



Evaluation Study

Historic Columbia River Highway Waterfall
Corridor Timed-Use Permit Pilot

Historic Columbia River Highway, Oregon

December 14, 2022





Contents

1	Introduction.....	1
2	Pilot Goals	1
3	Pilot Overview	2
	3.1 I-84 Exit 31/Multnomah Falls Parking Lot Timed-Use Permit System	3
4	Ongoing Pilot Monitoring	3
5	Pilot Evaluation.....	6
	5.1 Overall Visitation Patterns	6
	5.2 Personal Motor Vehicle Travel and Parking Patterns	13
	5.3 Non-Personal Motor Vehicle Travel Patterns.....	20
	5.4 Safety Issues	24
	5.5 Visitor and Stakeholder Understanding and Satisfaction.....	27
6	Key Findings and Conclusions	33

Acronyms and Abbreviations

CAT	Columbia Area Transit
MCSO	Multnomah County Sherriff's Office
ODOT	Oregon Department of Transportation
OPRD	Oregon Parks and Recreation Department
USFS	United States Forest Service

1 Introduction

This study evaluates the performance of the Historic Columbia River Highway Waterfall Corridor Timed-Use Permit Pilot. A partnership among the Oregon Department of Transportation (ODOT), Oregon Parks and Recreation Department (OPRD) and U.S. Forest Service (USFS), the pilot aimed to provide more predictable and reliable multimodal access, improve safety and enhance the visitor experience through more efficient management of public access in this popular area.

Over the past decade, visitation to federal and state land attractions along the Historic Highway has grown by around 35 percent, resulting in congestion and safety issues that burden an already constrained system while diminishing the user experience. In order to address these issues while allowing the public to continue accessing these attractions in a safe and reliable way, project partners with land management authority along the Historic Highway's Waterfall Corridor modified their roles and responsibilities for a limited-duration pilot in summer 2022.

This document begins with an overview of pilot goals and operating characteristics, followed by a summary of ongoing monitoring activities and adjustments that agency partners made over the pilot's duration. A summary evaluation of the pilot's performance follows, based on a variety of criteria developed by project partners prior to implementation. The document concludes with key findings that will inform future short- and longer-term safety and congestion management efforts along the Historic Highway.

2 Pilot Goals

The Waterfall Corridor pilot's primary goals included the following:

1. Improve safety

- Reduce emergency response times, multimodal conflicts and collision potential.
- Enhance the safety of the travelling public along the Waterfall Corridor, and in vicinity of Exit 31 on Interstate 84 (Multnomah Falls parking lot).

2. Reduce congestion

- Reduce parking demand and improve multimodal access to provide more predictable and reliable travel times for all travel modes.
- Spread visitation throughout the day and to lower-visitation days.

3. Improve access to scenic and recreational sites along the corridor, and improve the visitor experience

- Reduce visitor frustration associated with congestion and parking issues.
- Expand transportation options (make non-driving options more attractive, reliable, and viable).

3 Pilot Overview

The Waterfall Corridor Pilot represented a collaborative, multi-agency, peak season effort to improve safety, manage congestion and enhance access to federal and state lands within the Historic Highway Waterfall Corridor. OPRD, USFS and ODOT implemented a timed-used permit pilot between Bridal Veil and Ainsworth State Park from May 24 through September 5, 2022. As shown in Figure 3-1, the pilot's western edge was immediately east of the Angel's Rest Trailhead parking area, while the eastern edge was between Ainsworth State Park and the I-84 Exit 35 interchange.

Throughout the pilot's duration, visitors using personal vehicles to access federal lands within the pilot corridor were required to obtain a timed-use permit between 9 AM and 6 PM daily. Visitors could obtain permits (one per personal vehicle) either through the recreation.gov website (for a \$2 transaction fee) or in-person (no charge) at several locations outside the pilot area. OPRD, contract flaggers, and USFS employees staffed permit check-in points at both ends of the corridor, where visitors presented their timed-use permits to gain access. Each timed-use permit specified a one-hour window during which visitors could use their private vehicle to access federal lands between the permit check-in points. Upon entering the corridor, visitors could stay as long as they like. Corridor residents, businesses, and certain other users (including visitors intending to pass through, but not stop within the corridor) were exempt from the permit requirement.

Staff based the number of timed-use permits issued each day, and the allotment by hour based on parking occupancy and average visit duration data from previous studies, and set the level of permit available to ensure vehicle queues at permit check-in points did not extend onto I-84 while providing sufficient parking availability within the corridor.

Figure 3-1. Historic Highway Waterfall Corridor Pilot Segment



Source: ODOT.

3.1 I-84 Exit 31/Multnomah Falls Parking Lot Timed-Use Permit System

Separate but concurrent with the Waterfall Corridor Pilot, project partners established a similar timed-use permit system for the Multnomah Falls parking lot at I-84 Exit 31. USFS and Columbia Area Transit staff established a permit check-in point at the pedestrian tunnel linking the parking lot with Multnomah Falls, where visitors arriving by personal vehicle were required to present a timed-use permit to gain access. Visitors arriving by public transit or private tour bus were except from this requirement.

This pilot represented a resumption of a seasonal timed-use permit pilot launched in summer 2021. However, differing from the Waterfall Corridor Pilot, visitors could only obtain timed-use permits via [recreation.gov](https://www.recreation.gov); there were no in-person permits available. The permit systems for both Multnomah Falls and the Waterfall Corridor were also separate and distinct, and visitors could not use permits for both interchangeably.

4 Ongoing Pilot Monitoring

Throughout the pilot's duration, ODOT, OPRD and USFS convened weekly to review pilot operations, while on-the-ground staff monitored conditions to inform whether any temporary or permanent adjustments were necessary to maintain safety, improve the pilot's functionality or to address other issues.

Over the 15-week pilot, project partners instituted the following operational adjustments. OPRD, in coordination with ODOT implemented permanent traffic flow changes to accommodate vehicle flow and to efficiently manage the permit check-in points with limited staff. Other adjustments were temporary in nature, and were in response to incidents that were typically resolved within a relatively short timeframe.

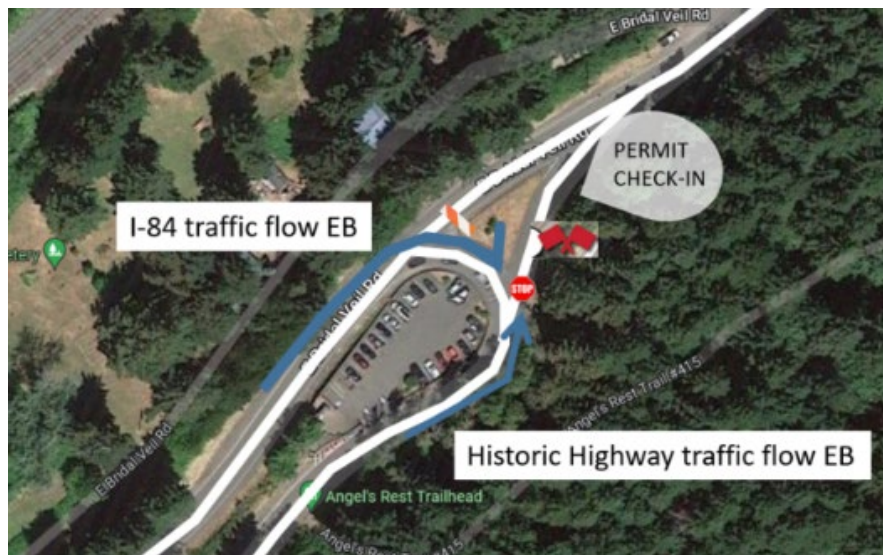
4.1 Permanent Pilot Changes

- Staff adjusted the Bridal Veil Check-in to help with vehicle queuing and flow from the original configuration with two staff points to a consolidated one check point by routing vehicles travelling from the I-84 off-ramp to the south leg of the triangle intersection, shown below. Staff barricaded the north leg of the intersection, though Sasquatch and the Waterfall Shuttles were allow through. Vehicles heading east on the Historic Highway remained on the Highway to pass through the check-in point. This allowed the permit check-point to operate with 3-4 instead of 4-5 staff. ODOT also supplemented OPRD staff with contract flagging staff to facilitate traffic flow at Bridal Veil and ensure that the vehicle queue did not reach the I-84 off-ramp at exit 28. Project staff did not modify the warning signage, both PCMS and roll-up temporary signs as part of this change.

Figure 4-1 Concept of Operations Bridal Veil Check-in Point Configuration



Figure 4-2 Field-modified Bridal Veil Check-in Point Configuration



- At Ainsworth, OPRD staff also modified the permit check-in to reduce the number of staff required to operate the check-in, allowing for one staff, if necessary, though for the majority of the pilot two staff were checking permits and interacting with visitors. Staff relocated the permit check area to the north-western leg of the triangle intersection with the I-84 off-ramps and the Historic Highway and Frontage Road, funneling all westbound vehicles to staff on the north side of the road.

Figure 4-3. Concept of Operations Ainsworth Check-in Point Configuration

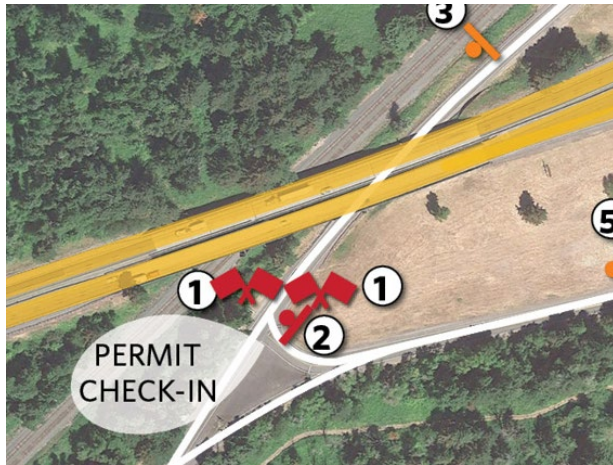


Figure 2-4. Field-modified Ainsworth Check-in Point Configuration



4.2 Temporary Pilot Changes

There were three notable incidences (all on I-84) that impacted Permit pilot operations, detailed below. All were crashes on I-84 that caused traffic to divert to the Historic Highway, increasing traffic volumes and the number of over-length vehicles attempting to illegally use the Historic Highway to bypass traffic on the Interstate.

- On Monday June 27, 2022, a crash on I-84 near Bonneville Dam at 6:50 AM resulted in a day-long closure of the freeway in both directions between Troutdale and Hood River (the crash was cleared around 3:30 PM). While the Waterfall Corridor remained open, staff temporarily suspended pilot operations to expedite emergency and maintenance vehicles through the corridor. Timed-use permit holders with reservations during this timeframe received a cancellation notice and were issued refunds, and staff did not set up the permit check-in locations.
- On Thursday, July 14, 2022, a crash on I-84 in vicinity of Milepost 34.5 (on the Warrendale overpass) around 11:40 AM pushed I-84 traffic onto the Historic Highway, significant increasing westbound traffic on the Historic Highway. The

permit system still operated, but the western permit check-in location saw a large increase in vehicles who were using the Historic Highway to drive through. July 14th was also a day where ODOT collected traffic counts for a “typical” weekday, and those data are not usable due to the increased westbound traffic avoiding backups on I-84.

- On Sunday, July 24, 2022, a crash on I-84 WB near MP 20 around 2 pm created a back-up extending back to Dodson/Warrendale. Permit checkers pulled the permit system, allowing vehicles to use the Historic Highway as an I-84 bypass, though ODOT maintenance staff and OPRD check-in staff communicated and stayed at the permit check-in areas to dissuade oversized vehicles from illegally using the Historic Highway.

5 Pilot Evaluation

As part of the Waterfall Corridor’s Concept of Operations, project partners developed evaluation measures to gauge the pilot’s performance over its 15-week operating period. Described in the sections below, the team organized the evaluation measures into five main themes:

- Overall visitation patterns
- Personal motor vehicle travel and parking patterns
- Non-personal motor vehicle travel patterns
- Safety issues
- Visitor and stakeholder understanding and satisfaction

Project partners or other agencies already collected data for several measures (e.g., collisions, incidents, parking lot occupancy) prior to the pilot’s activation, thereby enabling before/after comparisons for some variables. In-field staff, online surveys or other means provided additional data (e.g., vehicle queueing at permit check-in points, visitor understanding/satisfaction). Staffing limitations limited the data collected by in-field staff, as they prioritized their primary duties of maintaining safe and orderly pilot operations.

The sections below discuss the evaluation measures and findings in detail.

5.1 Overall Visitation Patterns

These evaluation measures gauge the pilot’s impact on broader visitation patterns, notably whether the pilot spread visitor access to federal and state lands toward off-peak days and hours. Understanding that the presence of a timed-use permit system could itself discourage visitation to the Waterfall Corridor, project partners also monitored visitation at similar destinations outside the pilot corridor.

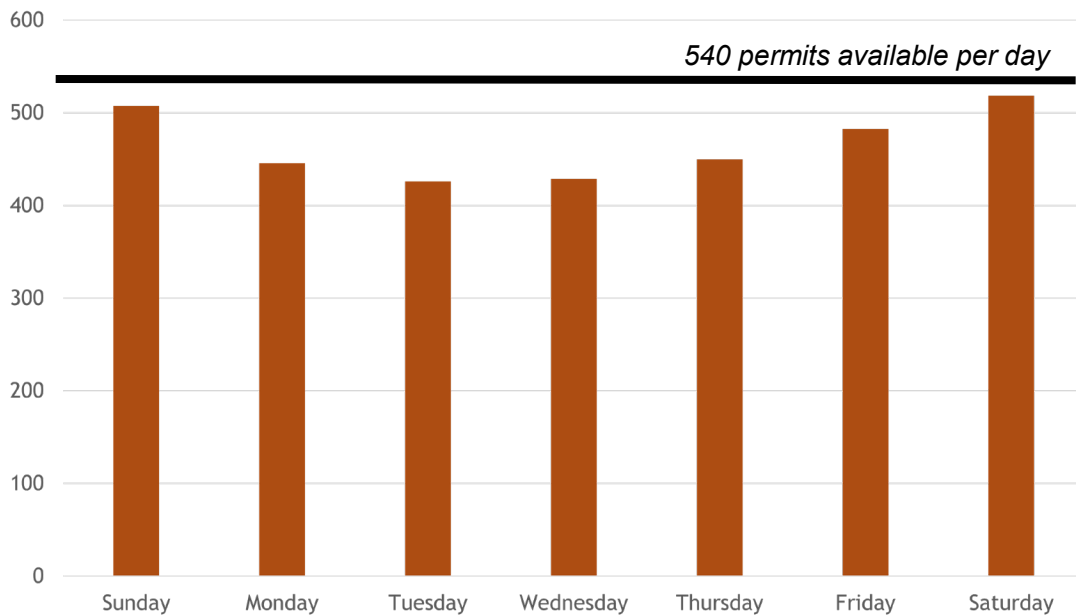
Day-of-Week and Time-of-Day Visitation Patterns

Waterfall Corridor Pilot

On the Waterfall Corridor pilot, USFS released 60 timed-use permits per hour within the pilot’s hours of operation (for a total of 540 permits per day). The system released fifty permits per hour two weeks in advance, and released the remaining ten permits per hour two days before the visit date. Over the 15-week pilot period, visitors reserved 49,633 timed-use permits using rec.gov for the Waterfall Corridor.

Figure 5-1 shows the average number of timed-use permits reserved by day-of-week. Visitors reserved an average of 400 to 500 permits each day, with Fridays, Saturdays and Sundays experiencing the highest demand, similar to conditions in the corridor prior to the permit system. While the number of issued permits provides a general indication of visitation, this data does not account for “no-shows” and visitors driving through but not stopping within the pilot corridor (for which permits were not required).

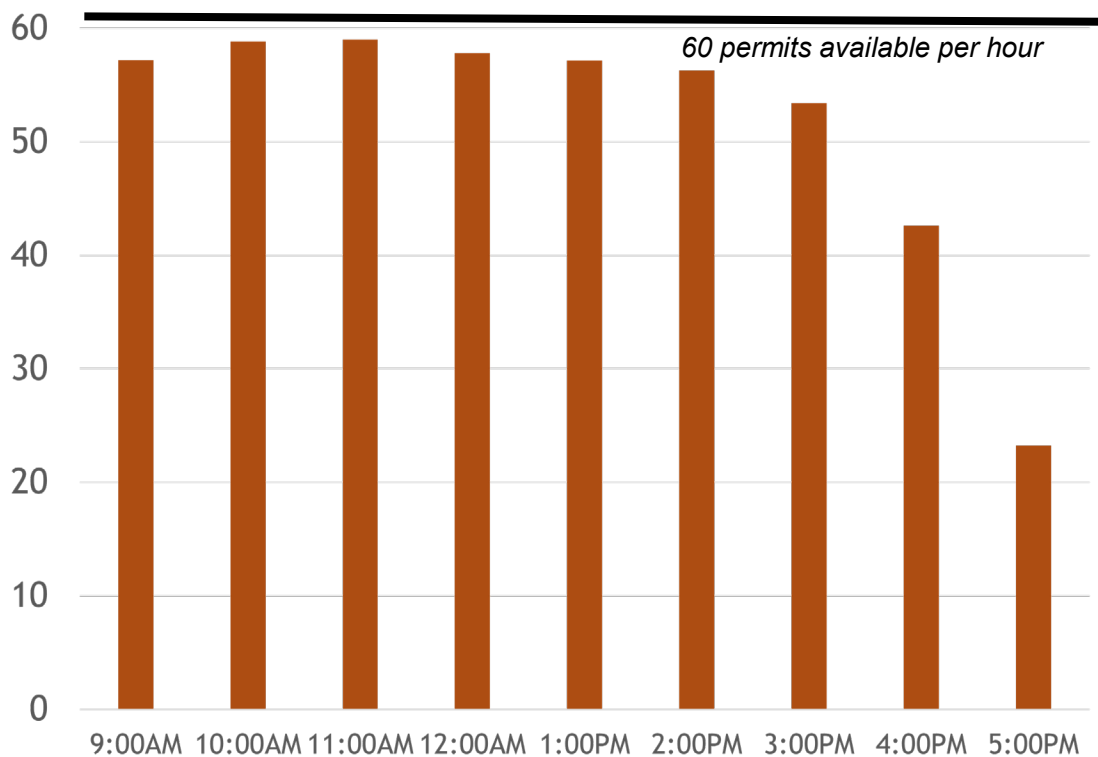
Figure 5-1. Average Number of Timed-Use Permits Issued by Day-of-Week, Waterfall Corridor Pilot



Source: USFS rec.gov records.

Figure 5-2 shows the average number of timed-use permits reserved by hour over the pilot’s duration. The pilot corridor experienced relatively consistent visitation demand between the hours of 9 AM and 2 PM, with the number of permits issued nearly reaching the maximum hourly allotment. The relatively high demand during the pilot’s first hour of operation may also indicate similar demand in the hours immediately leading up to 9 AM. After 3 PM, reserved permits reduce drastically. Most visitation to the Waterfall corridor prior to the permit system is consistent with this pattern; especially for visitors looking to hike or participate in other recreational activities, there is much more demand for starting activities in the morning or early afternoon compared to the late afternoon.

Figure 5-2. Average Number of Timed-Use Permits Issued by Hour, Waterfall Corridor Pilot

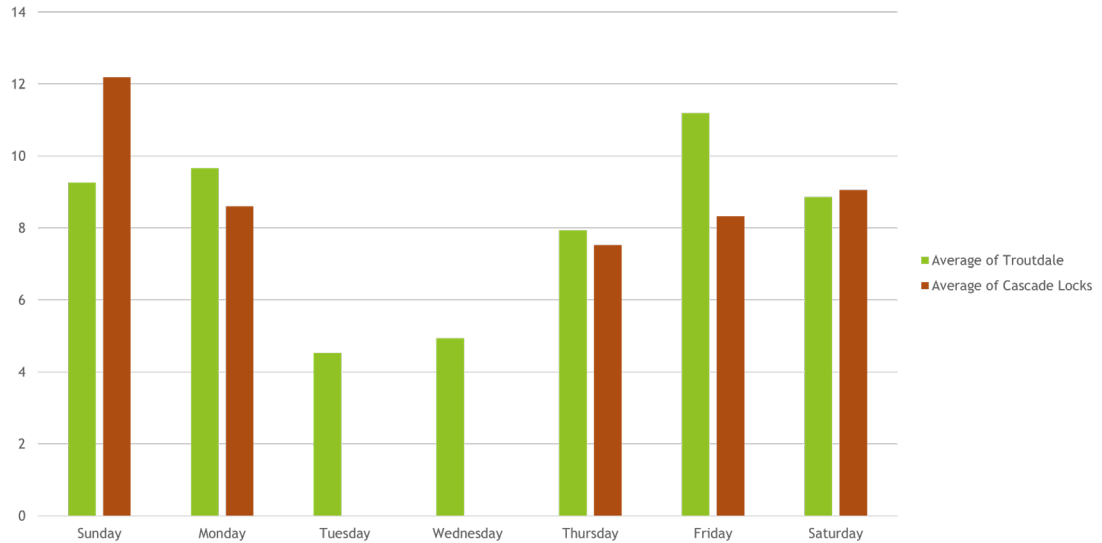


Source: USFS rec.gov records.

To address equity and access concerns for an online system, the project team created an in-person, no fee permit option. There were 50 Waterfall Corridor Pilot timed-use permits available per day. In-person permits were not available for the Multnomah Falls Pilot. Figure 5-3 illustrates average permits issued by day in-person at the Gateway to the Gorge Visitor Center in Troutdale and the Cascade Locks Historical Museum. Over the pilot's duration, the Gateway to the Gorge Visitor Center issued 846 timed-use permits and the Cascade Locks Historical Museum issued 686 permits. Visitors reserved a total of 1,532 in-person permits. Demand was highest Friday through Monday, with Sundays experiencing the highest demand. Both locations were initially closed on Tuesdays and Wednesdays, though the Gateway to the Gorge Visitor Center opened seven days a week starting the week of July 11 to accommodate increased demand for information and in-person permits. The Cascade Locks Historical Museum remained closed Tuesdays and Wednesdays throughout the pilot.

Of the 50 daily timed-use permits available in-person, 30 permits were available in Troutdale while 20 permits were available in Cascade Locks. Troutdale did not hand out all their allotted daily permits, while Cascade Locks routinely distributed all 20 tickets, usually on Saturdays and Sundays, especially toward the last two months of the permit system.

Figure 5-3. Average Number of Timed-Use Permits Obtained In-Person by Day, Waterfall Corridor Pilot



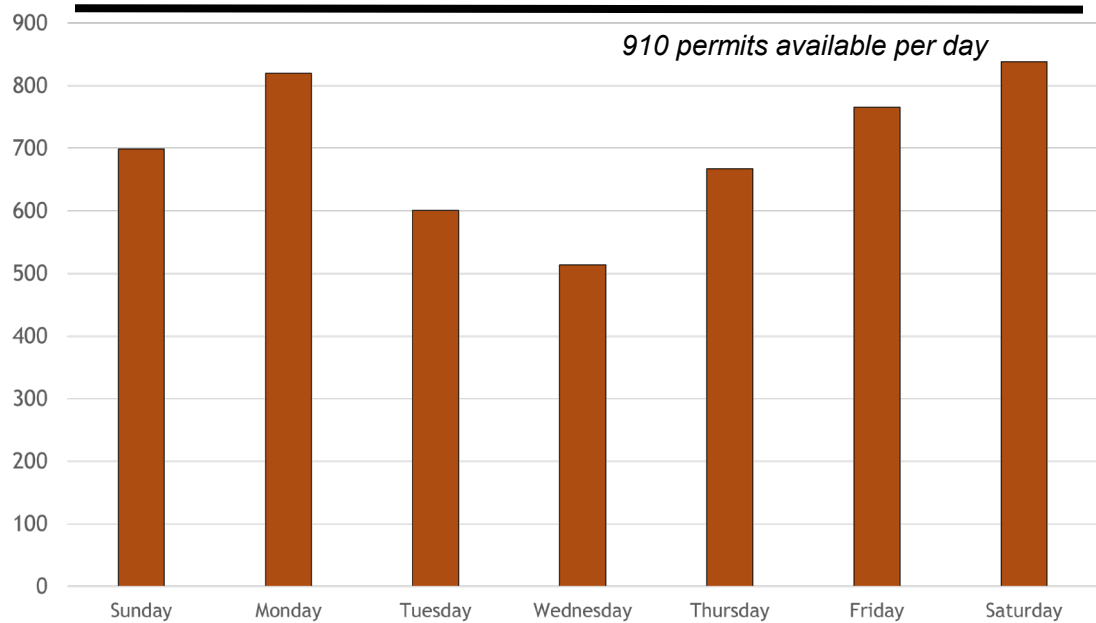
Source: Gateway to the Gorge Visitor Center and Cascade Locks Historical Museum. Troutdale data is on the left for each day and the only data for Tuesday and Wednesday.

Multnomah Falls Pilot

USFS released between 85 and 140 timed-use permits per hour for the I-84 Multnomah Falls lot within the pilot’s hours of operation (910 permits total per day). These permits granted visitor access to the I-84 Exit 31 parking lot, with CAT staff checking permits as visitors passed through the pedestrian tunnel. Over the 15-week pilot period, visitors obtained 79,670 timed-use permits.

Figure 5-4 shows the average number of timed-use permits issued by day-of-week. Visitors reserved approximately 500 to 800 permits each day, with Mondays, Fridays and Saturdays experiencing the highest demand. There are likely data missing for Sundays that are not reflected in Figure 5-4, as Sundays were generally busier than other days of the week. While the number of issued permits provides a general indication of visitation, this data does not account for “no-shows” and only applies to people accessing Multnomah Falls via the I-84 Exit 31 parking lot (visitors could also access Multnomah Falls via the Historic Highway). These data also do not indicate visitors who used their personal vehicles to travel to exit 31 without a permit, and when turned away at the pedestrian undercrossing chose to observe the falls from the parking lot or stayed for a while (picnicking, taking photos, or sitting in their vehicles) without going up to the site. Traffic counts from exit 31 show that vehicles within the exit 31 lot remained fairly steady in 2022 as compared to 2021.

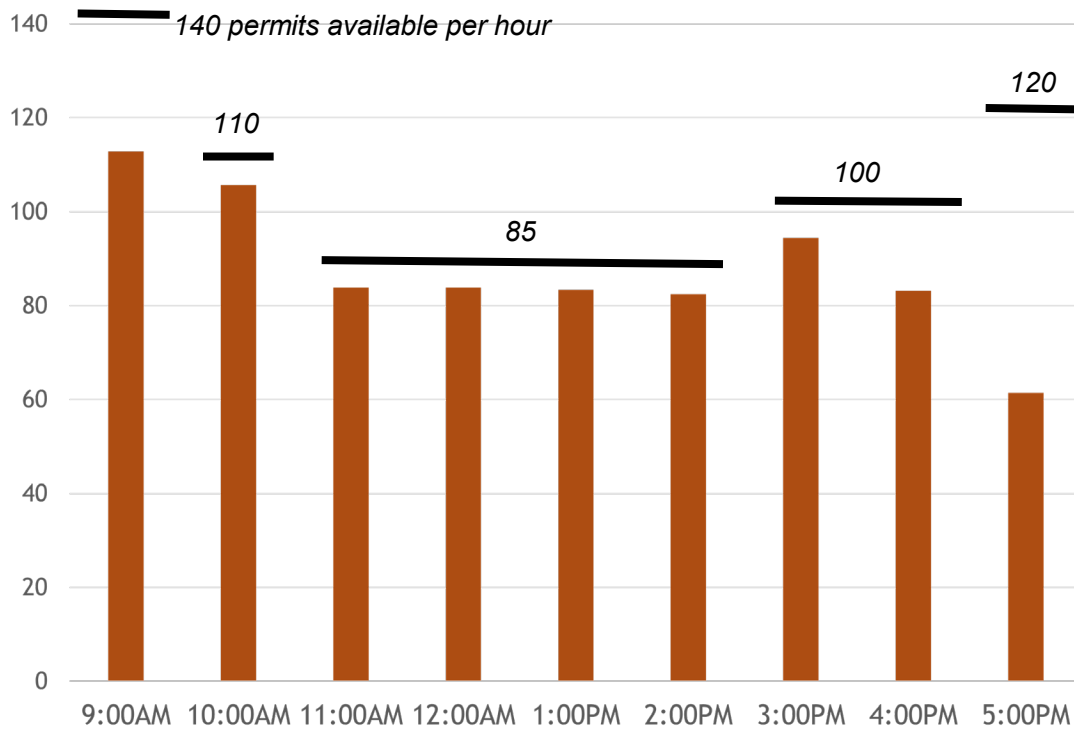
Figure 5-4. Average Number of Timed-Use Permits Issued by Day, Multnomah Falls Pilot



Source: USFS rec.gov records. As indicated above, the Sunday numbers are likely missing data.

Figure 5-5 displays the average number of timed-use permits issued by hour over the pilot's duration. While the I-84 Exit 31 parking lot experienced relatively consistent demand between in the late morning and early afternoon, demand peaked at mid-morning (9-10 AM) and mid-afternoon (3-4 PM). Demand for timed-used permits nearly reached the hourly allotments between 10 AM and 3 PM.

Figure 5-5. Average Number of Timed-Use Permits Issued by Hour, Multnomah Falls Pilot



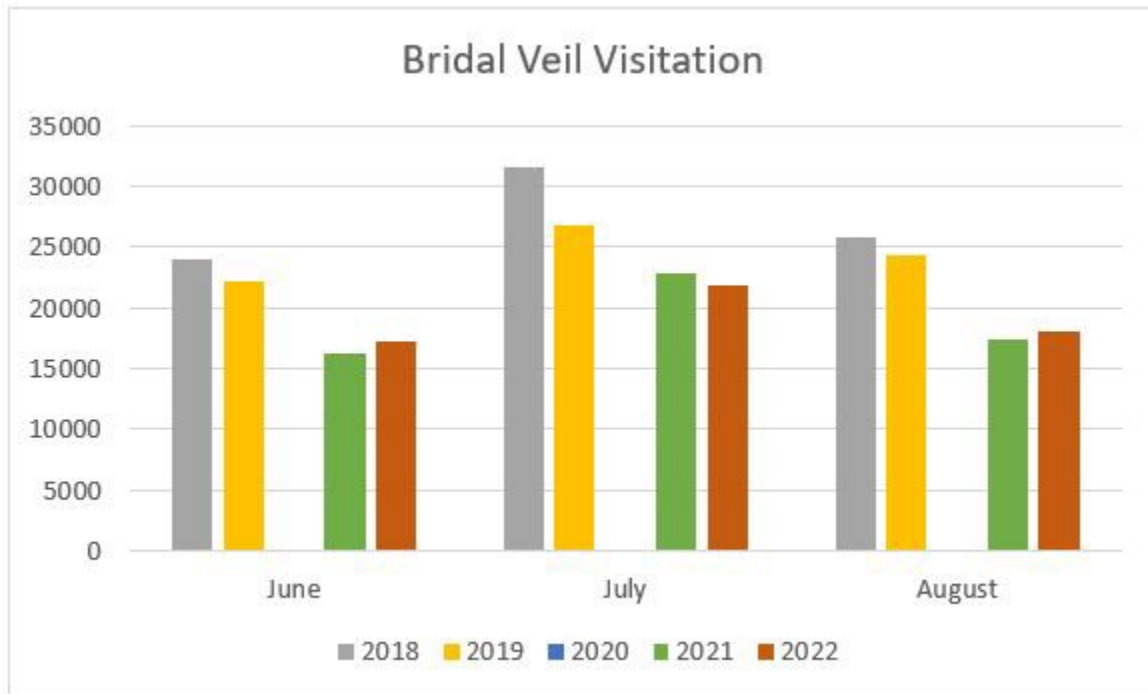
Source: USFS rec.gov records.

Visitation Patterns at Destinations Outside the Pilot Corridor

OPRD gathers visitation data at their parks throughout the corridor via vehicle counts at park entrances. Figure 5-6 shows vehicle visits at Bridal Veil Park¹, which includes a paved pedestrian trail, scenic vistas, and a short hike to a waterfall is just outside of the permit pilot area. Visitation in 2022 ranges from 39-44 percent below 2018 and 2019 levels.

¹ Bridal Veil, along with other destinations along the Waterfall Corridor were closed most of summer 2020 due to the COVID pandemic and lack of staff to maintain and operate area parks.

Figure 5-6. Summer Vehicle Visitation at Bridal Veil by Year



Source: OPRD. As noted above, the Park was closed due to COVID in summer 2020. Years are shown chronologically from the left for each month.

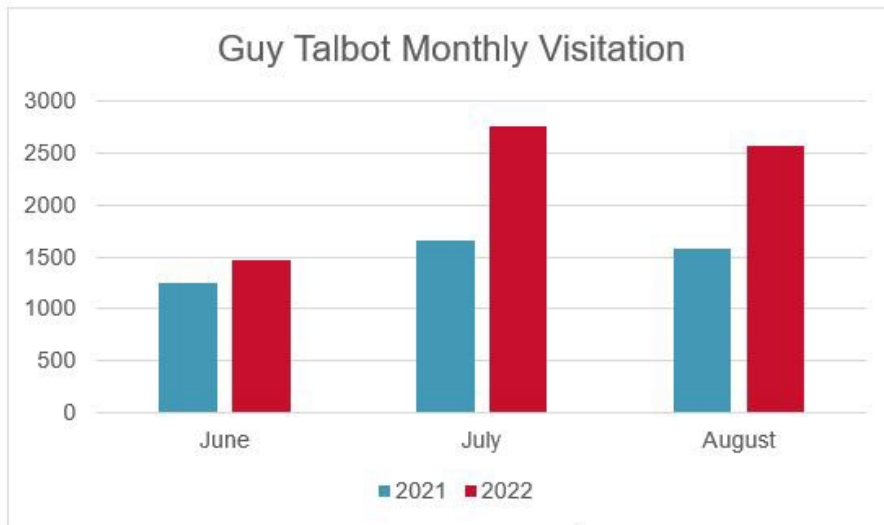
While Bridal Veil State Scenic Viewpoint did not see a visitation increase, two locations in the Latourell area did see a marked increase in vehicle visitation, likely due to an e-bike business that provided parking and e-bike pickup for their customers near OPRD-owned property. Figures 5-7 and 5-8 show the traffic increase compared to 2021. The parking lot for Latourell Falls is located along the Historic Highway, while the Guy Talbot State Park requires visitors to use a Multnomah County-owned road, Latourell Road, to access the park. Guy Talbot saw a large visitation increase over compared to last year during the pilot program. Latourell likely also saw a visitation increase because it is a short walk to the waterfall directly off the Historic Highway, and a good secondary option for visitors who did not get a permit for the Waterfall Corridor Permit.

Figure 5-7. Summer Vehicle Visitation at Latourell Falls 2021 vs 2022



Source: OPRD. 2021 data is on the left for each month.

Figure 5-8. Summer Vehicle Visitation at Guy Talbot 2021 vs 2022



Source: OPRD. 2021 data is on the left for each month.

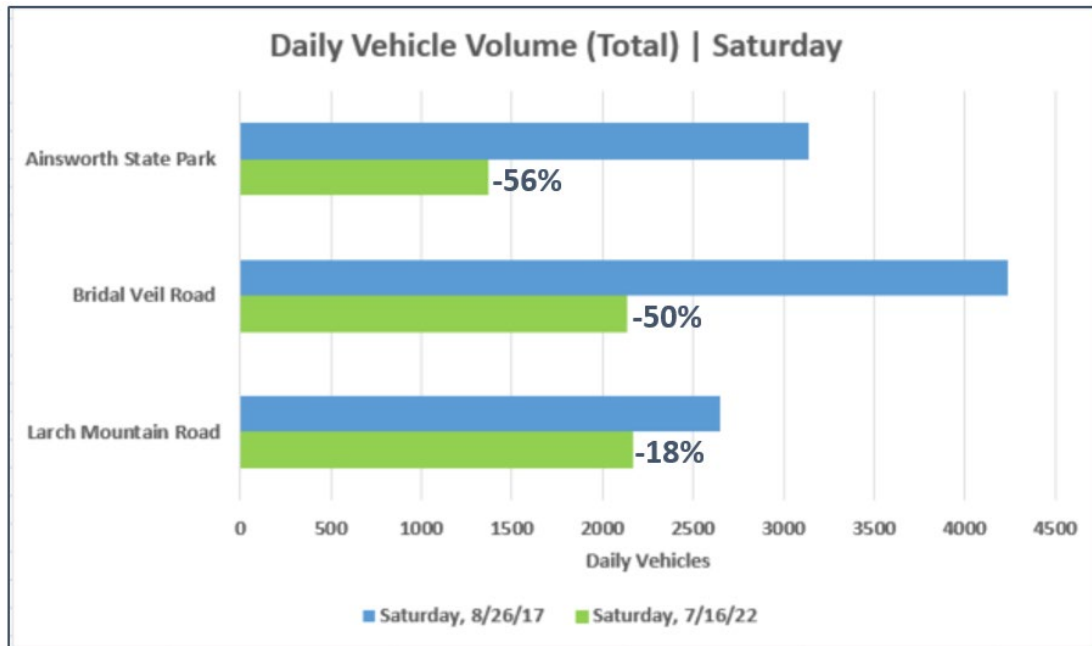
5.2 Personal Motor Vehicle Travel and Parking Patterns

Congestion reduction is a primary pilot goal, and the team focused on measuring impacts of the permit on personal motor vehicle travel within the Waterfall Corridor, both along the Historic Highway and at adjacent parking areas. The team also considered congestion effects in the vicinity of the permit check-in points and adjacent I-84 interchanges.

Motor Vehicle Volumes

Historic Columbia River Highway Motor Vehicle Volumes

Figure 5-9. Total Daily Vehicle Volume, Multnomah Falls Pilot



Source: ODOT. 2017 data is on top for each location.

Figures 5-9 – 5-13 compare 2017 and 2022 average daily traffic volumes for a typical Saturday at various locations on the Historic Highway. ODOT used 2017 as a baseline, as events in subsequent years (e.g., Eagle Creek Fire, Covid-19) disrupted travel through either extended-duration highway closures or closures of popular trails and tourist establishments. ODOT also collected data in 2017 to inform the Historic Columbia River Highway Congestion and Safety Plan, which provided much of the baseline data for implementing the permit system and this report.

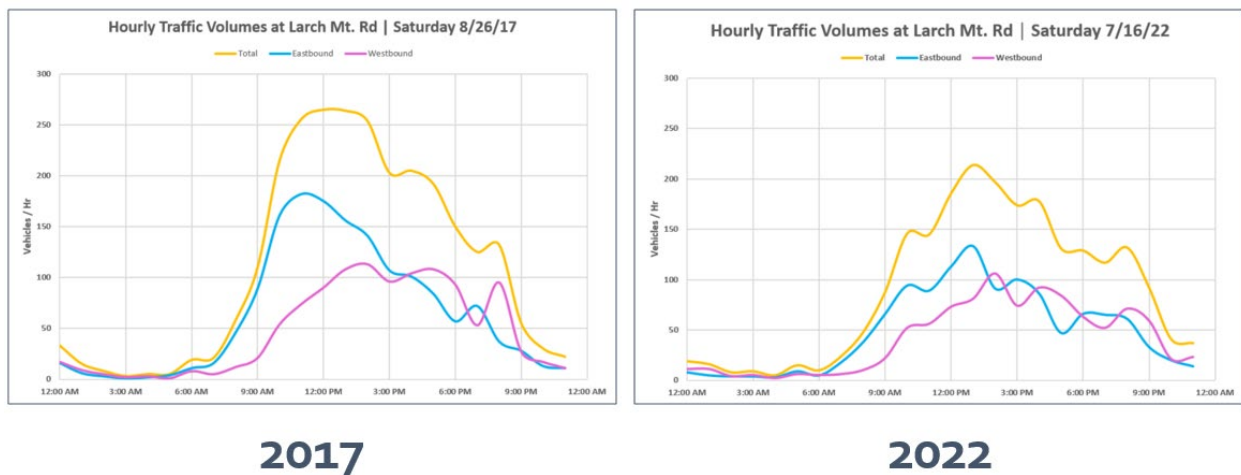
Corridor-wide, the motor vehicle traffic on a typical Saturday in 2022 relative to 2017 was lower on the Historic Highway. The decrease in volumes ranged from 12% less at Larch Mountain Road westbound (outside of the pilot area) to 60% less at Bridal Veil eastbound. Several factors may have contributed to this phenomenon, including:

- The timed-use permit pilot may have spread visitation to other areas in the Columbia River Gorge outside the pilot corridor, or discouraged visitation to the pilot area altogether
- Record-high fuel prices in spring/summer 2022 may have suppressed discretionary travel
- Northwest Oregon experienced unseasonably cool temperatures and higher-than-average precipitation in spring and early summer 2022, causing visitors to delay their trips or discourage them from visiting the Gorge
- The volume of international travelers (typically a sizeable proportion of Gorge visitors) has yet to return to pre-pandemic levels

Worth noting is that the vehicle volumes decreased less in vicinity of Larch Mountain Road compared to the other two locations studied. This pattern shift indicates that some visitors may have elected to avoid the timed-use permit pilot area in favor of other nearby destinations such as Vista House and Portland Women’s Forum, which were outside of the permit area.

Figure 5-9 shows the overall volume at Larch Mountain Road was 18% lower in 2022 compared to 2017. In 2022, the volume stayed under 200 vehicles/1-hour most of the day aside from the spikes between 12:00-1:00 PM. In contrast, the 2017 volumes stayed consistently above 200 vehicles/1-hour from 10:00 AM – 5:00 PM.

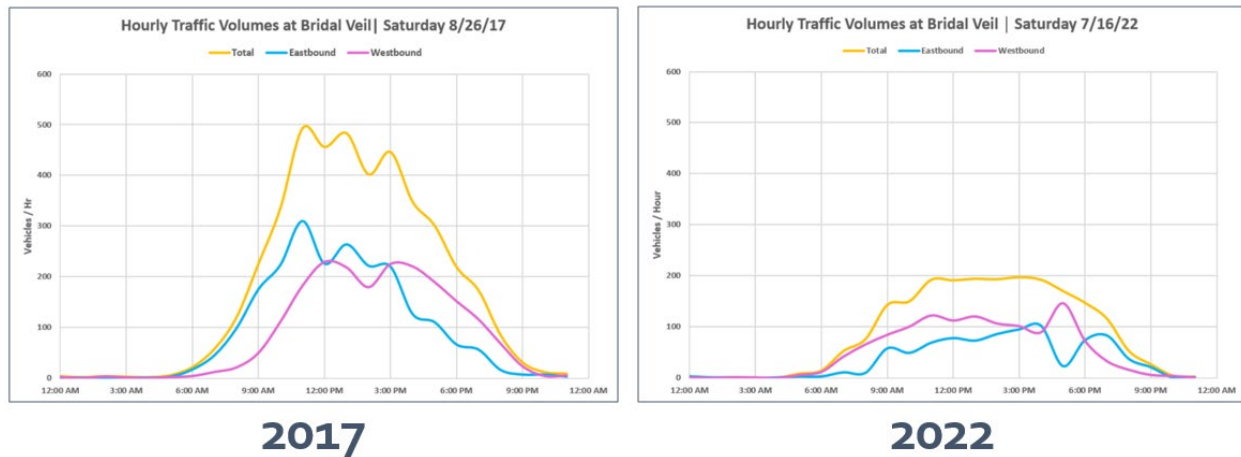
Figure 5-10. Larch Mountain Road- Saturday vehicles/hour



Source: ODOT. The total is the highest peak on each graph, followed by eastbound traffic.

Figure 5-11 displays eastbound, westbound and total average hourly traffic volumes for a typical Saturday on the Historic Highway in vicinity of Bridal Veil Road. Overall, motor vehicle volumes trended lower in 2022 relative to 2017. Worth noting is that 2022 volumes were spread more evenly throughout the day, with a less-pronounced spike in volumes in the late morning and early afternoon. As this location served as the pilot’s western terminus, and as a limited number of timed-use permits were available each hour, some visitors may have shifted their travel patterns to less congested days, or opted not to visit the corridor at all.

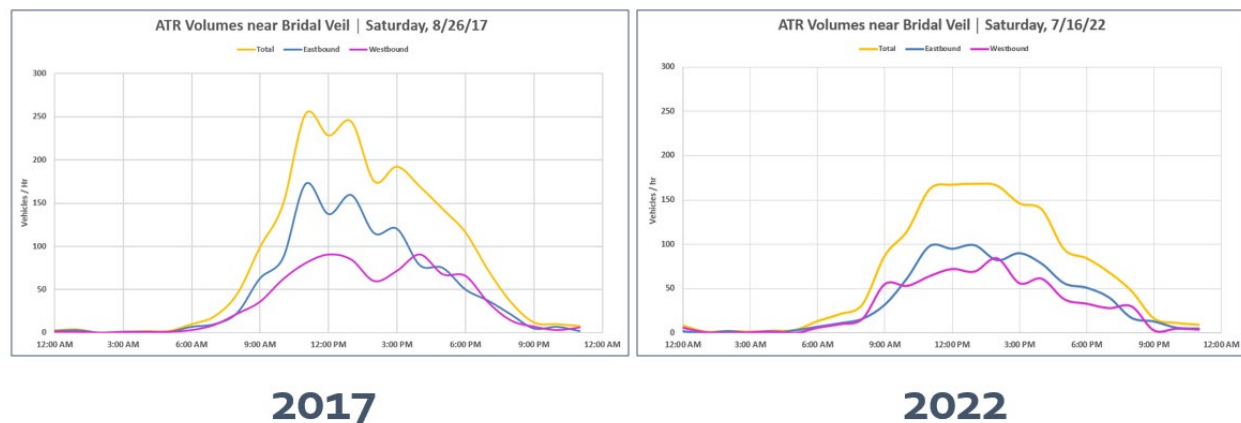
Figure 5-11. Bridal Veil Road- Saturday vehicles/hour



Source: ODOT. Total is the highest peak on each graph, followed by eastbound traffic in 2017 and westbound traffic in 2022.

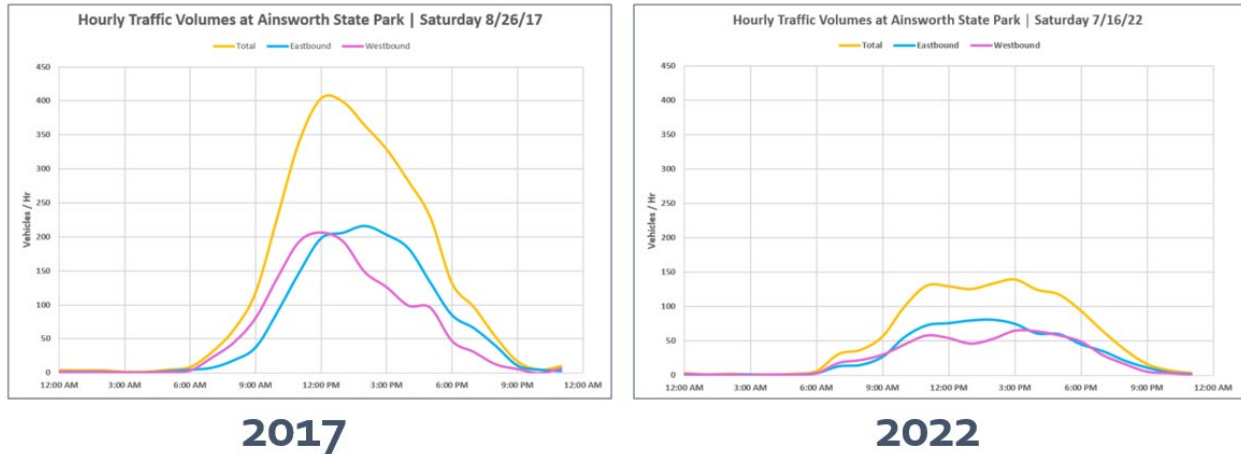
In 2022 the total daily traffic volumes at Bridal Veil Road were 50% less than those in 2017. Figure 5-11 shows that in 2022, there was a peak period from 11:00 AM – 5:00 PM when traffic volumes remained fairly constant (around 190 vehicles/hour). In 2017, there were 10 hours (9:00 AM -7:00 PM) with volumes higher than the 2022 peak period. The 2022 peak hour of 197 vehicle/hr (3:00-4:00 PM) was 60% less than the 2017 peak hour of 493 vehicles/hour (11:00 AM – 12:00 PM). This is fairly consistent with data taken from the Automatic Traffic Recorder (ATR) near Bridal Veil Road shown below in Figure 5-12. The volumes in Figure 5-11 are from a short-term count station where ODOT collected data specifically for this study. The ATR station is a permanent station and is a little over 1 mile west of where ODOT took the shorter-term counts. The ATR data indicates that in 2022, there was a peak period from 11am-2pm when traffic volumes remained fairly constant (162-168 vehicles/hour). In 2017, there were 6 hours (11am-5pm) with volumes higher than the 2022 peak period. The 2022 peak hour of 168 vehicles/hour (1-2pm) was 34% less than the 2017 peak hour of 253 vehicles/hour (11am-12pm).

Figure 5-12. Bridal Veil ATR data



Source: ODOT. The total is the highest peak on both graphs, followed by eastbound traffic.

Figure 5-13. Ainsworth State Park- Saturday vehicles/hour



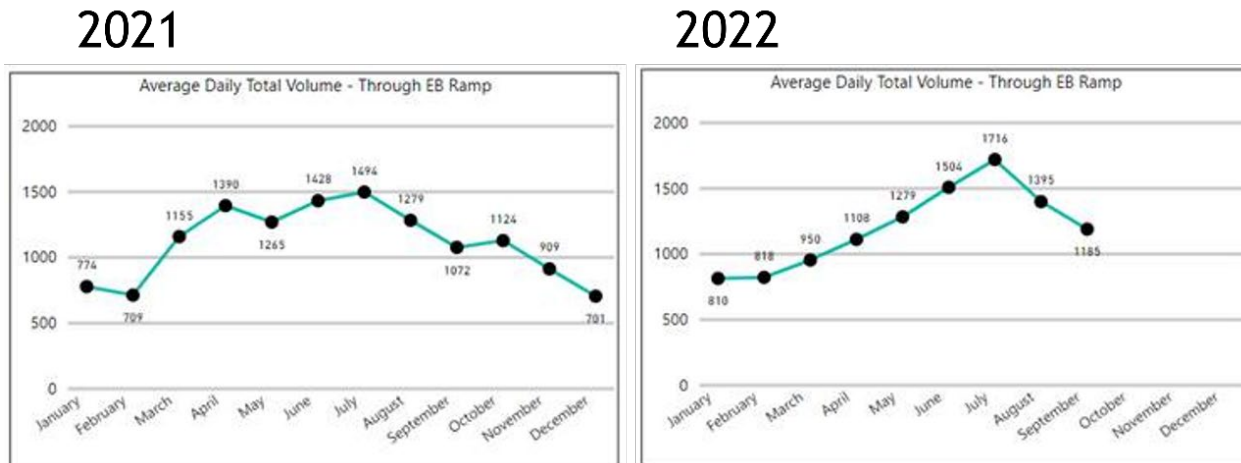
Source: ODOT. The total is the highest peak on both graphs. In 2017, eastbound peaks between noon and 3 p.m. and westbound peaks at noon. In 2022, eastbound peaks slightly higher than westbound traffic.

Figure 5-13 shows that in 2022, there was a peak period at Ainsworth State Park from 11am-6pm when traffic volumes remained fairly constant (118-140 vehicles/hour). In 2017 there were 8 hours (10am-6pm) with volumes higher than the 2022 peak period. The 2022 peak hour of 140 vehicles/hour (3-4pm) was 65% less than the 2017 peak hour of 404 vehicles/hour (12-1pm).

I-84 Exit 31 Motor Vehicle Volumes

Figure 5-14 shows 2021 and 2022 motor vehicle volumes at the I-84 Exit 31 eastbound ramp (accessing the Multnomah Falls parking lot). Over the June-through-August timeframe (note: the Multnomah Falls timed-use permit pilot existed in both years), 2022 volumes surpassed those of 2021 by 5 to 15 percent. Outside the June-through-August period, 2022 volumes were lower than 2021 volumes. The higher summertime volumes and lower non-summer volumes in 2022 may be partially attributed to pent-up demand resulting from an extended unseasonably cool and wet spring giving way to favorable weather in late June.

Figure 5-14. I-84 Exit 31 Eastbound Ramp Traffic Volumes by Month, 2021 and 2022



Source: ODOT.

Motor Vehicle Occupancy

ODOT did not collect quantitative motor vehicle occupancy data during the pilot, though ODOT asked permit check-in staff via a survey to estimate how many people were in vehicles they encountered. Staff at the permit check-in sites generally indicated that they noticed 2-4 people in each vehicle.

Motor Vehicle Congestion

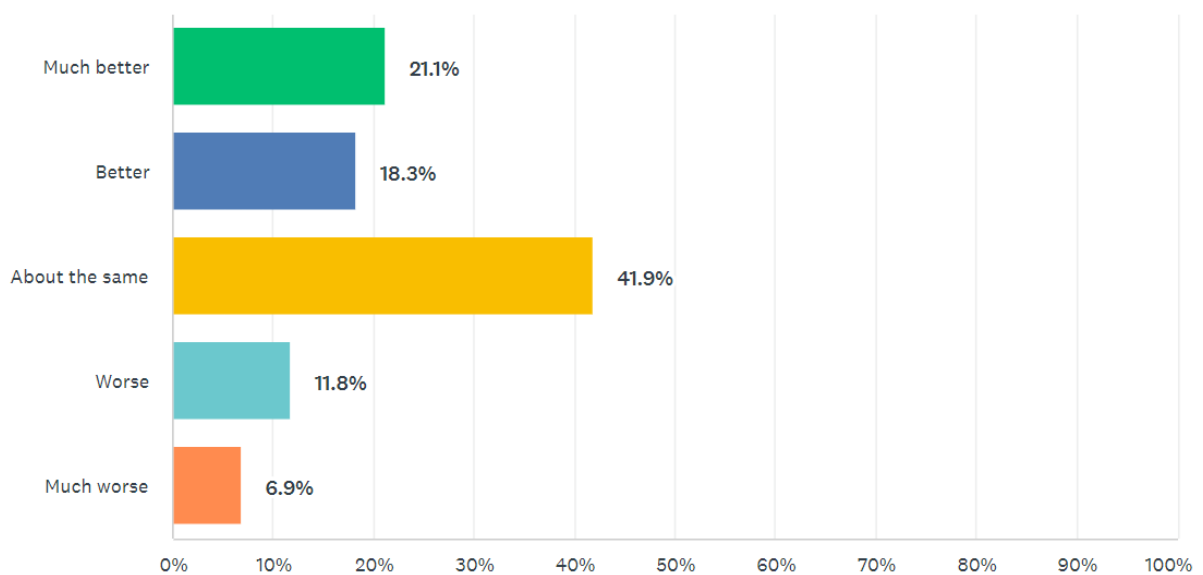
ODOT gathered quantitative and qualitative data on motor vehicle congestion. Given the reduction in vehicles indicated by the traffic count data, motor vehicle congestion was likely less severe due to fewer vehicles on the Highway.

User feedback on congestion also indicates that it was either better or about the same. From the general survey (that was open to the public, and did not require respondents to have used the permit system), around 39 percent indicated that congestion was better or much better than previous years, while around 42 percent said that it was about the same.

Figure 5-15 Congestion in the Waterfall Corridor

How does the congestion on the Waterfall Corridor compare to previous years?

Answered: 246 Skipped: 379



Source: ODOT.

The rec.gov website also allowed users to provide short feedback. Of the 97 respondents who mentioned congestion and crowding, 64 individuals, or almost 66 percent indicated that their experience with crowding or congestion was either positive or neutral.

Permit Check-In Point Queuing

ODOT did not collect quantitative data on queuing, but feedback from residents and Waterfall Corridor Check-in staff indicate that the longest queues occurred during the

peak visitation days, mainly Friday-Mondays, and on holidays. Lunchtime and middle of the day also were common times for queuing at the permit check-in locations.

Most staff reported that during their permit check-in shifts, they either “flushed” or moved vehicles through the permit check-in without checking permits either once a day or not at all. Staff were empowered to flush vehicles through to help reduce the possibility of vehicles queuing back on I-84. Staff were more likely to flush vehicles through the check-in site towards the beginning of the pilot, and did not need to rely on that method towards the end of the pilot to reduce queuing.

Staff reported that the majority of wait times for those in the queue were generally less than 10 minutes, with the majority reporting wait times less than 5 minutes for vehicles.

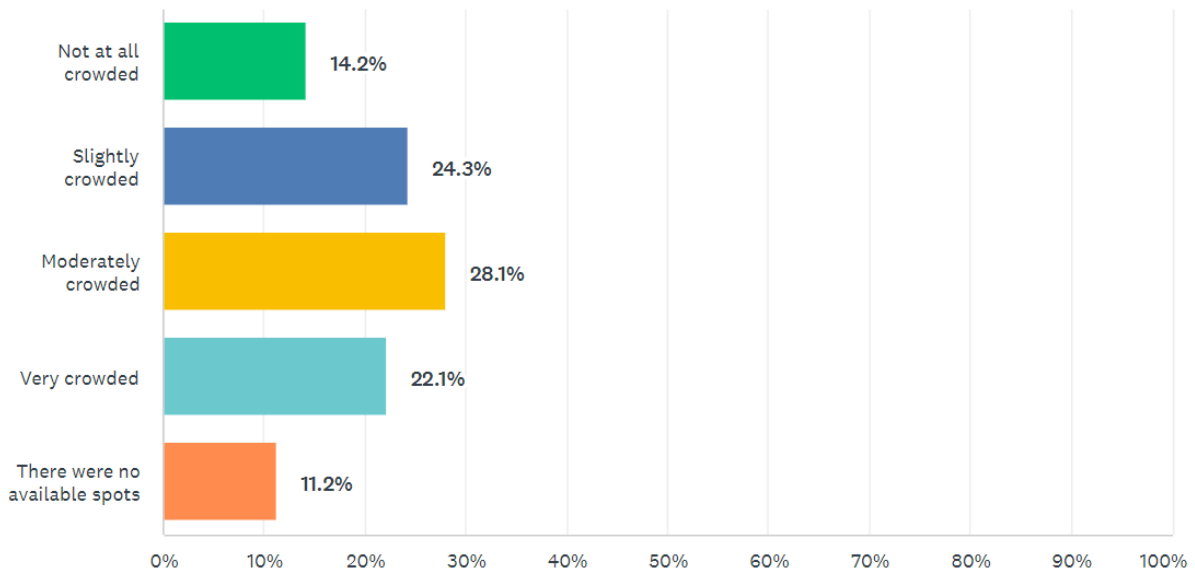
Parking Occupancy

Project partners did not collect quantitative parking data, but the general survey asked visitors their experiences at parking lots within the Waterfall Corridor. A third of the respondents to the general survey indicated that they were either very crowded or there were no available spots.

Figure 5-16. Crowding in Parking Lots

How crowded were the parking lots?

Answered: 267 Skipped: 358



Source: ODOT.

For those who commented using rec.gov, 245 people mentioned parking, and around 100 people commented positively about the parking situation. The permit did not guarantee a parking space, but the number of permits allocated by hour were meant to match parking demand to the available supply. Most of the negative comments about parking related to the confusion on the two different Multnomah Falls Parking lots

(Historic Highway and the I-84 lot), and the lack of available parking, or the need to circle lots multiple times to find a space to park a vehicle.

Illegal or Improper Parking Activities

The project team was also not able to collect quantitative data on illegal or improper parking activities. Anecdotally, information from residents along the corridor and staff, many of the overcrowding and illegal parking activities were curtailed in the corridor during the permit pilot.

The most pervasive issue regarding illegal parking tended to be visitors who tried to get around the permit system by indicating that they were just planning to drive through the Historic Highway. Because the Historic Highway is a state Highway, the permit pilot could not exclude visitors from driving through. Due to the lack of enforcement, anecdotally, a handful of folks indicated that they were planning on driving through, but still parked and visited federal lands without obtaining a permit.

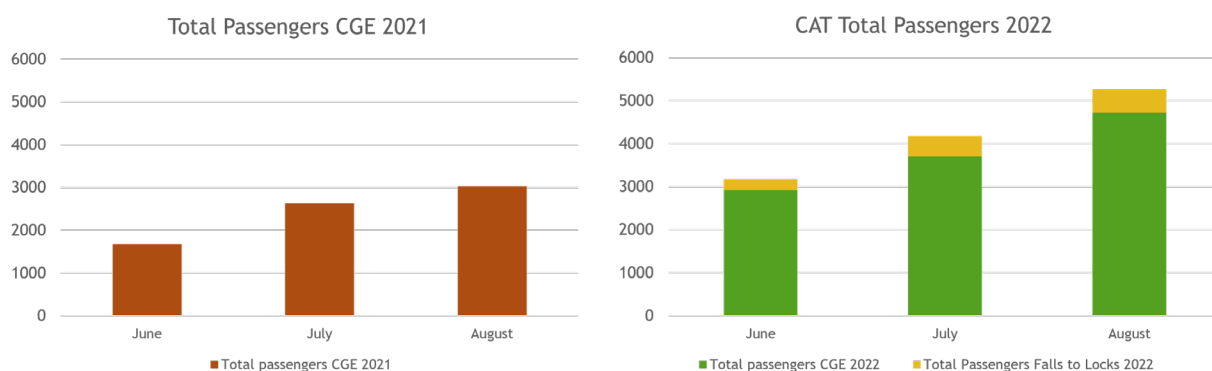
5.3 Non-Personal Motor Vehicle Travel Patterns

These measures focus on the pilot's ability to increase the viability of non-personal vehicle options including walking, bicycling and use of public transit and private tour operators. While most evaluation measures center on user counts, transit travel time reliability also represents an important means for measuring success.

Public Transit Ridership

Figure 5-17 shows 2021 and 2022 Columbia Gorge Express ridership during the June-through-August timeframe. Year-over-year ridership grew in all three months, including a nearly 50 percent increase in June 2022 relative to June 2021. The 2022 data also displays ridership on the "Falls to Locks" service, which only operated between Gateway Transit Center and Cascade Locks, while CGE operates between Gateway Transit Center and Hood River. Both services included a stop at the Exit 31 lot off I-84 at Multnomah Falls. This segment experienced a month-over-month ridership increase between June and August, which may be partially attributable to unseasonably cool and wet conditions in June giving way to more favorable weather conditions in July and August.

Figure 5-17. Columbia Gorge Express Ridership, 2021 and 2022



Source: CAT.

Private Tour Bus Ridership

Compared with 2021, Gray Line of Portland's Waterfall Hop-On/Hop-Off Trolley experienced substantial ridership gains, owing partially to recently-expanded service. While ridership increased relative to the previous year, the number of passengers in 2022 was lower than initially anticipated.

Ridership on Sasquatch Shuttle was also lower than anticipated in 2022. Passengers made more advanced reservations and fewer same-day reservations in 2022 relative to 2021. Residual concerns about Covid-19 (and associated crowding on transit vehicles) may have contributed to less-than-anticipated ridership on both services.

Transit Travel Time and On-Time Performance

Neither private shuttle operators collected quantitative data on on-time performance or transit travel time. Both operators built additional travel time into their schedules to account for the common congestion throughout the day, assuming the same trip would likely take longer during peak visitation hours than the early morning and late afternoon trips. Given the reducing in overall vehicles in the corridor discussed in the section below, shuttle operators on the Historic Highway likely saw a reduction in their travel time. Additional benefits from fewer personal vehicles in the corridor include and increased ability to access the bus loading/unloading zones at each of the attractions along the corridor due to a reduction in illegally parked vehicles. Feedback from both shuttle operators during the 2021 inaugural year indicated that illegal parking in the bus loading/unloading zones and improper parking in lots impeded the shuttle's ability to stay on schedule. During the 2022 permit pilot, ODOT staff received significantly fewer complaints regarding illegally parked vehicles from the shuttle operators.

Anecdotally, when there is a flagger at the Multnomah Falls crosswalk on the Historic Highway, shuttle service is better able to meet their operating schedules. Both shuttle operators agree that the flagger is key to reducing the extreme congestion around Multnomah Falls and is key to being able to operate a shuttle system with a schedule. This is the third year for a traffic flagger at Multnomah Falls, and conflicts and complaints regarding the flagger were reduced during the permit pilot, likely due to the reduction in traffic volumes. The flagger was able to more efficiently move vehicles through and past the parking lot when it was full due to the reduction in total vehicles within the corridor.

ODOT also worked with the shuttle providers to create a shuttle turn-around in the western end of the parking lot at Multnomah Falls off the Historic Highway specifically so that direct Multnomah Falls shuttles did not need to travel past the crosswalk, but could drop passengers and turn around prior to having to wait in the vehicle queue near the crosswalk.

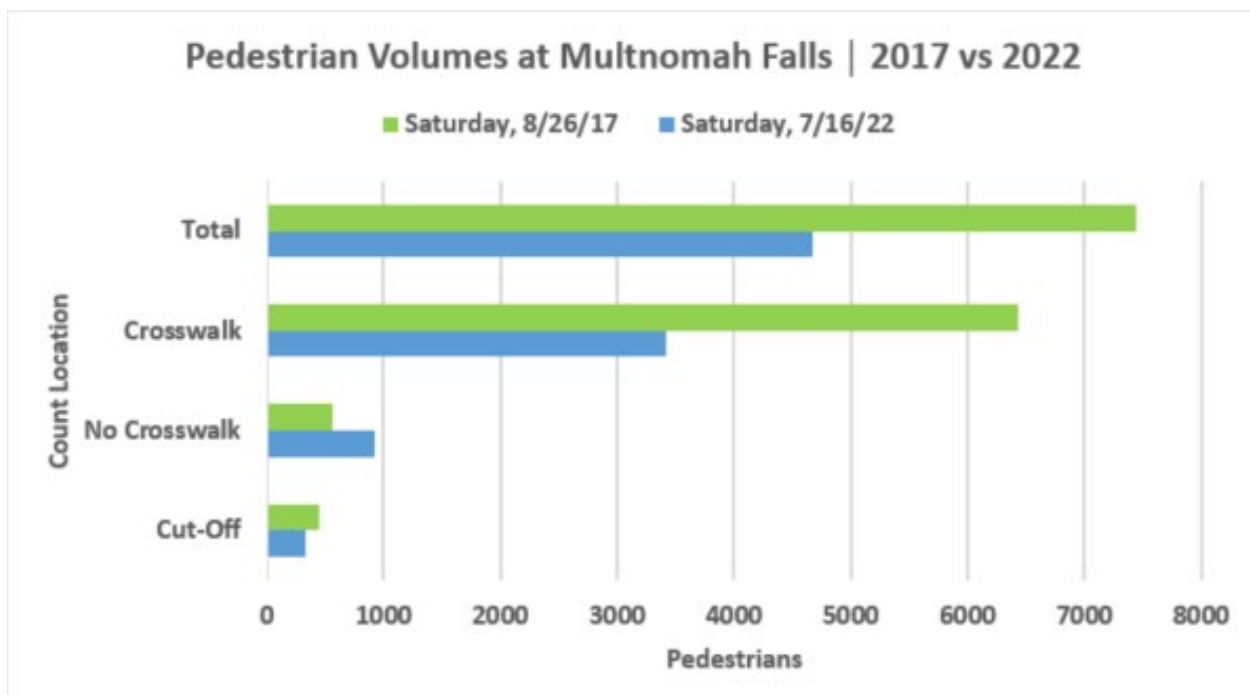
On-time performance for CAT public transit within 15 minutes of scheduled time in 2022 was similar to 15 minute on-time performance in 2021. Between June and August, 97-99% of CAT transit vehicles were within 15 minutes of their schedule in both 2021 and 2022. The percentage of on-time vehicles falls to 90-93% within 5 minutes of schedule in 2022, while 5 minute on-time performance in 2021 was higher, between 95-98%, likely due to congestion and potentially visitor confusion within the I-84 lot at Multnomah Falls. This is consistent with traffic counts at exit 31, which show that more vehicles accessed the lot in 2022 than 2021.

Pedestrian and Bicycle Volumes

ODOT collected pedestrian counts on the Historic Highway at the crosswalk in front of Multnomah Falls during the permit pilot, and compared the counts to similar counts taken for the Congestion and Safety Plan in 2017. Figure 5-18 shows the comparison between 2017 and 2022. While the data show only one day for both 2017 and 2022, the pedestrian crossing volumes are significantly lower in 2022 than in 2017. These data are similar to the reduced vehicle counts on the Historic Highway, and are likely indicative of a general reduction in crossings and visitation to Multnomah Falls site. The pedestrian counts separates out pedestrians who cross at the marked crosswalk, those that cross outside of the crosswalk, and those that cross at the cut-off for the video system.

Overall, there were 37% fewer pedestrians at Multnomah Falls in 2022 compared to 2017. Note that the pedestrians that crossed outside of the marked crosswalk were 64% higher in 2022. It is possible that more pedestrians crossed outside the crosswalk in 2022 because it was easier to find gaps in traffic with lower traffic volumes.

Figure 5-18. Pedestrian Crossing Counts



Source: ODOT. 2017 data is on the top for each category.

Figure 5-19. Pedestrian Volumes at Multnomah Falls

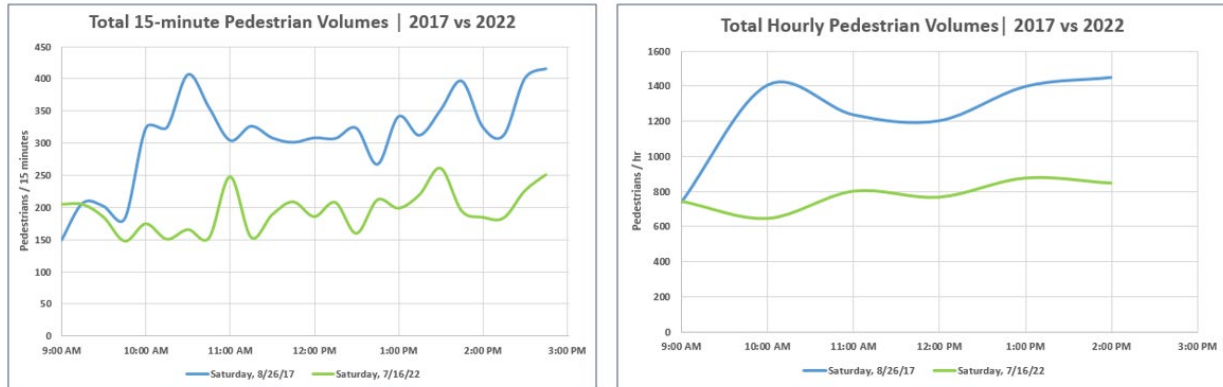
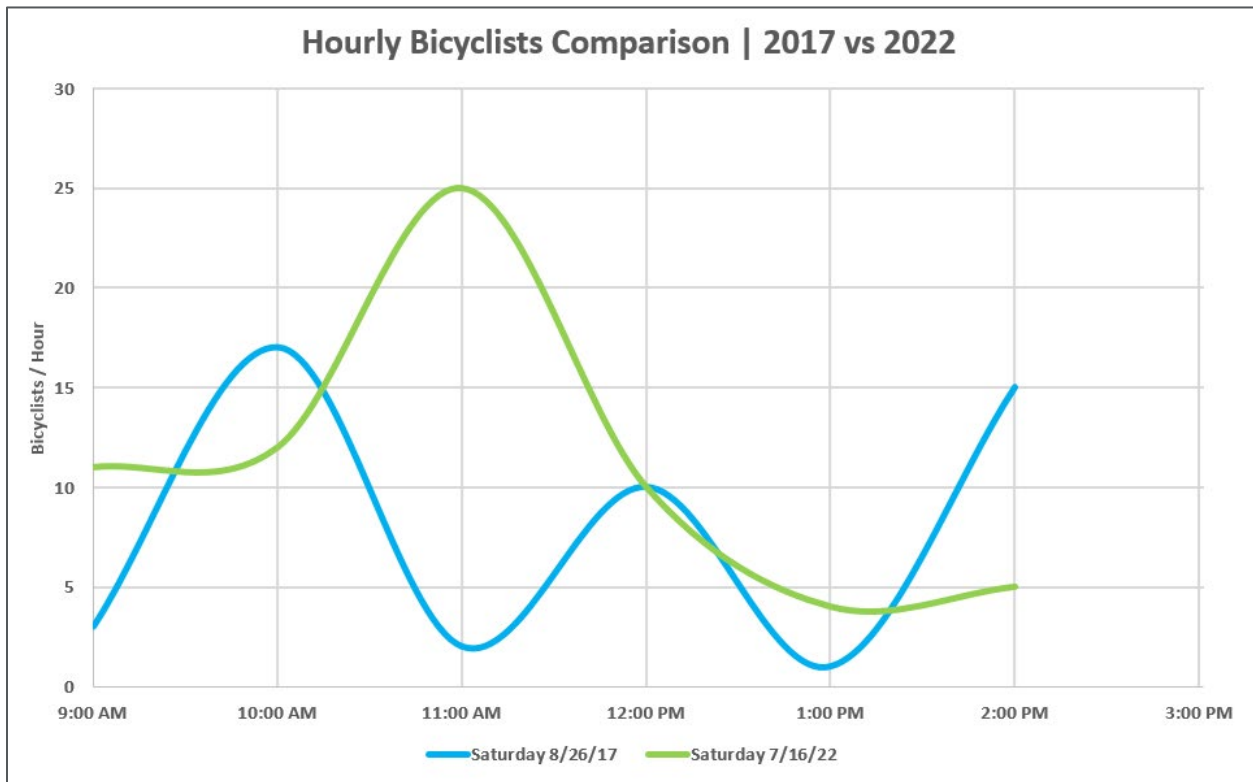


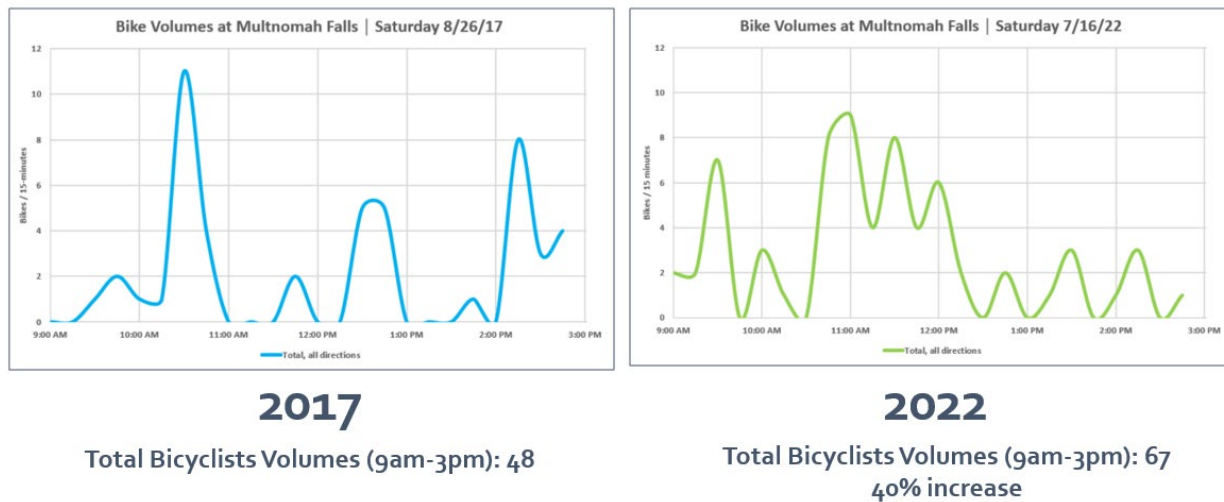
Figure 5-19 shows that the 2022 hourly total pedestrian volumes at Multnomah Falls from 10:00 AM – 3:00 PM were 35-54% lower than those in 2017. The 2022 volumes never reached 900 pedestrians/hour whereas in 2017, the volumes stayed near or above 1200 pedestrians/hour from 10:00 AM – 3:00 PM.

Figure 5-20. Multnomah Falls Weekend Bike Volumes by Hour



Source: ODOT.

Figure 5-21. Multnomah Falls Weekend Bike Volume by 15 Minutes



The 2022 bicyclist volumes were 40% higher than 2017 with the increase mostly between 11am-12pm (25 bicyclist in 2022 vs. 2 in 2017).

Figures 5-20 and 5-21 show cyclists crossing in front of the Multnomah Falls Lodge on the Historic Highway, again using the baseline data from the Congestion and Safety Plan and updated counts taken as part of the permit system. In 2017, it is likely that extreme congestion around Multnomah Falls deterred cyclists from using the Historic Highway at peak times. The lanes on either side of the Falls are very narrow, with little or no shoulder, and many seasoned cyclists likely rode before congestion developed on the Highway to avoid being stuck in the congestion without a viable way to bypass the vehicles.

In 2022, cyclists were more likely to ride during “peak” visitation times. One reason for the higher ridership during peak hours is cyclists anticipated that the permit system would address congestion and they felt the ride would be more pleasant as the congestion would be less likely to impact their experience. Another contributing factor to the number of cyclists on the Historic Highway is likely the Multnomah Falls E-bikes business operating near Latourell. This business started in 2021, but saw incredible growth in 2022 as users understood that cyclists would not have to obtain timed use permits to ride the Historic Highway.

ODOT also asked permit check-in staff to estimate on average how many people arrived to the permit check-in staff locations by bike or foot. The responses were evenly split between “6-10 people,” “11-20 people,” and “21+ people.”

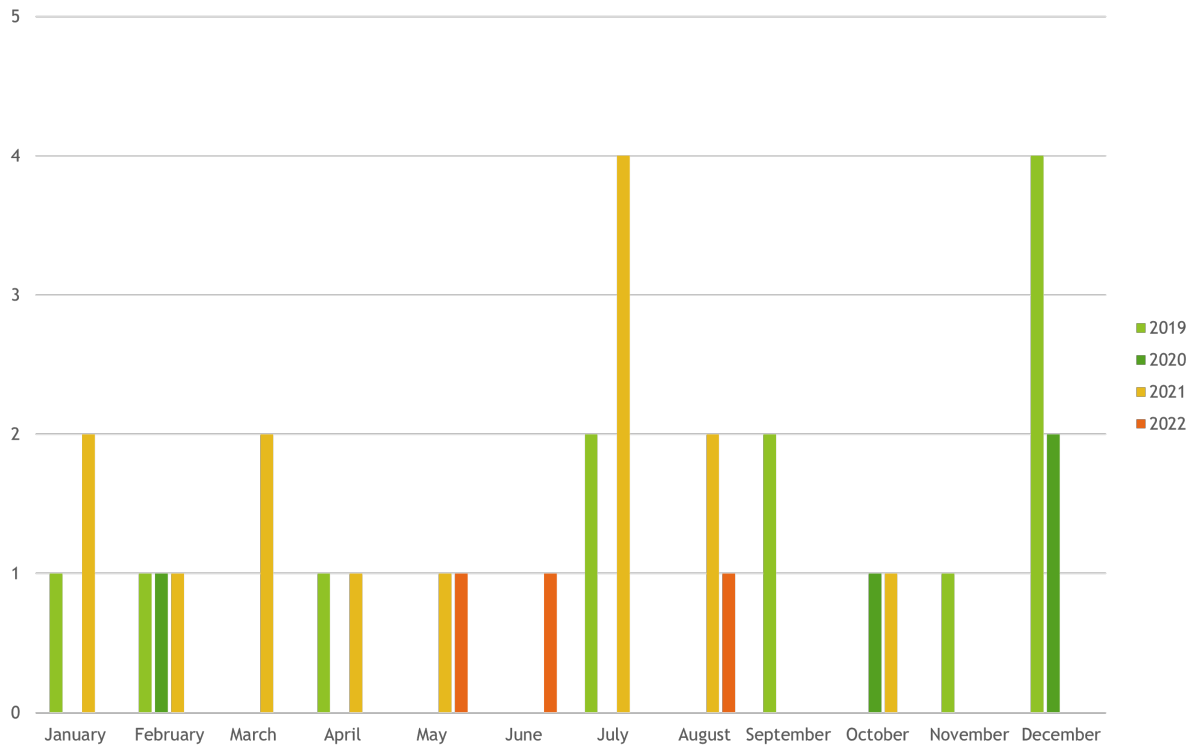
5.4 Safety Issues

Improving safety for all corridor users is a primary pilot goal. These evaluation measures capture collisions, incidents and other factors that may impact visitor and other user safety on the Waterfall Corridor.

Collisions

Figure 5-22 summarizes reports to Multnomah County Sheriff’s Office (MCSO) regarding collisions for both I-84 and the Historic Highway in the pilot’s vicinity. While this data does not capture collisions not resulting in a MCSO call nor collisions that went unreported, the information provides a general snapshot of potential safety issues in the area. Crash data by year is not indicative of a pattern; safety specialists need multiple years of data to interpret trends, but the goal of using this data is to demonstrate that the permit pilot did not increase or exacerbate the safety conditions on both corridors. The reduction in traffic and congestion noted above may also contribute to fewer opportunities for crashes that generally occur in congested conditions including rear-end and turning movement incidents. Worth noting is that the number American Medical Response contacts in 2022 was generally consistent with previous years.

Figure 5-22. Multnomah County Sheriff’s Office Collision-Related Calls, I-84 and Historic Columbia River Highway, 2019-2022



Source: MCSO. Years are listed chronologically from left to right for each month when data for that year is available. June only has 2022 data, July has 2019 and 2021 data and August has 2021 and 2022 data.

Ability for Emergency Services to Access the Waterfall Corridor

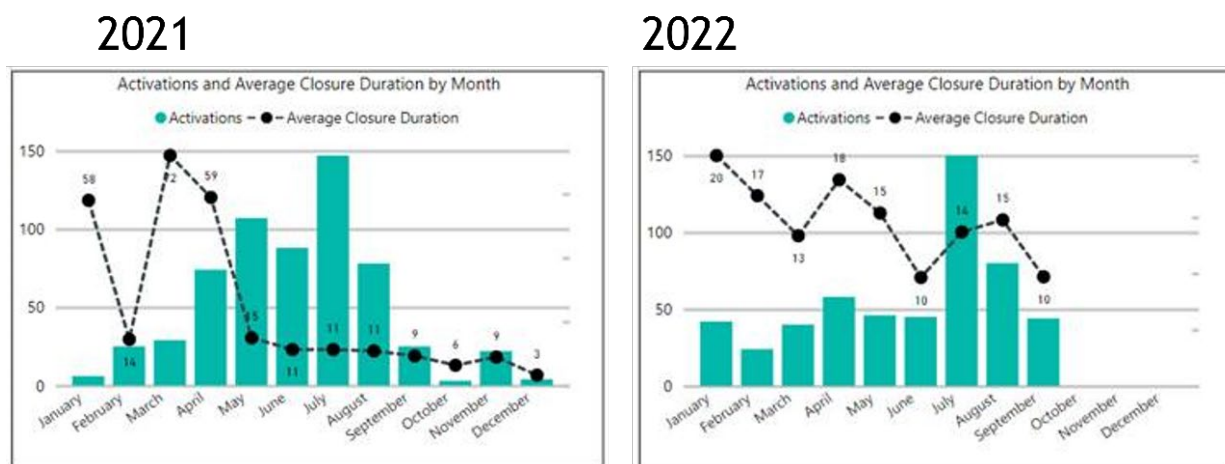
There are limited data on emergency response times, but qualitative feedback from emergency providers in the corridor indicate that response times and ability to respond to emergency calls were improved over the course of the permit pilot. There were events that required emergency response along the corridor during the permit pilot, and first responders were able to respond in a timely manner.

Additionally, ODOT maintenance staff and law enforcement officers from USFS reported being able to more quickly access the corridor to address issues during the pilot.

I-84 Exit 31 Gate Closures

In 2009, ODOT installed automated closure gates on the eastbound I-84 exit ramp to Multnomah Falls (Exit 31). Figure 5-23 depicts the monthly number of gate closures, and average closure duration, for 2021 and 2022. With the exception of June, the number of closures during the summer season was relatively similar in both years, with July experiencing the highest frequency of closures (approximately 150 closures). While the average closure duration lasted approximately 11 minutes between June and September 2021, the average closure duration during the same period in 2022 was between 10 and 15 minutes in length.

Figure 5-23. I-84 Exit 31 Gate Closure Activations and Durations by Month, 2021 and 2022

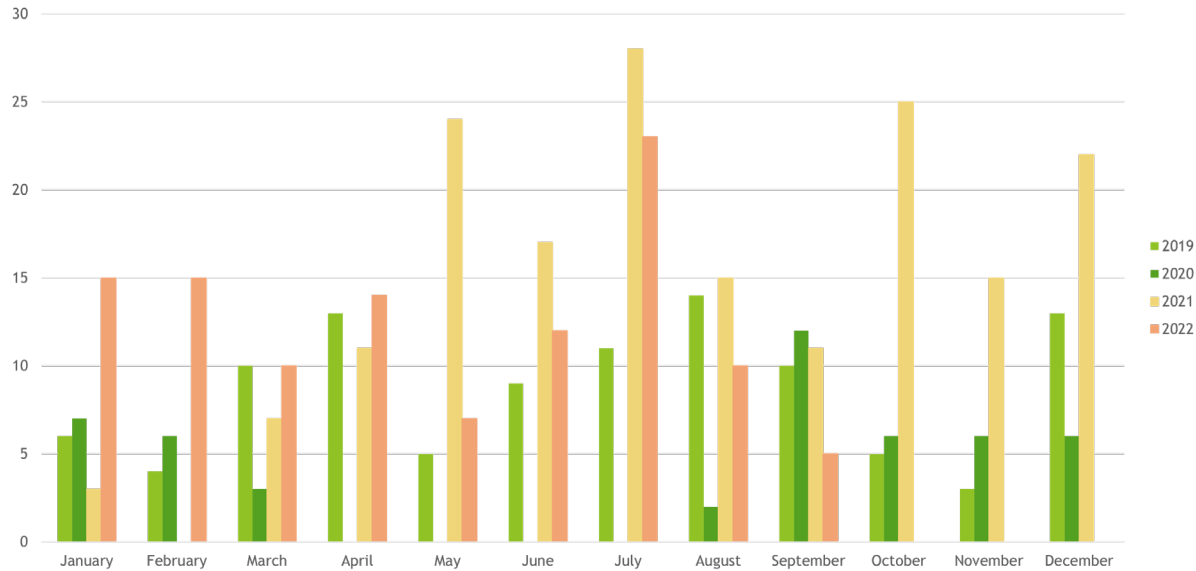


Source: ODOT.

Visitor Safety and Security

While many approaches exist for measuring a visitor's sense of safety and security, some data exists regarding criminal activities that may impact a user's perception. Figure 5-24 summarizes MCSO vehicle break-in, vandalism, and larceny call data for 2019 through 2022. Over the June-through-August period, the number of vehicle break-in calls decreased in 2020, rose substantially in 2021, followed by a modest reduction 2022. The 2020 reduction is likely attributed, in part, to the extended-duration Historic Highway closures associated with the Covid-19 pandemic. The 2021 increase in call volume may be linked to the resumption in visitation to the Gorge and the concurrent limitations on law enforcement staffing.

Figure 5-24. Multnomah County Sheriff’s Office Vehicle Break-In Calls, Historic Columbia River Highway, 2019-2022



Source: ODOT. Years are listed chronologically from left to right for each month when data for that year is available. April through July do not have 2020 data.

5.5 Visitor and Stakeholder Understanding and Satisfaction

These evaluation measures focus on community perceptions toward the pilot, including visitors, residents, business owners and other stakeholders. ODOT hosted an online survey throughout the pilot’s duration, providing opportunities for the public to weigh in on various aspects of the pilot. Project partners also received inquiries and feedback via the recreation.gov website, the “AskODOT” information portal, and e-mails and phone calls to ODOT/OPRD/USFS staff. Pilot check-in point staff also received verbal feedback from visitors upon their arrival.

General Feedback

In the months leading up to the pilot and over the pilot’s duration, project partners received approximately 1,900 inquiries and comments from the sources listed above. These inquiries and comments included general questions about how the pilot would function, and/or statements expressing support or opposition.

Of the roughly 1,900 comments received by project partners, approximately 1,600 contained an opinion about the pilot, with 55 percent expressing a positive perception and 45 percent expressing a negative perception. The following is a sampling of key themes emerging from the public feedback:

- Positive feedback:
 - Visitors already familiar with the area reported decreased congestion compared with previous years (when the timed-use permit pilot did not exist).

- Permit check-in point staff were courteous, helpful, patient, organized and efficient.
- Visitors reported finding and accessing parking with limited difficulty, even during peak visitation hours and days such as Labor Day.
- Visitors encountered less crowding on trails and at Multnomah Falls.
- Opportunities for improvement:
 - Visitors expressed confusion about the difference between the two separate timed-use permit pilots (Waterfall Corridor and Multnomah Falls). Accordingly, some visitors obtained permits for both pilots.
 - Some visitors were unaware if the timed-use permits were in effect before 9 AM and after 6 PM.
 - Visitors experienced difficulty using the online system, including the “check out” procedure.
 - Visitors expressed frustration about having to select a specific time to access Federal lands along the Waterfall Corridor. Accordingly, some visitors obtained multiple permits to build greater flexibility in their plans.
 - Some visitors were unaware of the timed-use permit pilot until their arrival at the Waterfall Corridor or Multnomah Falls.
 - Some visitors expressed displeasure about having to obtain a timed-use permit online or at the two in-person locations, as opposed to paying the transaction fee directly to permit check-in point staff.
 - Visitors expressed frustration about the lack of available parking upon entering the Waterfall Corridor or the I-84 Exit 31 parking lot.

Online Survey Feedback

Between May 24 and September 30, 2022, project partners hosted an online survey. While targeted toward Waterfall Corridor Timed-Use Permit Pilot users in particular, it is likely that people unaffiliated with the pilot may have partaken in the survey, as the survey was open to the broader public. Figures 5-25 through 5-28 show select survey results.

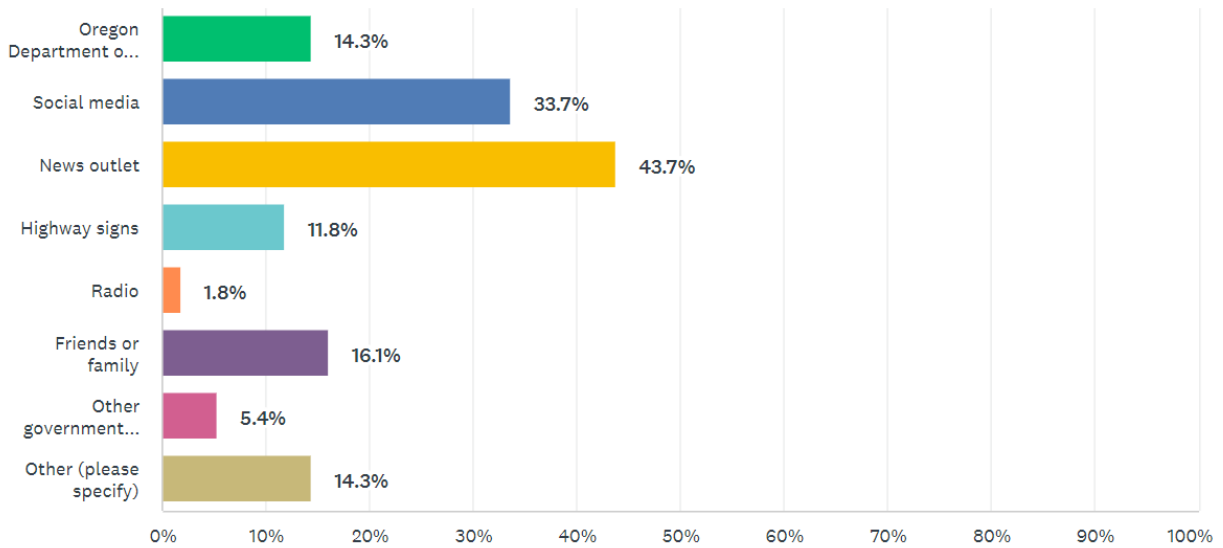
- Traditional media (e.g., news outlets) and social media constituted the primary sources for which respondents learned of the pilot.
- Just over half of respondents (approximately 53 percent) were able to reserve a timed-use permit on their desired date and time. The remaining respondents either had to select an alternate date or time.
- When asked to rate the overall experience of their most recent visit to the Waterfall Corridor on a scale of “1” to “5” (with “5” indicating the most positive rating), respondents provided an average rating of “3.” This rating generally reflects with the proportion of combined comments from all sources (online survey, AskODOT, recreation.gov, e-mail/phone) expressing a positive perception for the pilot.

- When asked about their overall experience on the Waterfall Corridor compared with previous years, most respondents (nearly 42 percent) indicated their experience “was about the same.”
- When asked directly if they would recommend continuing the Waterfall Corridor Timed-Use Permit Pilot in the future, approximately 45 percent of respondents indicated support for continuing the pilot.

Figure 5-25. Online Survey Results – Learning About the Timed-Use Permit Pilot

How did you find out about the Waterfall Corridor permit?

Answered: 279 Skipped: 344

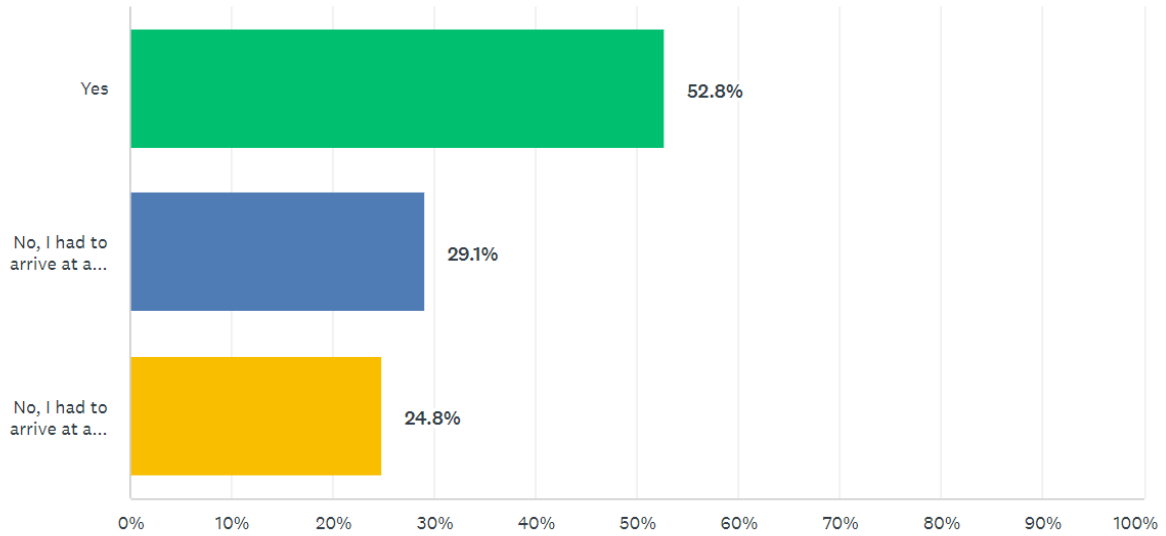


Source: ODOT.

Figure 5-26. Online Survey Results – Ability to Reserve Desired Timed-Use Permit

Were you able to reserve your permit for the desired date and time? (Select all that apply)

Answered: 254 Skipped: 369



Source: ODOT.

Figure 5-27. Online Survey Results – Overall Pilot Rating

How do you rate your overall experience during your most recent visit to the Waterfall Corridor?

Answered: 260 Skipped: 365

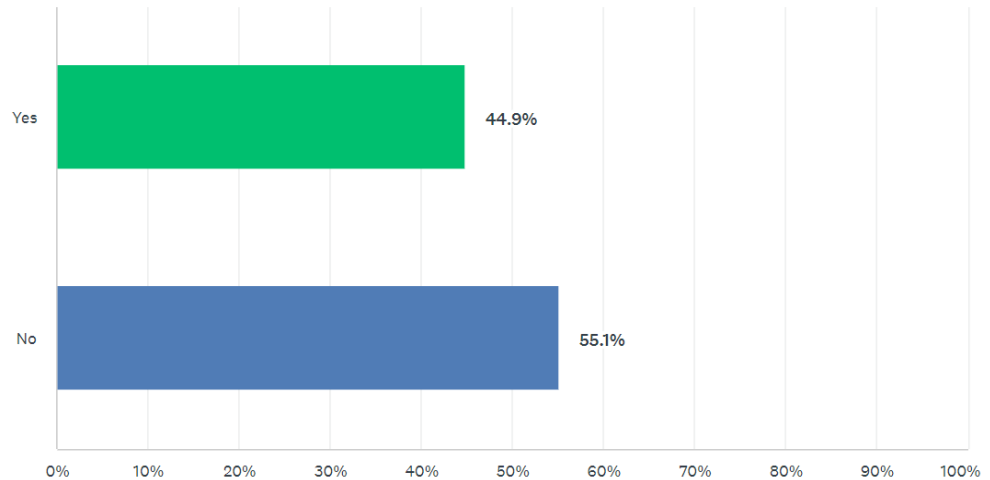


Source: ODOT.

Figure 5-28. Online Survey Results – Continuation of Pilot in Subsequent Years

Do you recommend continuing the Waterfall Corridor Timed Use Permit in the future?

Answered: 272 Skipped: 351



Source: ODOT.

In-Field Staff Feedback

In addition to soliciting feedback from stakeholders and the broader community, project partners also collected feedback from frontline staff, notably permit check-in point staff, in-field “floater” staff and others with on-the-ground experiences and insights. In-field staff offered the following feedback:

- The timed-use permit pilot generally reduced congestion, increased multimodal safety, and improved the user experience. Improvements were particularly noted by people visiting the corridor via bicycle or other non-single-occupant vehicle modes.
- Anecdotally, staff estimated that fewer than 40 percent of visitors understood that they needed to obtain a timed-use permit to access Federal and State lands along the pilot corridor.
- Despite the resulting congestion reductions, some staff suggested further reducing the number of permits released on an hourly basis.
- The timed-use permit pilot could benefit from further clarity among the traveling public, in particular:
 - The existence of the pilot (expanding public messaging more broadly), and
 - Clarifying the distinction between the Waterfall Corridor timed-use permit and the Multnomah Falls timed-use permit.
- Additional on-the-ground staffing are needed at the permit check-in points, including staff with multilingual capabilities.

- Enhanced check-in point infrastructure (e.g., booths) would improve safety for check-in point staff.
- In-field staff routinely encountered inappropriate visitor behavior including yelling, cursing and erratic/threatening/hostile driver behavior.
- Several visitors actively avoided the timed-use permit system by claiming to be driving through (but not stopping within) the corridor; staff routinely discovered these visitors parked at sites downstream from the permit check-in points.

5.6 Pilot Costs

The Pilot project was by the three goals, a success. The pilot reduced vehicle congestion, improved safety, and improved the visitor experience for the majority of visitors. However, there was no dedicated funding for implementation, and project partners agree that identifying and implementing a sustainable funding source to help future programs will be key to continuing any project to address congestion in the corridor.

The three lead agencies each contributed staff time, materials, and funding to help implement the permit pilot.

OPRD estimates that staff, supplies, and other elements of the project cost the agency around \$200,000.

Columbia Area Transit, who provided staffing at the Multnomah Falls site spent around \$40,000 in staffing over the permit pilot.

ODOT estimates around \$200,000 in staff time, flaggers, signage, contractors, materials and supplies, website, translations, etc.

USFS provided funding to ODOT for flagging staff (\$75,000), and also provided staff support throughout the permit, both for check-in staff and office staff to help with outreach and planning. Their total costs are likely around \$120,000.

Agency	Estimated Cost
CAT	\$40,000
ODOT	\$200,000
OPRD	\$200,000
USFS	\$130,000
Total	\$570,000

Not all costs are captured in the estimates, and the partners estimate that the full cost for the permit pilot is likely closer to \$1M. Additionally, there is an opportunity cost for each agency; as staff was working on elements of the permit pilot, other aspects of agency workload were deferred or delayed. OPRD indicated that the amount of staff it took to help run the permit check-in meant that there were fewer staff to conduct regular maintenance such as mowing, trash pick-up, etc. at parks not included in the pilot permit.

Travel Oregon and Travel Portland also provided support staff for outreach, organized webinars, and worked with travel and tourism businesses to ensure that operators in the Gorge were familiar with the system and could communicate with visitors to help ensure that the pilot was successful. The Columbia Gorge Tourism Alliance also helped by updating the Ready, Set GOrge! Website and worked to advertise the Gorge Transit Pass as a way to access the corridor without having to obtain a permit.

Costs also not quantified in the table above include the staff at both the Troutdale Gateway to the Gorge Visitor Center and the Cascade Locks Historical Museum that provided the in-person permits. The Gateway to the Gorge Visitor center was open Thursday-Monday until July 11th, when they opened seven days a week through the end of the permit pilot. Cascade Locks Historical Museum was open Thursday-Monday. Staff provided information on the permit pilot, distributed in-person passes, and helped visitors navigate the website, if needed.

Additionally, volunteers at Vista House to the west of the permit pilot were also instrumental in sharing information to visitors heading east on the Historic Highway. Vista House is outside of the permit area, but many visitors start from the west on the Historic Highway and head east. The Vista House volunteers provided important information to those who had questions regarding the permit pilot, and could help visitors navigate the website or share the in-person permit option.

6 Key Findings and Conclusions

After the permit pilot ended, many social media posts and traditional media outlets advertised the fact that permits were no longer needed to access federal lands adjacent to the Historic Highway. This resulted in an increase in visitation, and without the permit system and the traffic team at the crosswalk at Multnomah Falls, queues, frustration and congestion followed. Unmitigated access without any support is not sustainable, and the issues the permit pilot addressed all returned.

Congestion, frustration and long backups continued through the fall even during inclement weather. ODOT and USFS received multiple complaints over the Thanksgiving holiday regarding extreme congestion and backups on the Historic Highway, further confirming that any nice day or a day where most people have a holiday draws visitation to the Gorge.

Figure 6-1. Vehicle Queue and Congestion on the Historic Highway at Multnomah Falls Monday, September 26, 2022.



Photo credit: Lizzie Keenan

6.1 Goals met

The permit pilot met all of the goals; improve safety, reduce congestion, and improve the visitor experience.

6.2 Lessons learned

This pilot demonstrated that when the vehicle demand is more closely aligned to parking supply, many of the congestion, safety, and visitor experience issues can be mitigated. The pilot provided proof of concept, and helped to confirm that many of the undesirable impacts on the Historic Highway are due to the misalignment between parking supply and demand.

The challenge now is to work towards a more permanent and sustainable system to help continue to match the demand with parking supply; much of the negative feedback was from folks who, after obtaining a permit still struggled to find available parking. Due to regulatory and authority challenges, a parking permit was not achievable in 2022, but in future years, it may be possible to create a system that is explicitly tied to parking.

Project partners did not have any dedicated funding to implement the permit pilot; as such the pilot created an undesirable strain on both staffing and agency budgets. Replicating this exact pilot in future years without dedicated funding or staff is not possible. Additionally staff safety concerns and lack of physical separation from active traffic creates additional barriers for future implementation.

Additionally, active traffic management at Multnomah Falls parking lot and parking management has benefits to reduce congestion, helps the shuttles along the highway keep to reasonable schedules, and reduces safety concerns for pedestrians at the crosswalk.

The permit also confirmed that the Historic Highway and the exit 31 Multnomah Falls parking lot on I-84 are inextricably connected. Any program that addresses congestion on the Historic Highway also has to consider impacts to exit 31 concurrently as to not create safety issues on the interstate.

Future programs will need to accommodate visitors who may not be native English speakers, with either intuitive systems that are universally able to accommodate users and/or multilingual outreach and staff to help visitors successfully navigate future systems to visit the corridor.

Project partners will continue to meet and aim to have an agreed-upon approach to congestion management at Multnomah Falls and on the Historic Highway by the end of January 2023.