phone providers to pinpoint the locations and travel patterns of people throughout the United States. This does not actively require a cell signal, as these companies essentially share high resolution spatial diaries of people with Streetlight. Then, Streetlight Data uses this data to estimate vehicle volumes as well as indexes of volumes of bicyclists and pedestrians.

Due to the wealth of data on automotive traffic, the company is able to estimate automobile volumes with relatively low uncertainties, but the same is not true of active modes. Because of the uncertainty in their estimates of active modes, only an index of each mode is reported, indicating a relative magnitude rather than an actual count. Ground-truth measurement of bicycle and pedestrian flows are needed to convert these indexes to absolute estimates of volume. It is our hope that such a ground-truth can be added in a future project. For now, the data presented includes vehicle volumes (measured as number of trips within the given time period) for cars but only reports an independent index for pedestrian and bicycle trips. This means that bike and pedestrian indexes are useful for comparing the distribution of trips for each mode (e.g. where the highest numbers of trips by each mode are) but not for comparing the number of trips by each mode. The analysis does not include transit trips because the Streetlight data is unable to differentiate shuttle riders from people in private vehicles (it may be possible to adjust Streetlight data based on shuttle ridership data in future analyses). For the remainder of the report, “all modes” refers to driving, walking, and bicycling.

For this study, two different sets of spatial areas were considered. The first set of spatial areas represents each of the major destinations within Yosemite Valley: Yosemite Village, Curry Village, Yosemite Lodge, Ahwahnee Lodge, Lower Yosemite Falls, and the combined Vernal Falls/Mirror Lake/Upper Pines zone. The purpose of looking at these major zones is to understand not only the volume of each mode into each of these areas but also the flow of trips between these areas. This analysis shows where people walk, where people bicycle, and where people drive within the valley and give an indication of the degree to which visitors get around by car. The major zones shown in Figure 1 were chosen due to their relative importance within the park, as well as their bike traffic as reported in previous studies. The zones were defined based on the location of parking lots so that it is unlikely that a visitor would drive between destinations within a zone. Visitors can drive, walk, or bike between zones. Travel to and from the zone was analyzed with respect to changes in traffic volume throughout the day, as well as between weekdays and weekends. These are shown in Figure 2, Figure 6, and Figure 10. Other zones were examined to understand time of day variation but they all exhibit roughly the same

pattern. We produced maps to show the relative volumes for each major zone which can be found in Figure 4, Figure 8 and Figure 12 for vehicles, bikes, and pedestrians, respectively.

The second set of spatial areas consists of corridors (including roadways and parallel bike/ped paths) used by the Yosemite Shuttle, a system that reaches all the major zones as well as a few other smaller sites around the Yosemite Valley. This set of routes can be found mapped out in Figure 14. This allows the measurement of traffic flows along a corridor rather than simply in or out of a zone and better represents traffic conditions along that route. Similar to the analysis for major zones, these corridors were analyzed for time-of-day variability across all three modes – walking, biking and driving – and for weekend versus weekday. We identified the highest volume corridors for each mode. These corridors are shown in Figure 15, Figure 18 and Figure 21. Other corridors were examined with respect to time-of-day variation but they all seem to exhibit roughly the same pattern. In addition, we produced maps to show the relative volumes for each major corridor by mode, as shown in Figure 17, Figure 20 and Figure 23.

Results

Map of Zones

The zones analyzed for this project represent each of the major destinations within Yosemite Valley: Yosemite Village, Curry Village, Yosemite Lodge, Ahwahnee Lodge, Lower Yosemite Falls, and the combined Vernal Falls/Mirror Lake/Upper Pines zone. The defining areas for these zones are shown below in Figure 1.

Figure 1. Map of each major zone within the park

Vehicle Trips Over Time (busiest zone)

Here, time of day fluctuations in vehicle trip volumes are shown for the busiest zone in the valley. Figure 2 depicts weekday trip volumes, while Figure 3 depicts weekend trip volumes. While the general shape of the volume curve remains the same, weekend traffic rises faster in the morning and tapers off slightly slower at night, resulting in slightly higher average trip volumes.

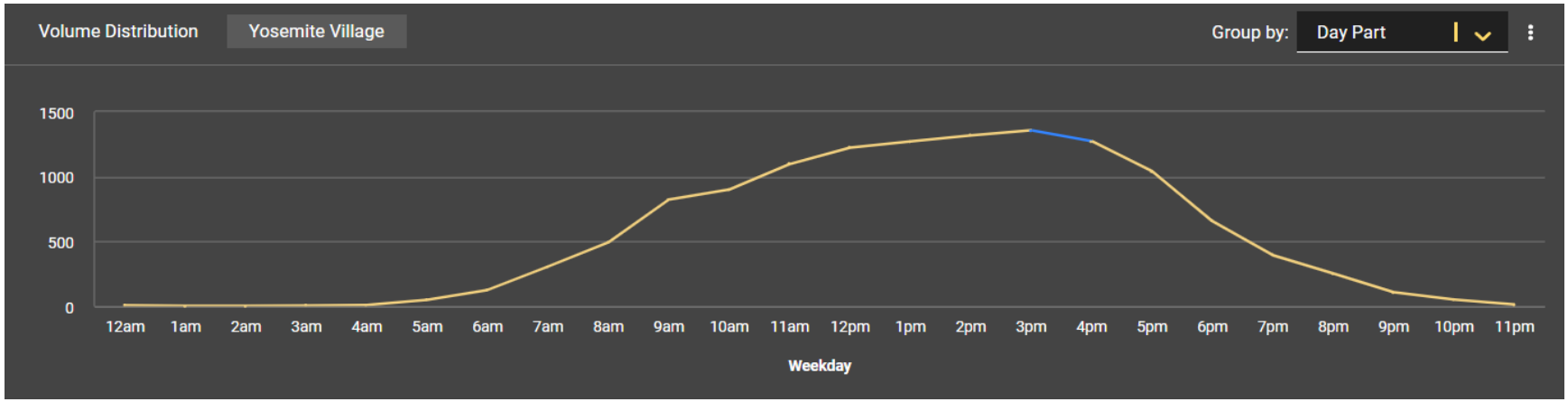

Figure 2. Weekday vehicle volume in the busiest zone (Yosemite Village)

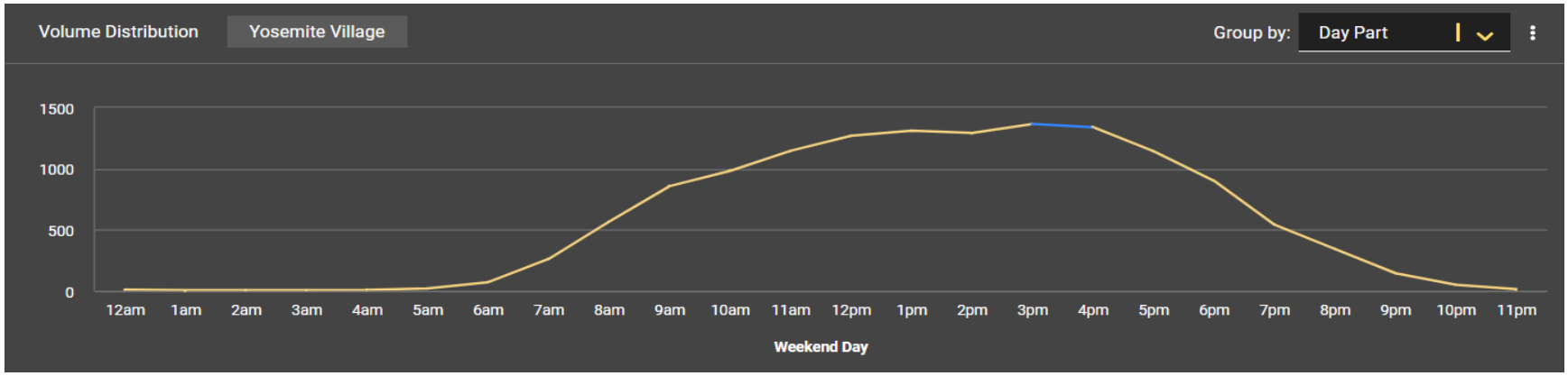

Figure 3. Weekend day vehicle volume in the busiest zone (Yosemite Village)

All Day Vehicle Trips Map

Figure 4 shows the average daily vehicle volumes both in and out of the major zones analyzed. When comparing all the zones by the average number of daily trips, both Yosemite Village and Yosemite Lodge attract the highest trip volumes, while Curry Village and the area around the Eastern campgrounds by Mist Trail attract significant traffic as well. To our surprise, Lower Yosemite Falls has far fewer trips but this can be explained by low parking availability and walking proximity to Yosemite Village and Lodge.

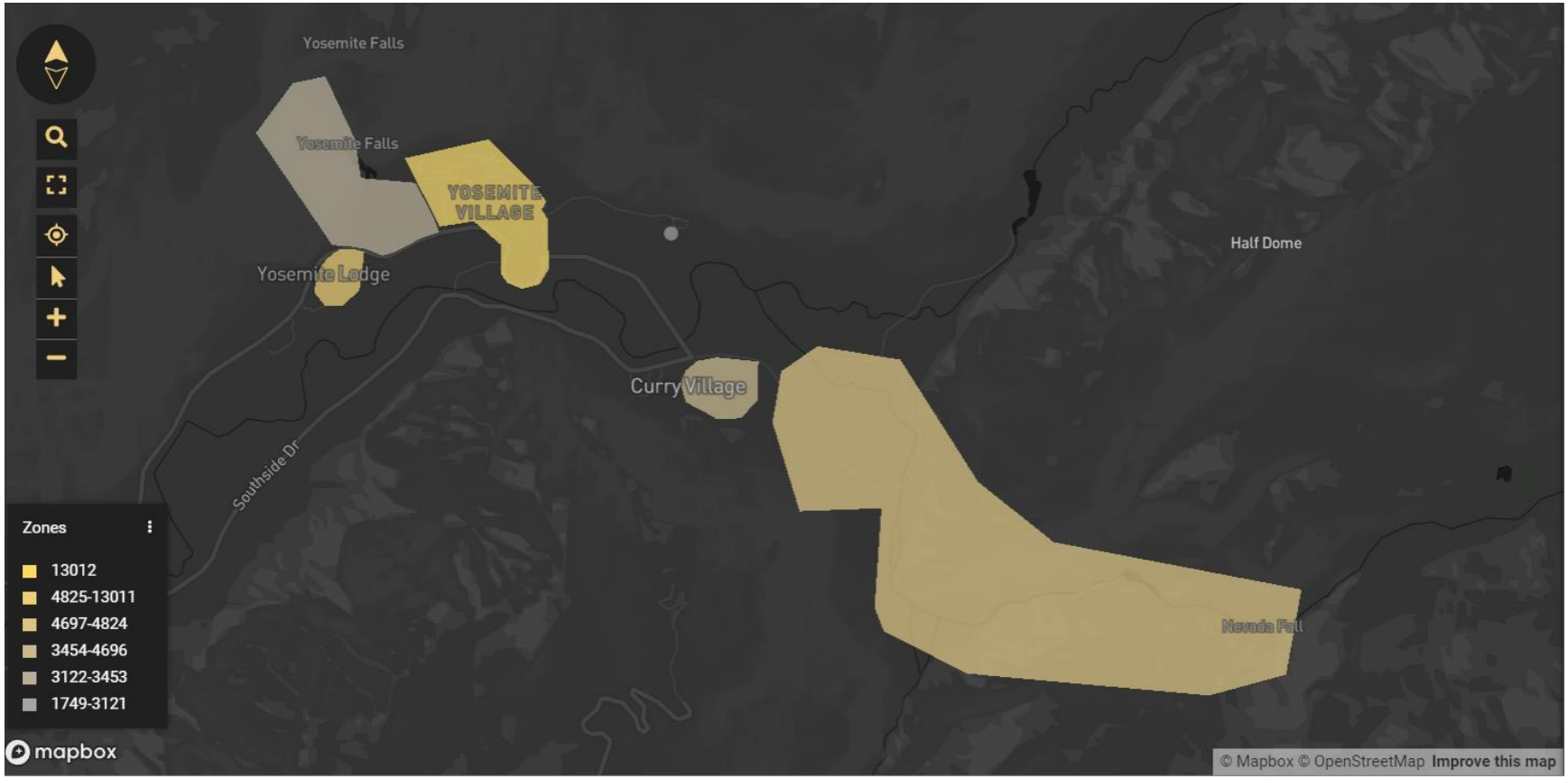

Figure 4. Map of daily vehicle volume in each major zone

All Day Vehicle Origin-Destination Matrix

While knowing total traffic volumes is useful, it is much more powerful to understand the flows of traffic between different start and end points. Thus, Figure 5 illustrates trip volumes between origin and destination pairs consisting of the 6 major zones analyzed. Once again, it is clear that Yosemite Village is the most popular travel point. Patterns of trips for other popular destinations suggest that most trips are short in length and occur between neighboring zones like Yosemite Village and the Lower Falls. Distances between each origin and destination pair are shown in Appendix B: Distances Between Origins and Destinations.

Origins \ Destinations	Ahwahnee	Curry Village	Lower Falls	Mist Trail/Mirror Lake/ Upper Pines	Yosemite Lodge	Yosemite Village
Ahwahnee	0	50	37	15	83	250
Curry Village	55	0	43	197	121	314
Lower Falls	16	43	0	24	124	415
Mist Trail/Mirror Lake/ Upper Pines	34	182	19	0	50	241
Yosemite Lodge	76	121	93	62	0	561
Yosemite Village	266	341	686	197	817	0

Figure 5. Matrix showing the daily trip volumes between the major regions by car

Bike Trips Over Time (busiest zone)

In Figure 6 and Figure 7, bike volumes are shown in the busiest zone for bike traffic, Yosemite Village. Due to the nature of the Streetlight Index, these numbers represent an index rather than an actual daily count. Nonetheless, the indes shows similar patterns between weekend and weekday ridership, with a slightly longer peak ridership period on weekends.

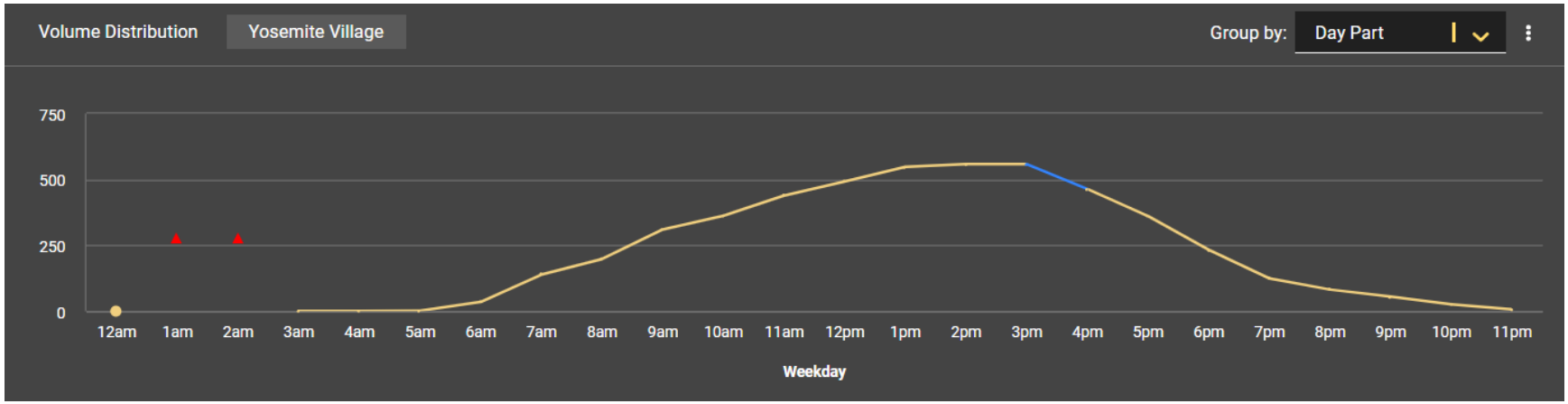

Figure 6. Weekday bike volume in Yosemite Village (values represent a unitless index)

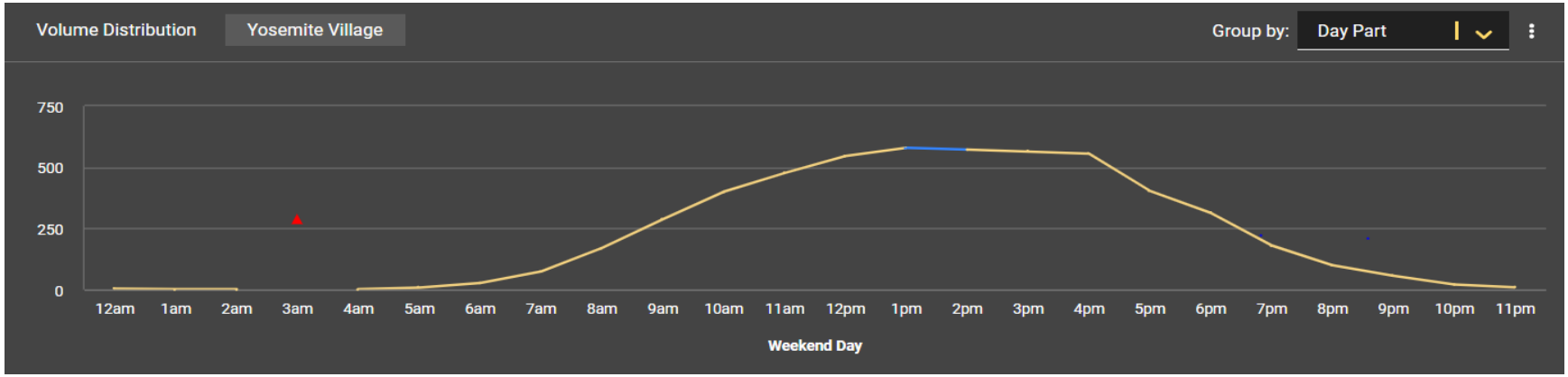

Figure 7. Weekend bike volume in Yosemite Village (values represent a unitless index)

All Day Bike Throughput Map

In many ways, the map of average daily ridership by zone closely mirrors the patterns of trip volumes found with vehicles. Figure 8 shows that Yosemite Village, Yosemite Lodge and Curry Village are the most popular travel zones. This lines up with the fact that all three of these zones offer bicycle rentals, and have the biggest parking areas for visitors to park and ride from. The zone by the campgrounds and the Mist Trail also shows considerable ridership which makes sense because it offers an accessible paved biking route with destinations of interest where passenger cars cannot drive.

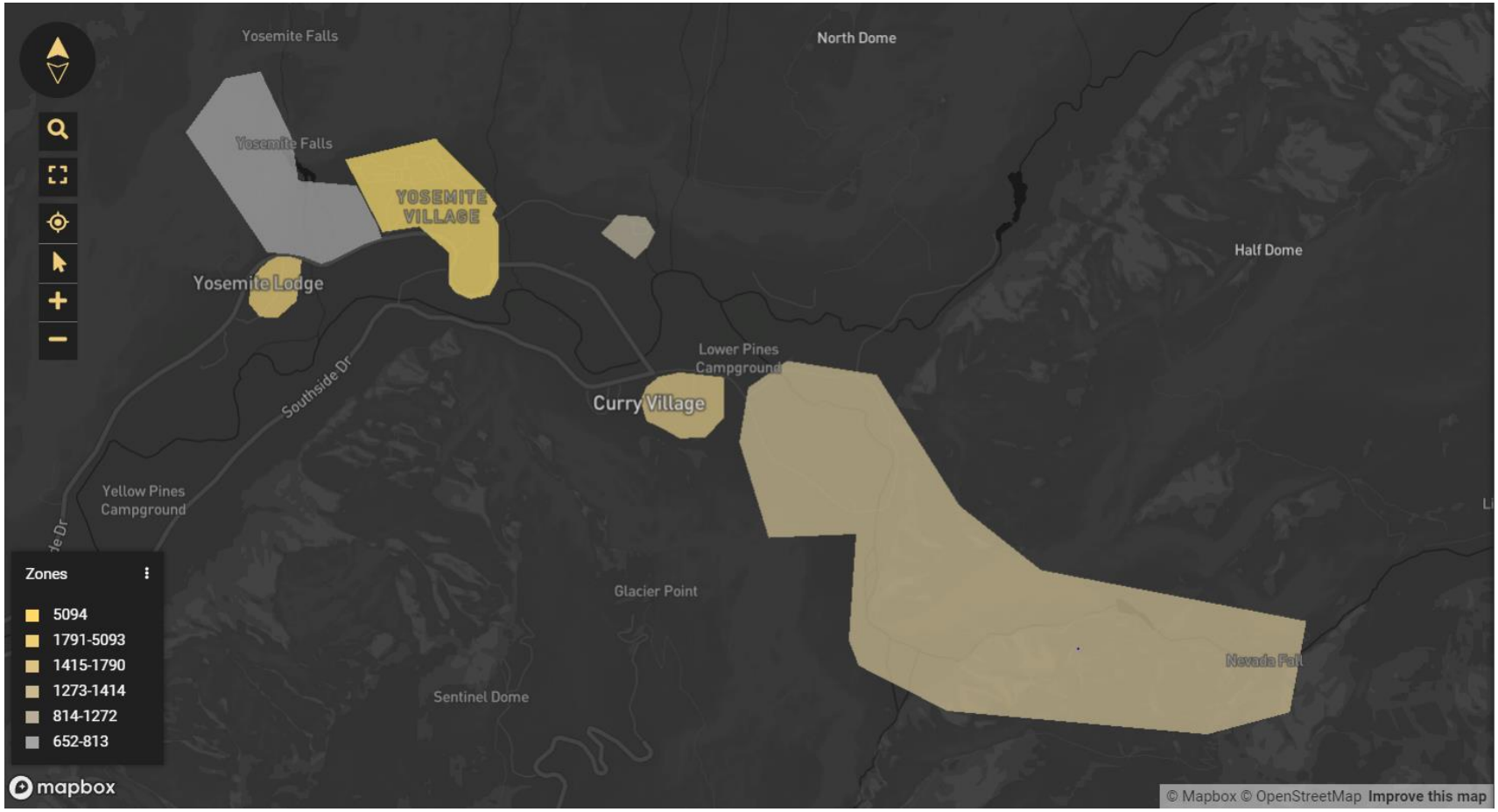

Figure 8. Map of daily bicycle volume in each major zone (values represent a unitless index)

All Day Bike Origin Destination Matrix

Unlike for drivers, bicyclists seem to show a greater willingness to travel to non-neighboring zones. Nonetheless, the matrix in Figure 9 shows that the overall proportions of travel from each origin and destination pair generally exhibit the same pattern as with drivers, with Yosemite Village remaining the most popular starting point for trips and the most popular ending point. Seeing the wide range of start and end points across the park certainly makes the case that many car trips within the park could be replaced by biking. Distances between each origin and destination pair are shown in Appendix B: Distances Between Origins and Destinations.

Origins \ Destinations	Ahwahnee	Curry Village	Lower Falls	Mist Trail/Mirror Lake/ Upper Pines	Yosemite Lodge	Yosemite Village
Ahwahnee	0	34	15	11	56	129
Curry Village	29	0	20	72	92	210
Lower Falls	9	14	0	15	37	66
Mist Trail/Mirror Lake/ Upper Pines	24	70	13	0	47	176
Yosemite Lodge	39	84	19	55	0	240
Yosemite Village	128	185	140	155	297	0

Figure 9. Matrix showing the daily trip volumes between the major regions by bike (values represent a unitless index)

Pedestrian Trips Over Time (busiest zone)

In Figure 10 and Figure 11, pedestrian volumes are shown in the busiest zone for pedestrian traffic, Yosemite Village. Due to the nature of the Streetlight Index, these numbers represent an index rather than an actual daily count. Nonetheless, the index shows similar patterns between weekend and weekday ridership, with a slightly longer peak ridership period on weekends.

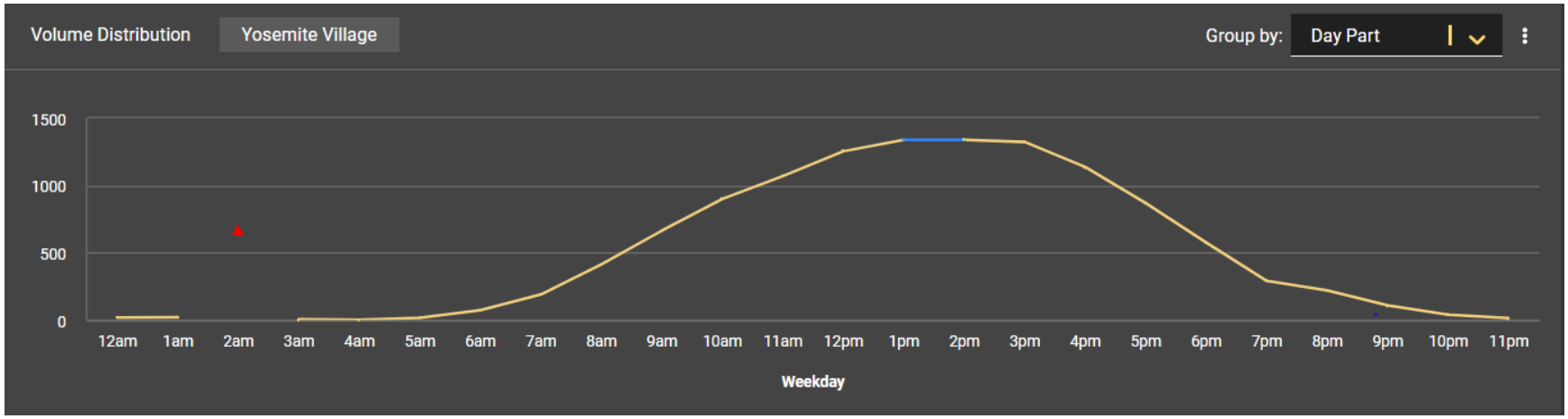

Figure 10. Weekday walking volume in Yosemite Village (values represent a unitless index)

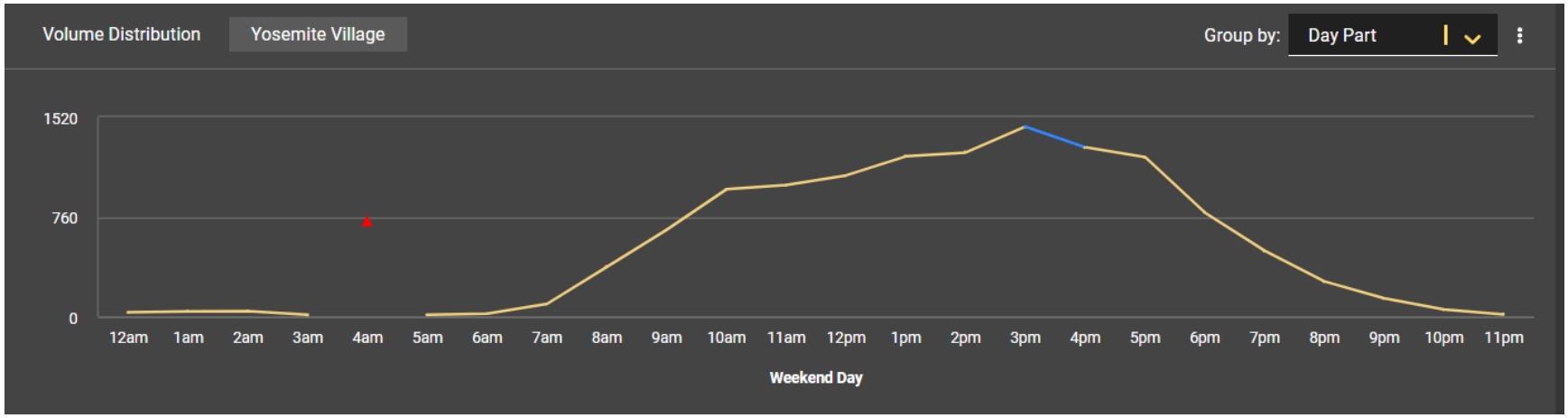

Figure 11. Weekend walking volume in Yosemite Village (values represent a unitless index)

All Day Pedestrian Throughput Map

The map of average daily walking trips by zone, shown in Figure 12, closely mirrors the patterns of trip volumes found with vehicles and bicycles except that the Mist Trail area replaces Curry Village as one of the three most population popular travel zones.

Figure 12. Map of daily walking volume in each major zone (values represent a unitless index)

All Day Pedestrian Origin Destination Matrix

According to the matrix of pedestrian trip origins and destinations, visitors mostly walk to neighboring zones, with the most common pairs of zones being Yosemite Village and Yosemite Lodge, Yosemite Lodge and Lower Falls, and Curry Village and the Mist Trail. These are relatively short trips that do not make sense as driving trips given limitations on parking. Distances between each origin and destination pair are shown in Appendix B: Distances Between Origins and Destinations.

Origins \ Destinations	Ahwahnee	Curry Village	Lower Falls	Mist Trail/Mirror Lake/ Upper Pines	Yosemite Lodge	Yosemite Village
Ahwahnee	0	21	10	4	36	286
Curry Village	57	0	19	493	17	235
Lower Falls	4	10	0	0	426	447
Mist Trail/Mirror Lake/ Upper Pines	13	357	0	0	3	59
Yosemite Lodge	21	14	376	3	0	462
Yosemite Village	228	117	649	28	645	0

Figure 13. Matrix showing the daily trip volumes between the major regions by walking (values represent a unitless index)

Map of Route Segments

In addition to analyzing traffic flows from zone to zone, traffic flows along the shuttle corridor were quantified using the routes shown in Figure 14. These routes cover entry and exit from the eastern part of the loop road and capture all traffic into the heart of Yosemite Valley.

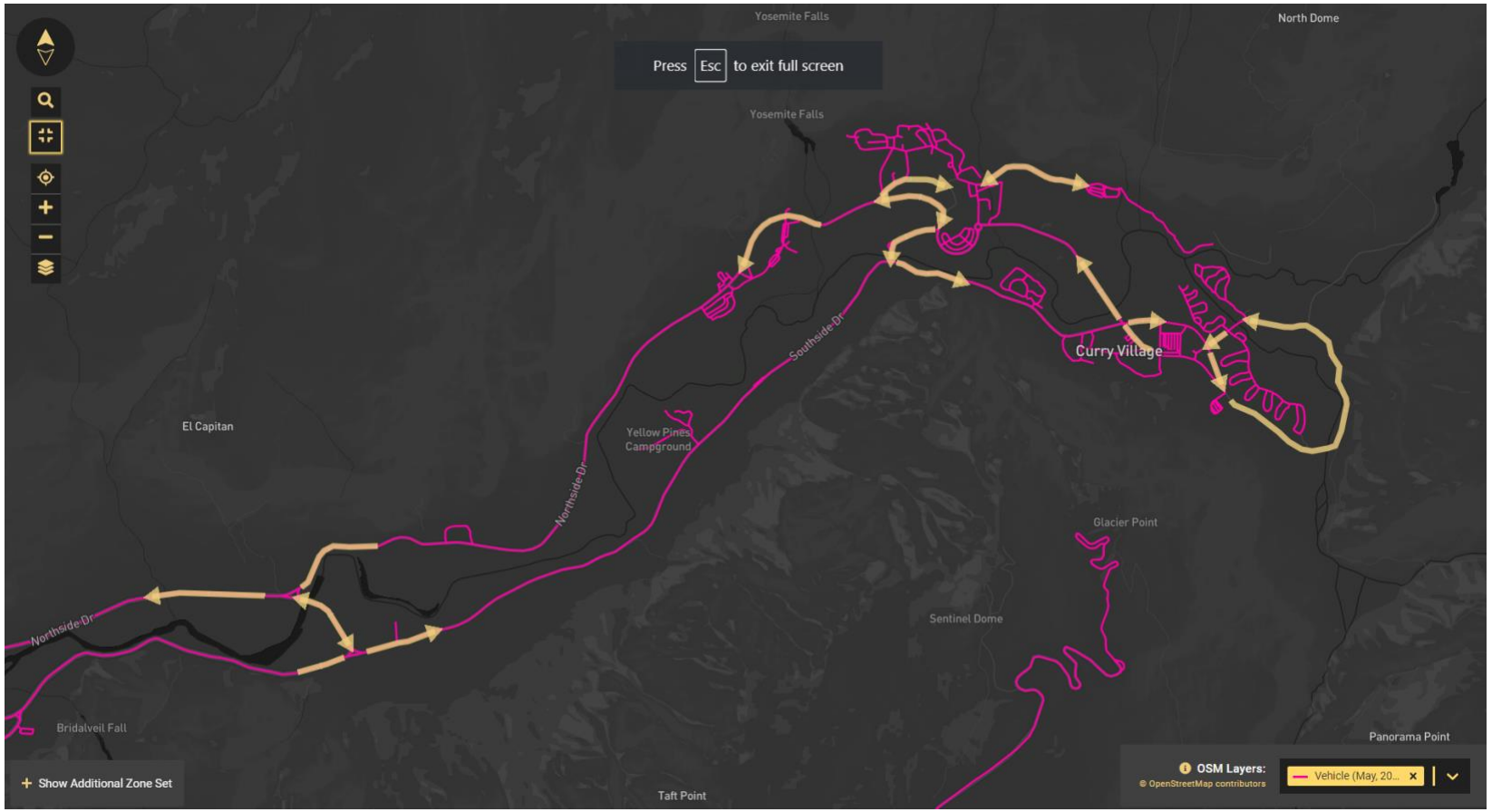

Figure 14. Map of each route segment analyzed

Vehicle Traffic Volume Over Time (busiest segment)

Of all the segments analyzed, Northside Drive near the Yosemite Village parking lot was shown to be the most heavily trafficked route segment in the park. Figure 15 shows the average trip volumes on all of the weekdays, while Figure 16 shows trip volumes on each of the weekend days. Saturday is clearly the busiest, with weekends generally having longer peak periods than weekdays.

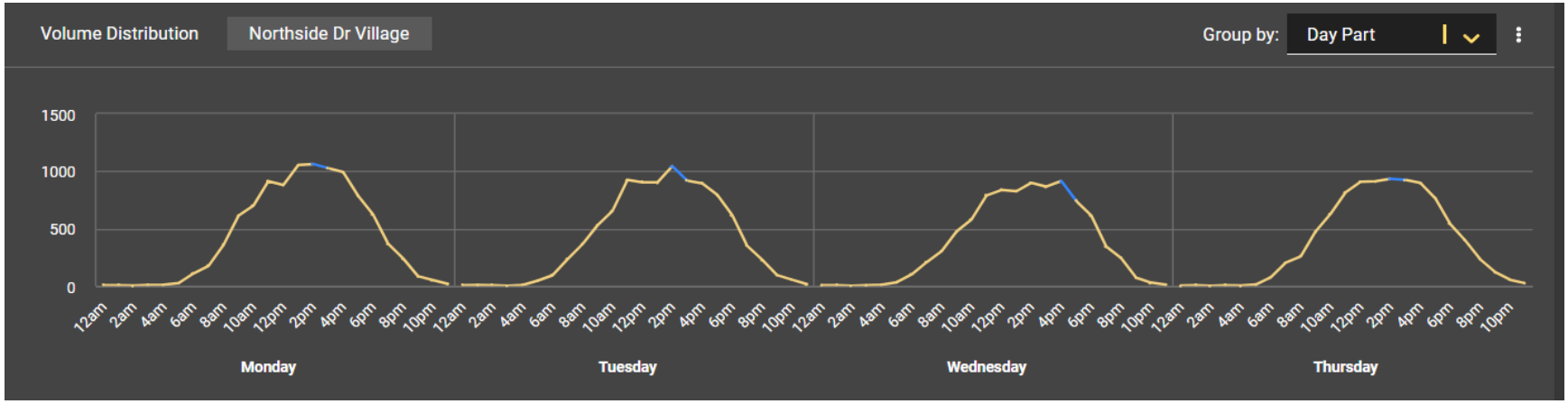

Figure 15. Weekday bidirectional vehicle volume on Northside Drive

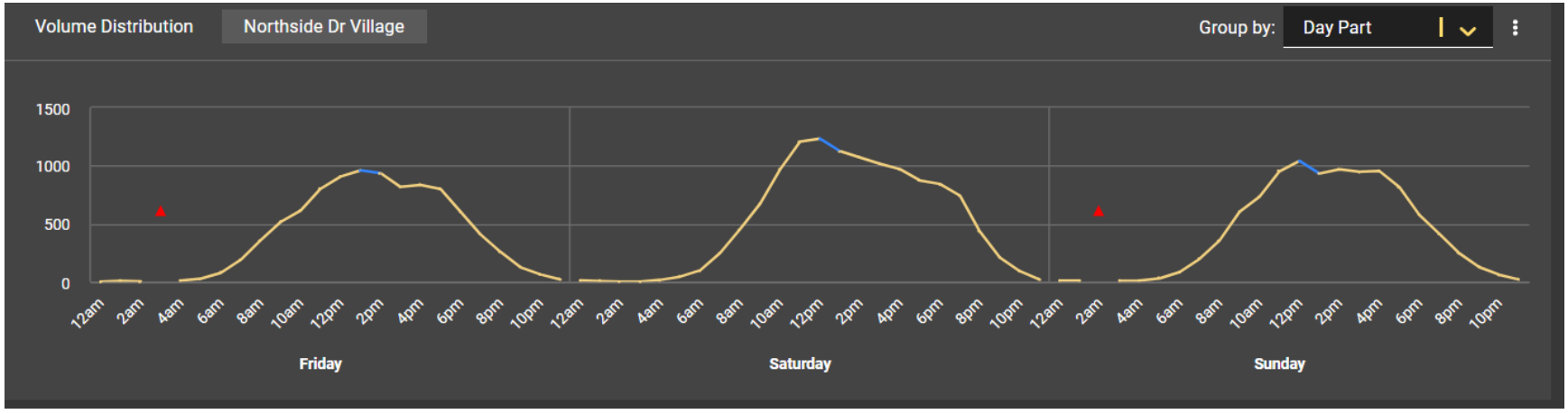

Figure 16. Weekend bidirectional vehicle volume on Northside Drive

Daily Vehicle Volume Map

In Figure 17, the average daily vehicle trip volumes are shown for all the segments analyzed. Since all visitors must come into the loop from the southwest on Southside Rd, it is clear that drivers exhibit circularity in their driving because the trip volumes on the eastern segments are higher than the western segments, showing flow in and out of the loop. These short trips around the loop while already at the park are trips which can potentially be replaced by the shuttles, walking or biking.

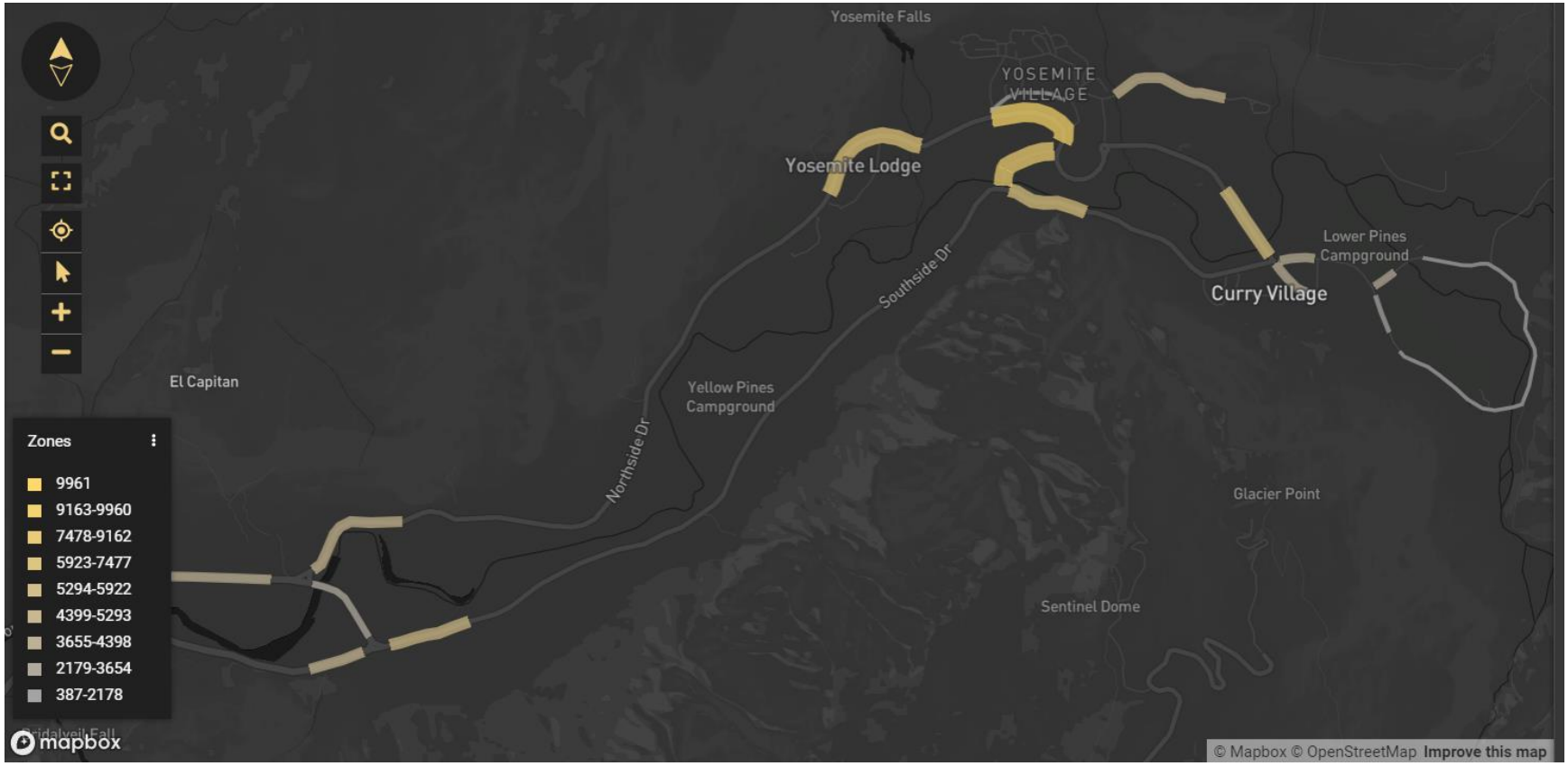

Figure 17. Map of daily vehicle volume on each route segment

Bike Traffic Over Time (top segment)

Figure 18 and Figure 19 show the average bike volume on the most heavily trafficked segment, which happens to be Village Drive near Yosemite Village. In examining this route data, weekdays appear to have heavier ridership late in the afternoon after a long ramp up. Weekends seem to quickly plateau in ridership around 11 AM and maintain that ridership before starting to decline around 5 PM.

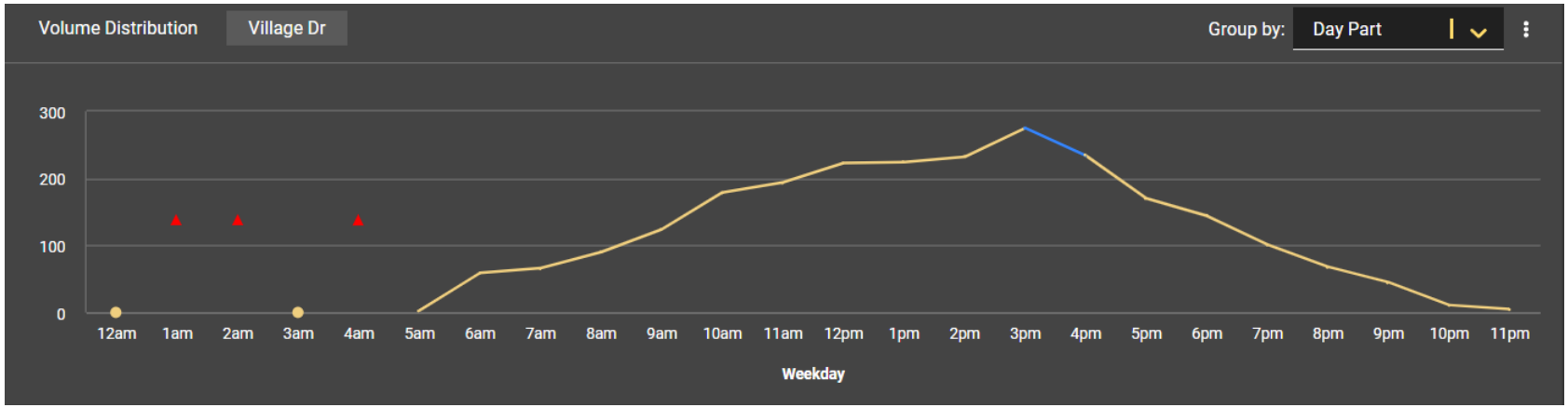

Figure 18. Weekday bidirectional bike volume on Village Drive

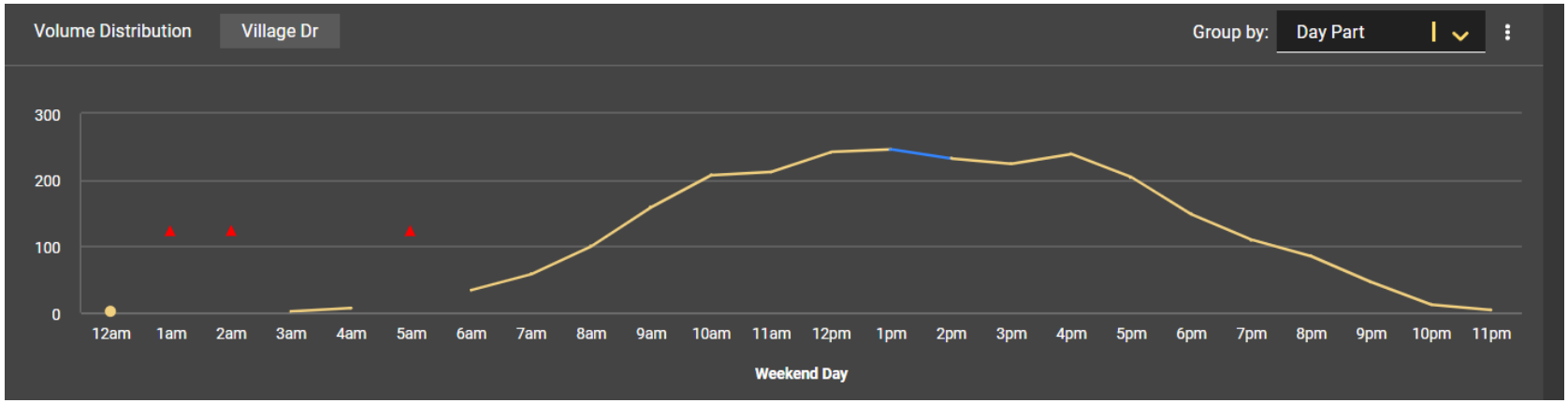

Figure 19. Weekend bidirectional bike volume on Village Drive

Daily Bike Throughput Map

Figure 20 below shows average daily bike ridership on the shuttle route segments. As we might expect, few bicyclists choose to ride in and out of the loop on the eastern side of the valley where there are fewer attractions and poorer cycling infrastructure. Bicycling is mostly concentrated on the roads and paths near Yosemite Village, Yosemite Lodge and Curry Village.

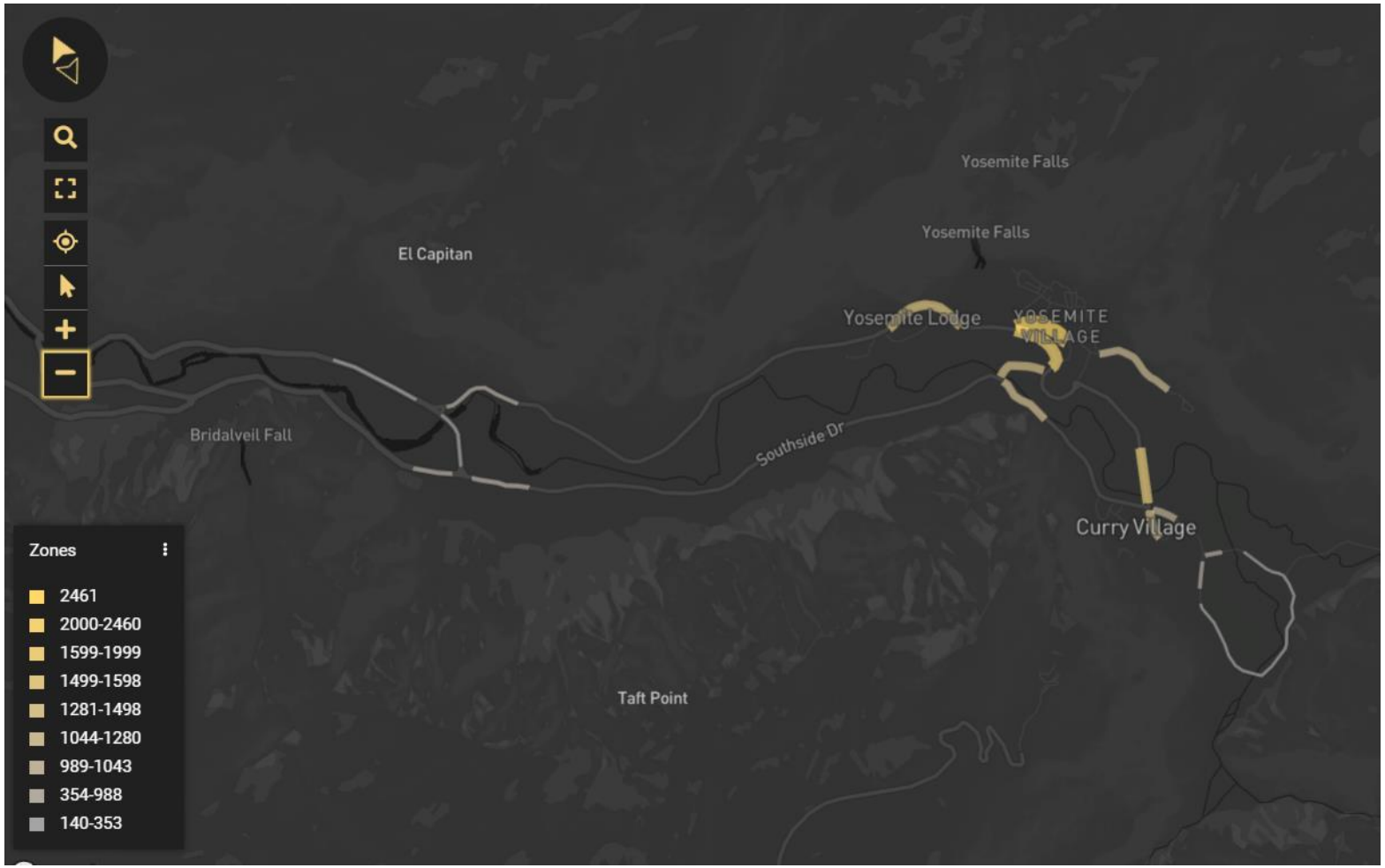

Figure 20. Map of daily bicycle volume on each route segment

Pedestrian Traffic Over Time (top segment)

Figure 21 and Figure 22 show average walking volumes in the most trafficked segment, which is once again Village Drive. Peak volumes for walking appear to be fairly similar on both weekends and weekdays, but once again traffic plateaus earlier on weekend days, but the peak hour is the same on weekends and week days. This general pattern is similar for bicycling and driving.

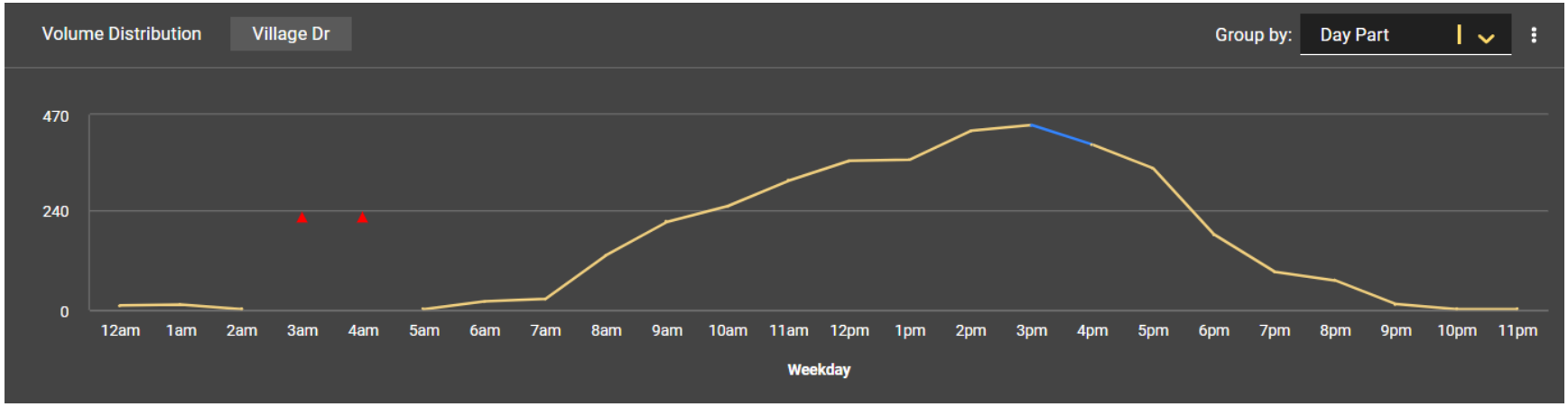

Figure 21. Weekday bidirectional walking volume on Village Drive

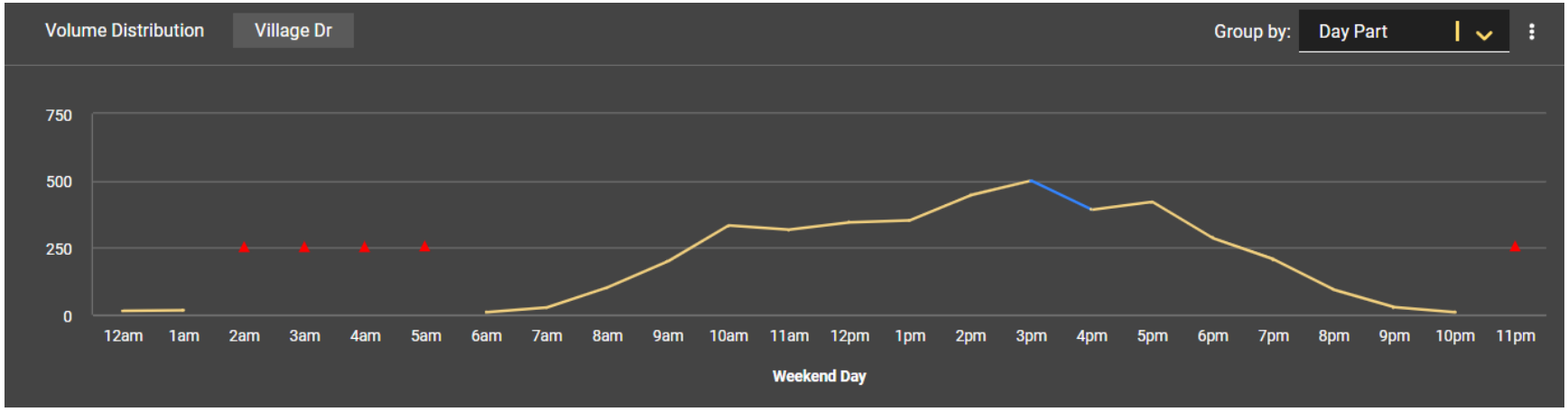

Figure 22. Weekend bidirectional walking volume on Village Drive

All-Day Pedestrian Index Map

Figure 23 below shows average daily walking activity on the shuttle route segments. Since many of the walking paths around the valley do not align particularly well with the loop road, walking activity is highest on segments near Yosemite Village where paths are directly adjacent to the road. As we might expect, few visitors chose to walk on segments on the eastern side of the valley since there are fewer attractions and no sidewalks.

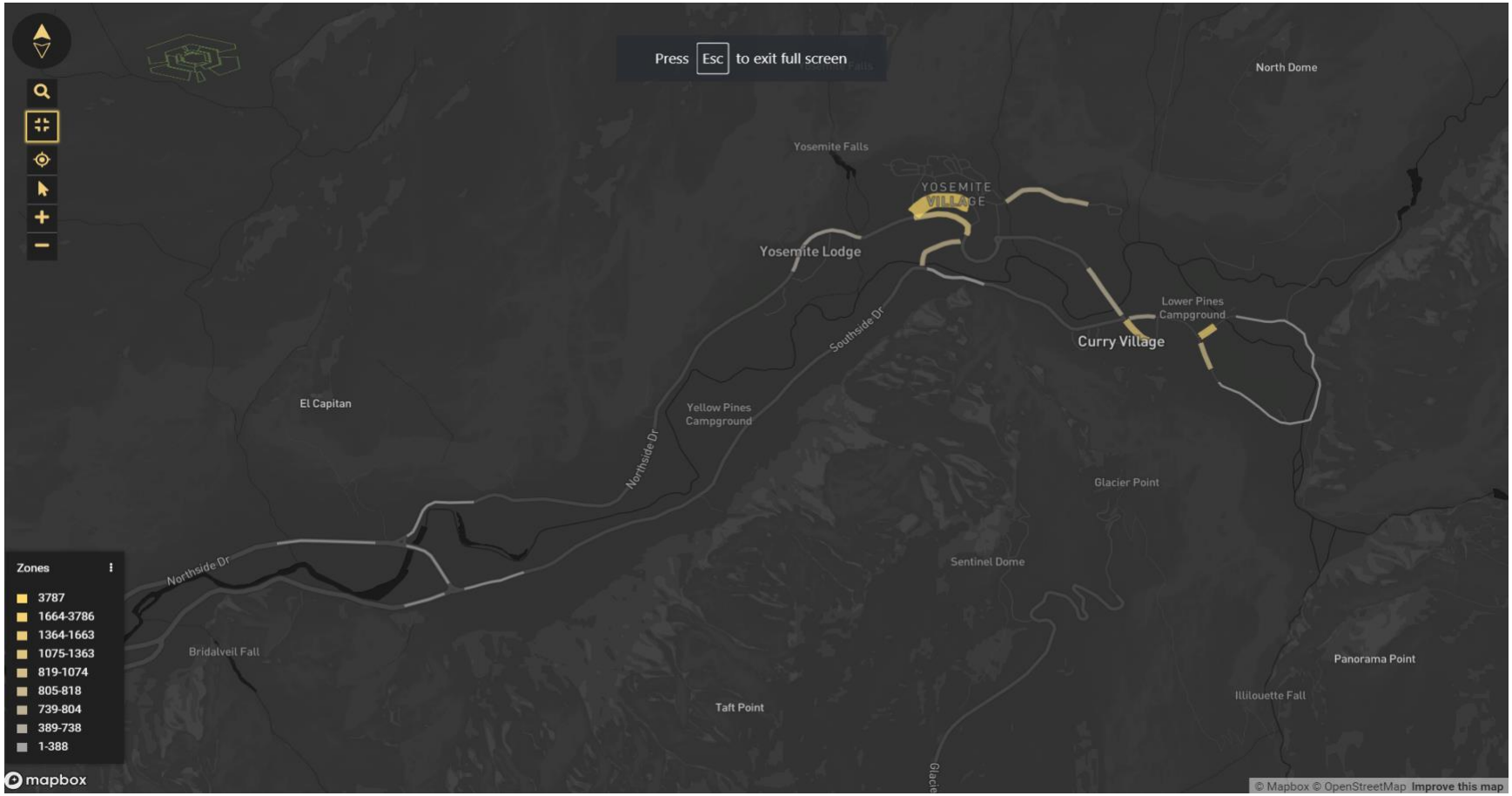

Figure 23. Map of daily walking volume on each route segment

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Data Summary

Products of Research

In this research, data was acquired using the Streetlight Data platform. This data shows traffic volumes for cars, bikes and walking around Yosemite Valley. Further, these three modes have data for average daily travel as well as travel by time of day in both zones and along specific routes.

Data Format and Content

Due to our agreement with Streetlight Data, their data cannot be shared with the public and we may only share results from our analysis of these areas.

Data Access and Sharing

The general public may not access this data. It may not be reused or used in any commercial manner either, or be reverse engineered.

Reuse and Redistribution

The general public may not access this data. It may not be reused or used in any commercial manner or be reverse engineered.

Appendix A: Intercept Survey Instrument

Yosemite National Park Visitors' Travel Survey (2021)

Start of Block: Introduction

Intro **Yosemite National Park Visitors' Travel Survey**

Welcome to the Yosemite National Park Visitors' Travel Survey! The Institute of Transportation Studies at the University of California, Davis, in collaboration with the California Department of Transportation and the National Park Service, is conducting a survey on how visitors get around Yosemite National Park. With the data gathered in this survey, park officials can better address the transportation needs of visitors.

This survey asks you questions about how you get around in the park with a specific focus on bicycling and your satisfaction with the bike infrastructure in the park.

The survey takes about 10 to 15 minutes to complete. Your participation is voluntary, your responses are completely confidential, and the results will be published only in summary form without connection to any individual. You are free to decline to take part in the survey. You can decline to answer any questions, and you can stop taking part in the survey at any time without penalty.

At the end of the survey, you will be entered into a drawing for $50 Amazon gift cards with your expected chances of winning about 1 in 100 depending on how many people participate. Everyone can be entered in the drawing regardless of participation. If you prefer not to participate in the survey but want to be included in the drawing, please email me at slhandy@ucdavis.edu. To be included in the drawing, please complete the survey (or contact me) by September 1, 2022. If you are unable to complete the survey by then, we still welcome your responses for some time afterward.

Thank you for participating!

End of Block: Introduction

Start of Block: Screener Questions

Q1a Do you agree to participate in the Yosemite National Park Visitors' Travel Survey?

I agree to participate (1)

I do not agree to participate (0)

Skip To: End of Survey If Q1a = I do not agree to participate

Page Break

Q1b Where do you live in?

Where generally? (1)

Where specifically? (2)

▼ California (1) Elsewhere in the US [list of states] Outside the US [list of countries]

Page Break

Q1c By what means did you enter Yosemite National Park for your most recent visit (or this visit if you are still in the park)? Please mark only one.

On foot (1)

Bicycle (2)

Motorcycle (3)

Personal vehicle (car/truck/ truck with trailer/ RV) (7)

Tour Bus (5)

Public Transportation (6)

Other (please specify) (8) _____

Q1d Is this your first-time visit to Yosemite National Park?

Yes (1)

No (4)

Q1e Was this visit to Yosemite Valley just for the day, or did your visit involve an overnight stay?

Day visitor (did not stay overnight in Yosemite Valley) (1)

Overnight visitor (stayed overnight in Yosemite Valley) (2)

End of Block: Screener Questions

Start of Block: General Commute Information

We'd like to ask you some questions about your daily travel when at home.

Q2a How do you usually get around your community? Please select the option you use most often.

Walking (1)

Bicycling (2)

Taking a bus or train (3)

Driving (4)

Getting a ride with someone else (5)

Other (please specify) (6) _____

Display This Question:

If Q2a = Bicycling

Q333 Do you ride an electric-assist bicycle, also known as an e-bike?

Yes (1)

No (2)

Q2b Do you currently have any physical or other health conditions that prevent you from:

	Yes (1)	No (2)
Walking? (1)		
Biking? (4)		
Riding a bus? (9)		

Skip To: End of Block If Q2b = Biking? [Yes]

Q2c When at home, how often do you ride a bicycle for exercise or recreation?

- Every day or almost every day (1)
- A few times per week (2)
- A few times per month (3)
- A few times per year (4)
- Not once in the last year (5)
- Never (6)

Q2d When at home how often do you ride a bicycle to get to a destination such as work, school, a store, a park, or another type of place?

- Every day or almost every day (1)
- A few times per week (2)
- A few times per month (3)
- A few times per year (4)
- Not once in the last year (5)
- Never (6)

Q2e When at home, how often do you use bike-share services? Bike-share services provide bicycles for short periods of time for a daily, monthly, annual, or trip-based fee.

- Every day or almost every day (1)
- A few times per week (2)
- A few times per month (3)
- A few times per year (4)
- Not once in the last year (5)
- Never (6)

Display This Question:

If Q2e = Not once in the last year

Or Q2e = Never

Q2f Have you ever used a bike-share system anywhere?

No (1)

Yes (2)

Display This Question:

If Q2f = Yes

Q2g How comfortable are you using bike-share systems?

Not very comfortable (1)

Somewhat comfortable (2)

Very comfortable (3)

End of Block: General Commute Information

Start of Block: Your Visit to Yosemite National Park and Use of Transportation Services

Q3 Now, we will ask you some questions about your visit to the Yosemite Valley and use of the transportation services in the Valley. If you are still in the Valley while completing this survey, please answer for your current trip.

Q3a When in the Valley on your most recent trip, did you ever use the following options to get around? Please select all the options you used.

- ☐ Walking (1)
- ☐ A bicycle you (or someone in your party) brought to the Valley (2)
- ☐ A bicycle you rented at Yosemite Lodge, Yosemite Village, or Curry Village (5)
- ☐ A bicycle you borrowed from Yosemite Valley Bikeshare (6)
- ☐ Free shuttle service (7)
- ☐ Private car or other type of vehicle (8)
- ☐ Other…… (please specify) (9)

_____

Display This Question:

If Q3a = A bicycle you (or someone in your party) brought to the Valley

Q332 Was this an electric-assist bicycle, also known as an e-bike?

Yes (1)

No (2)

Q3b When in the Valley on your most recent trip, how did you typically get around? Please select the option you used most often.

Walking (1)

A bicycle you (or someone in your party) brought to the Valley (2)

A bicycle you rented at Yosemite Lodge, Yosemite Village, or Curry Village (5)

A bicycle you borrowed from Yosemite Valley Bikeshare (6)

Free shuttle service (7)

Private car or other type of vehicle (8)

Other…… (please specify) (9)

_____

Display This Question:

If Q3b = A bicycle you (or someone in your party) brought to the Valley

Q334 Was this an electric-assist bicycle, also known as an e-bike?

Yes (1)

No (2)

Q3c We would like to know your opinions about different options for getting places within the Valley. Please answer for all options, even if you have not used them.

1 In general, how would you evaluate getting places by car in the Yosemite Valley on the following characteristics?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	
inconvenient						convenient
slow						fast
unenjoyable						enjoyable
uncomfortable						comfortable
unsafe						safe
difficult to use						easy to use
expensive						inexpensive
unappealing						appealing

Q330 In general, how would you evaluate getting places by the shuttle bus in the Yosemite Valley on the following characteristics?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	
inconvenient						convenient
slow						fast
unenjoyable						enjoyable
uncomfortable						comfortable
unsafe						safe
difficult to use						easy to use
expensive						inexpensive
unappealing						appealing

Q331 In general, how would you evaluate getting places by bicycle in the Yosemite Valley on the following characteristics?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	
inconvenient						convenient
slow						fast
unenjoyable						enjoyable
uncomfortable						comfortable
unsafe						safe
difficult to use						easy to use
expensive						inexpensive
unappealing						appealing

Q335 In general, how would you evaluate getting places by walking in the Yosemite Valley on the following characteristics?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	
inconvenient						convenient
slow						fast
unenjoyable						enjoyable
uncomfortable						comfortable
unsafe						safe
difficult to use						easy to use
expensive						inexpensive
unappealing						appealing

End of Block: Your Visit to Yosemite National Park and Use of Transportation Services

Start of Block: Use and Opinion About Bike-share and Bike-rental Service at the Yosemite Valley

Display This Question:

If Q2b = Biking? [No]

Q4 Now we have some questions about your use of the bicycle services available in Yosemite Valley.

Display This Question:

If Q2b = Biking? [No]

And Q3a = A bicycle you borrowed from Yosemite Valley Bikeshare

Q4a Please indicate your level of agreement with the following statements regarding the Yosemite Valley bike-share service.

	Strongly Disagree (1)	Somewhat Disagree (2)	Neutral (3)	Somewhat Agree (4)	Strongly Agree (5)
A bike was available when I needed it (4)					
The bike-share locations were convenient for me (5)					
Getting on and off the bike was physically challenging for me (6)					
Checking out and returning the bike using the mobile app was easy for me (7)					
The bike-share service was a convenient way for me to get places in the Valley (8)					
I am overall satisfied with my experience with the bike-share service (9)					

Display This Question:

If Q2b = Biking? [No]

And Q3a = A bicycle you borrowed from Yosemite Valley Bikeshare

Q4b Would you have used the following options more, less, or the same amount during your most recent visit if the bike-share service had not been available?

	A lot less (1)	Somewhat less (7)	Same amount (6)	Somewhat more (4)	A lot more (5)
a. Walking (4)					
b. Your Own Bicycle (5)					
c. Bike Rental Service (6)					
d. Free Shuttle Service (7)					
e. Personal Car or Other Vehicle (8)					

Display This Question:

If Q3a != A bicycle you borrowed from Yosemite Valley Bikeshare

And Q2b = Biking? [No]

Q4c Why have you not used the bike-share service? Please check all answers that apply.

- ☐ I did not know anything about the service (1)
- ☐ I did not want to download the app to my smartphone (6)
- ☐ The bike-share locations were inconvenient for me (7)
- ☐ No bikes were available when I needed one (8)
- ☐ The process of checking out and returning a bike was difficult (9)
- ☐ I am not comfortable bicycling in the Valley (10)
- ☐ I had no need for a bicycle while in the Valley (11)
- ☐ I had no interest in riding a bicycling in the Valley (12)
- ☐ Other…….. (Please describe) (5)

_____

Page Break

Display This Question:

If Q2b = Biking? [No]

And Q3a = A bicycle you rented at Yosemite Lodge, Yosemite Village, or Curry Village

Q4d Please indicate your level of agreement with the following statements regarding the bike rental service at Yosemite Lodge, Yosemite Village, or Curry Village.

	Strongly Disagree (1)	Somewhat Disagree (2)	Neutral (3)	Somewhat Agree (4)	Strongly Agree (5)
A bike was available when I needed it (4)					
The bike rental locations were convenient for me (5)					
Getting on and off the bike was physically challenging for me (6)					
Renting and returning the bike was easy for me (7)					
The bike-rental service was a convenient way for me to get places in the Valley (8)					
I am overall satisfied with my experience with the bike-rental service (9)					

Display This Question:

If Q2b = Biking? [No]

And Q3a = A bicycle you rented at Yosemite Lodge, Yosemite Village, or Curry Village

Q4e Would you have used the following options more, less, or the same amount during your most recent visit if the bike rental service had not been available?

	A lot less (1)	Somewhat less (7)	Same amount (6)	Somewhat more (4)	A lot more (5)
a. Walking (4)					
b. Your Own Bicycle (5)					
c. Bike-Share Service (6)					
d. Free Shuttle Service (7)					
e. Personal Car or Other Vehicle (8)					

Page Break

Display This Question:

If Q3a != A bicycle you rented at Yosemite Lodge, Yosemite Village, or Curry Village

And Q2b = Biking? [No]

Q4f Why have you not used the bike rental service? Please check all answers that apply.

- ☐ I did not know anything about the service (1)
- ☐ The bike rental locations were inconvenient for me (6)
- ☐ No bikes were available when I needed one (7)
- ☐ The process of renting and returning a bike was difficult (13)
- ☐ Renting a bicycle was too expensive (14)
- ☐ I am not comfortable bicycling in the Valley (10)
- ☐ I had no need for a bicycle while in the Valley (11)
- ☐ I had no interest in riding a bicycling in the Valley (12)
- ☐ Other…….. (Please describe) (5)

_____

Display This Question:

If Q3a = A bicycle you rented at Yosemite Lodge, Yosemite Village, or Curry Village

Or Q3a = A bicycle you borrowed from Yosemite Valley Bikeshare

Q4g What impact has your use of the bike-share and/or bike-rental service in Yosemite Valley had on your use of a bicycle to get places at home?

Compared to before, are you bicycling (or do you expect to bicycle)…

- Much less often (1)
- Somewhat less often (4)
- Neither more or less often (5)
- Somewhat more often (6)
- Much more often (7)

Display This Question:

If Q3a = A bicycle you rented at Yosemite Lodge, Yosemite Village, or Curry Village

Or Q3a = A bicycle you borrowed from Yosemite Valley Bikeshare

Q4h What impact has your use of the bike-share and/or bike-rental service in Yosemite Valley had on how you feel about bicycling in general?

Compared to before, do you like bicycling…

- Much less (1)
- Somewhat less (4)
- Neither more or less (5)
- Somewhat more (6)
- Much more (7)

End of Block: Use and Opinion About Bike-share and Bike-rental Service at the Yosemite Valley

Start of Block: Yosemite Valley Bike Infrastructure Improvements

Display This Question:

If Q2b = Biking? [No]

5a What improvements would make you more likely to use a bicycle to get places the next time you visit Yosemite Valley? **Please mark up to 5.**

- ☐ Nothing would make me more likely to use a bicycle (26)
- ☐ More bikes available in the bike-share service (1)
- ☐ More bikes available in the bike rental service (12)
- ☐ Cargo bicycle available from either service (23)
- ☐ 3-wheeled bicycle for extra balance available from either service (24)
- ☐ More bike-share checkout and return locations (13)
- ☐ More bike racks at visitor destinations (14)
- ☐ Bike racks provided near shuttle stops (15)
- ☐ More secure parking for personal bikes throughout the Valley (16)
- ☐ More off-street paths for biking in the Valley (17)
- ☐ Bike lanes on the roads in the Valley (25)
- ☐ Better amenities at bike-share locations (e.g., shelters, restrooms) (18)
- ☐ Bike-share and bike rental information available at shuttle stops and other visitor locations (19)
- ☐ Increase in the time limit for the bike-share service (20)
- ☐ Later evening check-out and return options for bike-share and rental bikes (21)
- ☐ Other (specify) (11) _____

End of Block: Yosemite Valley Bike Infrastructure Improvements

Start of Block: Basic Socio-Demographic Information

Q6a Thank you so much for your input! In this last section, we would like to learn a little more about you. Remember, this information will remain anonymous.

In what year were you born? (e.g., 1975)

_____

Q6b Which gender do you most identify with?

Man (1)

Woman (2)

Non-binary (3)

Prefer to self describe (4) _____

Display This Question:

If Q1b = California

Or Q1b = Outside California, but within the US

Q6c Please tell us which race and ethnicity categories best describe you (select all that apply):

- ☐ Black/African American (1)
- ☐ Hispanic/Latino (2)
- ☐ White (3)
- ☐ Asian (4)
- ☐ Pacific Islander/Native Hawaiian (5)
- ☐ American Indian/Alaskan Native (6)
- ☐ (Please Specify) (7) _____
- ☐ Prefer not to say (8)

Q6d What is your highest completed level of education?

No formal education (1)

Grade school or Jr. High (2)

High School Diploma or GED (3)

Associate or technical certificate (4)

Bachelor's degree(s) (5)

Graduate degree(s) (e.g., MS, PhD, MBA) (6)

Professional degree(s) (e.g., JD, MD, DDS) (7)

Q7e Are you currently employed? (check all that apply)

- [ ] Full-time employed (1)
- [ ] Part-time employed (2)
- [ ] Student (3)
- [ ] Retired (4)
- [ ] Homemaker (5)
- [ ] Not currently working (6)
- [ ] Permanently unable to work (7)

Q6f Please check the category that contains your approximate annual household income before taxes. Remember, by “household” we mean “people who live together and share at least some financial resources” (housemates/roommates are usually not considered members of the same household)

- Less than $10,000 (1)
- $10,000 to $24,999 (2)
- $25,000 to $49,999 (3)
- $50,000 to $74,999 (13)
- $75,000 to $99,999 (14)
- $100,000 to $149,999 (15)
- $150,000 or more (16)

Page Break

Q6g Do you have a driver’s license?

- Yes (1)
- In the past but not currently (4)
- Have never had one (3)

Q6h How many motor vehicles does your household have? Please include cars, trucks, and motorcycles?

- 0 (1)
- 1 (2)
- 2 (3)
- 3 (4)
- 4 (5)
- 5 or more than 5 (6)

Q6i How many functioning bikes are there in your household?

0 (1)

1 (2)

2 (3)

3 (4)

4 (5)

5 or more than 5 (6)

Page Break

Q7k How many people live in your household, including you?

1 (1)

2 (2)

3 (3)

4 (4)

5 or more than 5 (5)

Q7l How many members in your households are younger than 18 years old?

0 (1)

1 (2)

2 (3)

3 (4)

4 (5)

5 or more than 5 (6)

End of Block: Basic Socio-Demographic Information

Start of Block: OPTIONAL

Q7 After completing the survey, you will be entered into a drawing for ten $50 Amazon gift cards. The drawing will occur between September 7th and 14th. We will randomly select from those who complete the survey to receive this prize. If you wish to be included in the drawing or you are willing to be contacted further, please provide the following information. We will only use it for the purposes you authorize.

Q7a
Can we contact you...

	Yes (4)	No (5)
If you win the $50 gift card prize? (1)		
If we have any questions about the survey? (2)		

Display This Question:

If Q7a = If you win the $50 gift card prize? [Yes]

Or Q7a = If we have any questions about the survey? [Yes]

Q7b Please provide your email so we can contact you for the purposes you just indicated

_____

Q7c **THANK YOU!** We would value any additional comments you may have on this survey. Please write them in the space below.

_____

End of Block: OPTIONAL

Appendix B: Distances Between Origins and Destinations

Table 1. Distances Between Origins and Destinations in Miles

	Ahwahnee	Curry Village	Lower Falls	Mist Trail	Yosemite Lodge	Yosemite Village
Ahwahnee	-	1.8	1.8	2.6	2.3	1.2
Curry Village	1.8	-	2.1	1.2	2.6	2.3
Lower Falls	1.8	2.1	-	2.9	0.5	0.4
Mist Trail	2.6	1.2	2.9	-	3.4	3.5
Yosemite Lodge	2.3	2.6	0.5	3.4	-	0.9
Yosemite Village	1.2	2.3	0.4	3.5	0.9	-

Source: Google Maps