



**Adirondack High Peaks Wilderness**  
**Visitor Use Management Study**  
Final Report

**Submitted to:**

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## ABBREVIATIONS

APA	Adirondack Park Agency
APSLMP	Adirondack Park State Land Master Plan
DEC	New York State Department of Environmental Conservation
HPAG	High Peaks Strategic Planning Advisory Group
HPWC-UMP	High Peaks Wilderness Complex Unit Management Plan
IVUMF	Interagency Visitor Use Management Framework
LOS	Level of Service
PAOT	People-at-one-time
VUM	Visitor use management

## Section 1. Introduction

The High Peaks Wilderness region is a natural resource treasure and a primary recreation destination for visitors traveling to the Adirondack Park, NY, from New York State, the broader region, and beyond. Visitation to the region has increased year after year and was likely magnified by the COVID-19 pandemic. The 2021 High Peaks Strategic Planning Advisory Group (HPAG) final report anticipated visitation would continue to increase and recommended immediate action to support long-term strategic planning to protect the region's natural resources and wilderness character (High Peaks Advisory Group, 2021).

HPAG's recommendations include the adoption of a formal visitor use management (VUM) and planning framework for developing long-term management strategies, as well as visitor use data collection to inform future science-based decisions. These recommendations align with the draft management guidance developed in 2021 by New York State Department of Environmental Conservation (DEC) and the Adirondack Park Agency (APA). HPAG's final report and DEC-APA draft management guidance point to the federal Interagency Visitor-Use Management Framework (IVUMF) as the process for managing to desired conditions for natural resources and the visitor experience. The IVUMF is a tool for defining desired conditions, identifying measurable indicators, specifying thresholds for each indicator, estimating visitor capacities, and developing related monitoring and adaptive management strategies. The Adirondack Park State Land Master Plan (APSLMP) and the High Peaks Wilderness Complex Unit Management Plan (HPWC-UMP) provide the basis for describing desired conditions with respect to visitors' experiences in the High Peaks Wilderness region. More recently, the DEC-APA draft management guidance recommended indicators and thresholds specific to the visitor experience in Wilderness and other land use classifications. The 1999 HPWC-UMP further indicates that parking facilities were designed to indirectly manage visitor access to a desired capacity for the region. The motivation and resources exist to develop a VUM planning process following the IVUMF for the High Peaks Wilderness region.

The Adirondack Council commissioned Otak as a neutral, third-party expert to provide an initial rationale and important descriptive information on indicators of visitor use for a subarea of the High Peaks Wilderness region to inform and support long-term VUM strategies. The purposes of this study are to:

- Systematically collect unbiased descriptive data to estimate visitor use levels and conditions at roadside parking areas, at select trailheads, along trail corridors, and on key summits in the High Peaks Wilderness region. When possible, these measures were selected to align with indicators recommended by the DEC-APA draft management guidance.
- Conduct exploratory analyses to understand relationships among visitor use levels and indicators of the visitor experience within the study area.

The descriptive data collected for this study will enhance existing datasets that provide important information on visitor use types and levels in the High Peaks Wilderness. These datasets are routinely collected by the DEC using trail registers and other protocols, APA, the Summit Stewardship Program, volunteers, and staff at the Adirondack Mountain Club, the State University of New York College of Environmental Science and Forestry, members of the Adirondack 46ers, Paul Smith's College Adirondack Watershed Institute, and other engaged stakeholders. Data that provide important information on visitor use types and levels are fundamental for informing future science-based decision related to visitor use management and applying the IVUMF for the High Peaks Wilderness region.

The remainder of this report is organized as follows: Section 2 describes the study area, sampling conditions, and study methods; Section 3 reports descriptive summaries and exploratory analysis results; and Section 4 provides conclusions and recommendations for how the results of this study may be used to inform a VUM strategy in the High Peaks Wilderness region.

## Section 2. Methods

This section of the report describes the study area and summarizes the study methods for the Adirondack High Peaks Wilderness Visitor Use Management Study.

### 2.1. Study Area

Data collection, analysis, and modeling for this study focused on a relatively small subarea of the High Peaks Wilderness Complex, located in the northeast region of the Adirondack Park, NY (Figure 1). As a whole, the High Peaks Wilderness Complex contains the largest state-designated Wilderness area in New York state, many of the state's tallest mountains, and pristine lakes and streams including the source of the Hudson River. These natural amenities are accessed by a number of public trailheads located in the communities of Newcomb, Keene Valley, Keene, Lake Placid, and others. In recent years, increasing levels of visitor use have directly impacted the natural resources in this area as well as the quality of visitors' experiences, and may conflict with the area's Wilderness character and values.

This study focused on a subarea of the High Peaks Wilderness that included approximately 4% of the total area of the High Peaks Wilderness Complex, as depicted in Figure 1. This subarea included the primary trails used to access the summits of Mt. Marcy and Algonquin Peak, the two highest points in the state. Both high-elevation summits are expansive and rocky and are popular hiking destinations that provide scenic views. Both summits are accessed primarily by the Adirondack Loj parking lot and trailhead, with secondary access from the South Meadows, the Garden, and Upper Works trailheads. Peak visitation tends to concentrate during the summer months of July and August, and frequently extends into the fall foliage season in September and October.

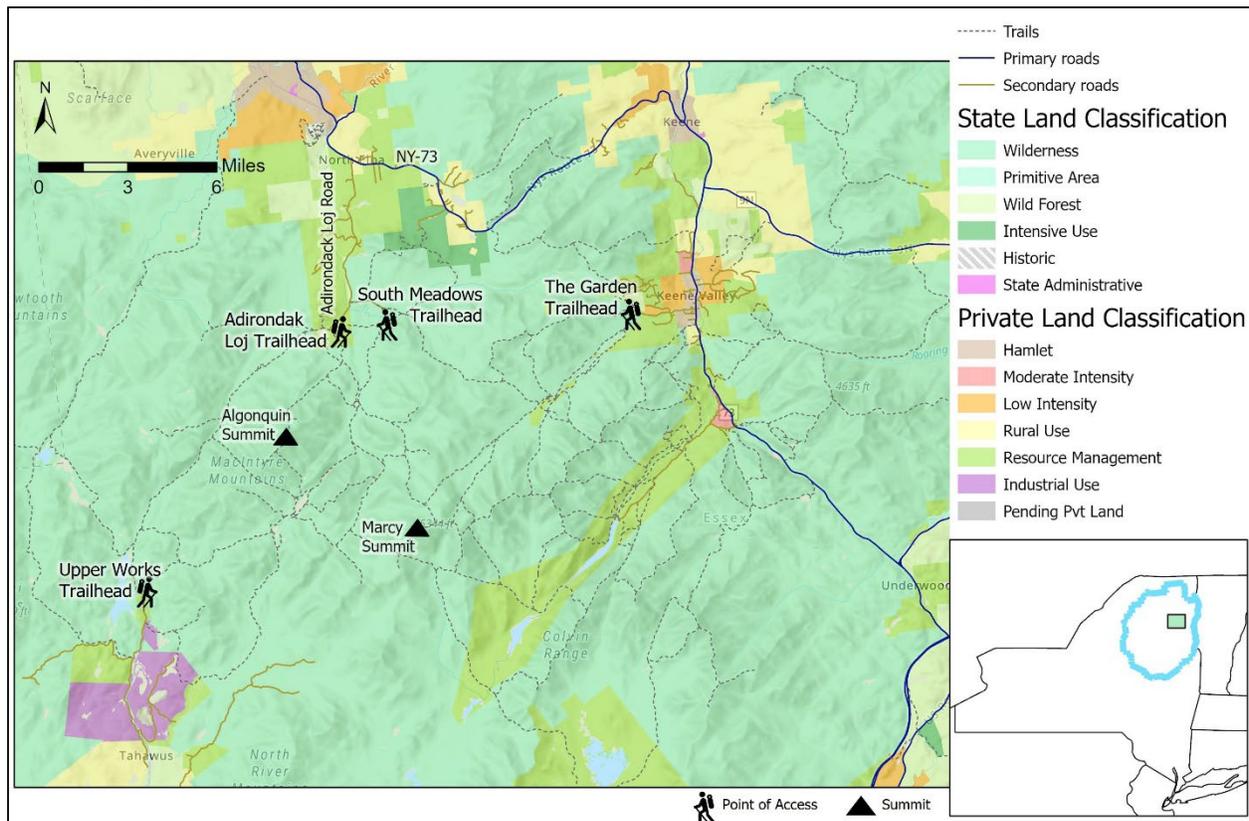


Figure 1 High Peaks Wilderness study area

## 2.2. 2021 Sampling Period Conditions

Due to the growing momentum in support of visitor use management and comprehensive planning across the park and specific to the High Peaks Wilderness region, this study was launched in the summer of 2021 to collect baseline descriptive information on visitor use conditions. The 2021 visitor use season in the High Peaks Wilderness study area was characterized by lower use levels than in previous years. The Adirondack Mountain Club Summit Stewardship Program, which stations stewards on high-elevation alpine summits for the purposes of education, trail maintenance, and scientific research, reported a substantive decrease<sup>1</sup> in the number of visitors contacted on the summits of Algonquin (44% decrease) and Marcy (38% decrease) during July 2021 compared to July 2020 (Table 1). Similarly, Adirondack Loj parking occupancy data<sup>2</sup> provided by the Adirondack Mountain Club suggest that the parking lot filled on only 42% of days during the 2021 season, compared to 67% of days in 2020 and 63% of days in 2019. The decrease in visitation in the High Peaks Wilderness area noted during the 2021 summer season was likely the result of poor weather in July and August, with only 33% of days during this study's data collection period characterized as "sunny," while the remainder were described as "overcast," "rainy," or "stormy." Poor weather and the continued closure of the Canadian border<sup>3</sup> likely reduced visitation to the High Peaks Wilderness study area during the 2021 data collection period and broader summer season.

**Table 1 Total number of contacts by Adirondack Mountain Club Summit Stewards on select summits in July 2020 compared to July 2021**

Location	Total number of contacts in July 2020 (all days)	Total number of contacts in July 2021 (all days)	Percent difference
Algonquin Summit	2,736	1,538	44% decrease
Marcy Summit	3,284	2,033	38% decrease

SOURCE: [2021 Mid-Season Summit Steward Report, Adirondack Mountain Club Summit Stewardship Program](#)

These results suggest that visitor use in the High Peaks Wilderness study area during the 2021 summer season when data for this study were collected may have been less intensive than previous summer seasons.

## 2.3. Data Collection

As noted, this study was designed to collect important baseline descriptive information on visitor use levels and conditions for a subarea of the High Peaks Wilderness. Data collection methods included documenting roadside parking, estimating visitor use counts via infrared trail counters, recording intergroup encounters and instantaneous counts of visitors at destinations along key trail corridors, and counting people-at-one time (PAOT) on high-elevation alpine summit areas. Data for the study were collected on select Fridays through Sundays in July and August 2021 (referred to hereafter as the "sampling period").<sup>4</sup> The sampling period was selected in consultation with the Adirondack Council to coincide with the area's peak visitor use days and season. The location where each data collection

<sup>1</sup> Each summit steward's goal is to contact as many visitors on the summit as possible, which suggests the decrease in contacts is due to a decrease in overall visitor use levels and not a systematic limit to the number of contacts.

<sup>2</sup> The 2021 Adirondack Loj parking lot occupancy data provided a record of whether the parking lot filled, the time the lot filled, the number of vehicles parked at 12:00 p.m., the number of hikers engaged with, and pounds of trash collected for the majority of days from May 21, 2021 through October 17, 2021.

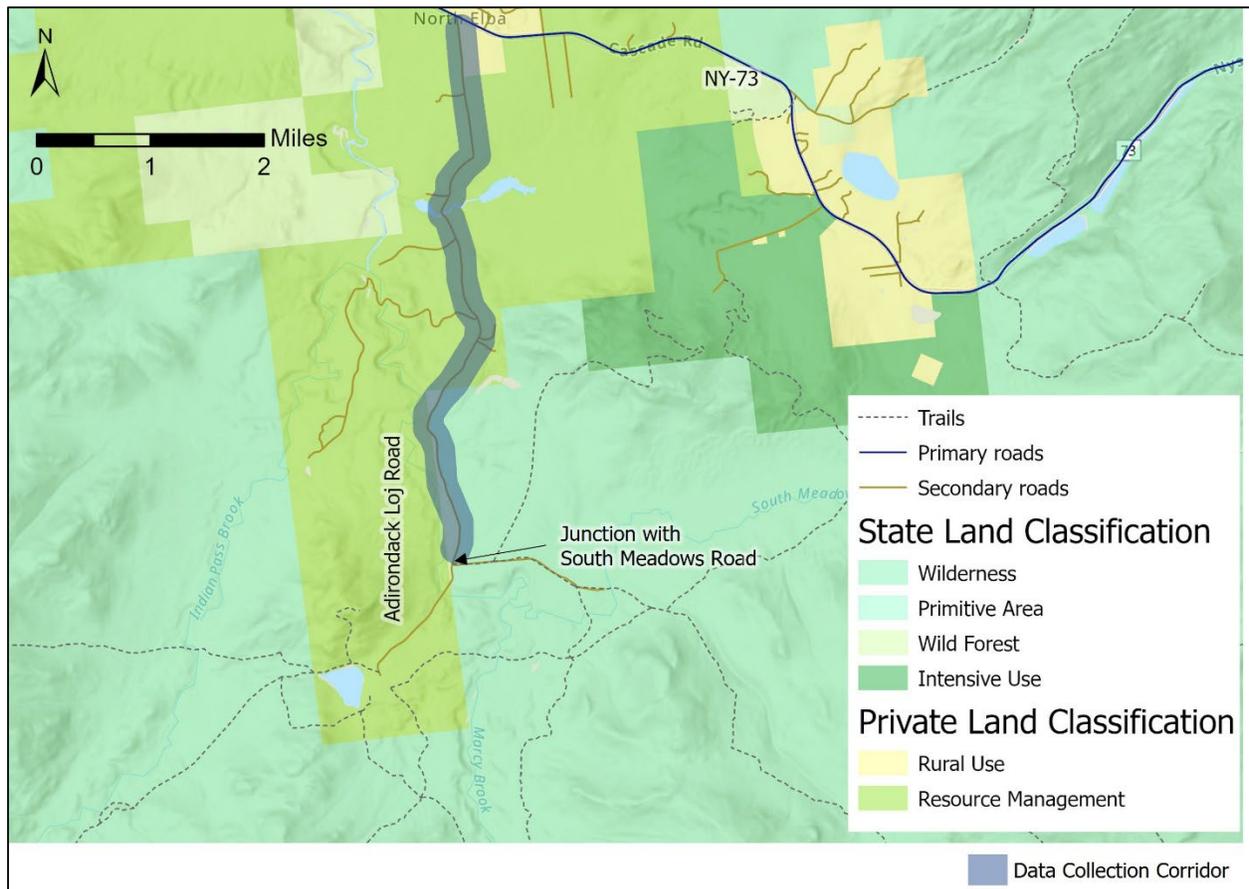
<sup>3</sup> Canadians represent an important share of visitation to the High Peaks Wilderness but were largely prevented from visiting the High Peaks Wilderness due to border closures related to COVID-19.

<sup>4</sup> The sampling period includes the following Fridays through Sundays: 7/02/2021-7/04/2021, 7/16/2021-7/18/2021, 7/30/2021-8/01/2021, 8/06/2021-8/08/2021, 8/13/2021-8/15/2021. PAOT counts on Marcy summit were also collected 9/03/2021-9/05/2021.

method was conducted is illustrated in Figure 2 through Figure 9. The following sub-sections describe the methods for each study component.

### 2.3.1. Roadside Parking

An observation-based method was used to document roadside parking along the Adirondack Loj Road each hour from 8:00 a.m. through 4:00 p.m. each day of the sampling period. At the start of each hour, a trained field technician drove through the data collection corridor, heading north from the intersection of Adirondack Loj Road and South Meadows Road toward the intersection of Adirondack Loj Road and New York Route 73 until they reached the last parked vehicle, or the vehicle parked furthest north and closest to Route 73 (Figure 2). Using a field-grade GPS unit, the latitude and longitude coordinates of the last parked vehicle were recorded each hour. Vehicles using the pull-off area near Route 73 for pictures or cellular service were not considered the last parked vehicle and were excluded from data collection. It is important to note that this method does not capture the number or spacing of any vehicles parked in addition to the last parked vehicle. Appendix A includes a copy of the log form used to document roadside parking, and Appendix B includes the protocols for data collection. The coordinates were post-processed using osrm<sup>5</sup> package in R (Giraud 2022; R Core Team 2021) to estimate the distance along the roadway from the intersection of Adirondack Loj Road and South Meadows Road to the last parked vehicle along the roadside, measured in miles.

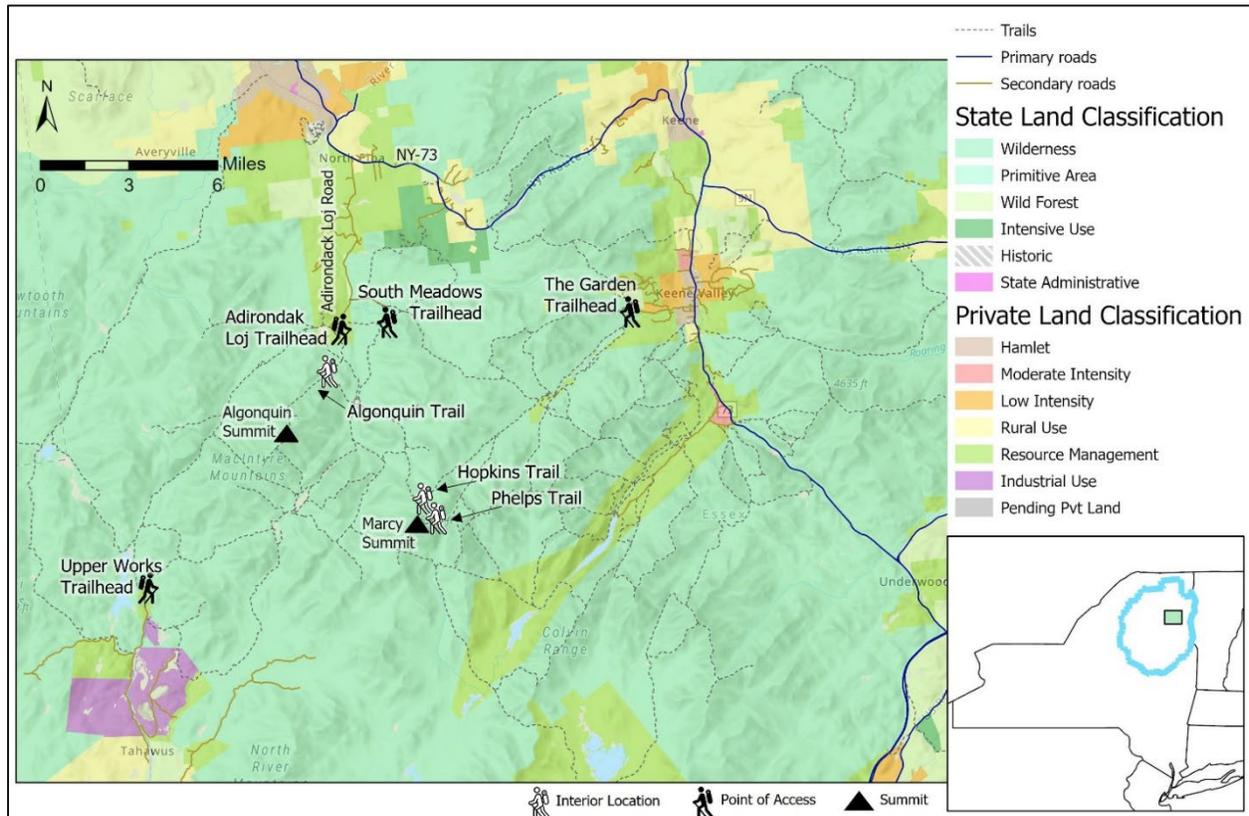


**Figure 2 Roadside parking data collection corridor along the Adirondack Loj Road**

<sup>5</sup> The osrm package interfaces with OpenStreetMap to estimate a routed distance given a pair of origin and destination coordinates. For this analysis, the intersection of Adirondack Loj Road and South Meadows was used as the origin and the coordinates of the last parked vehicle each hour were used as the destination.

### 2.3.2. Visitor Use Counts

Visitor use count data were collected with SensMax DE bi-directional infrared trail counters at seven locations in the study area (Figure 3). The counting locations were selected in consultation with the Adirondack Council to estimate visitor use at the four primary trailheads that access trails to the summits of Algonquin and Marcy, and at three key interior trail junctions to further describe visitor use to the summits (Figure 3). The infrared trail counters were deployed by the Adirondack Council and programmed to record directional counts in hourly bins, 24 hours per day during the counting period from July 2, 2021 through October 31, 2021<sup>6</sup> (Figure 4).



**Figure 3** Visitor use counts collected at points of access and interior locations

Field staff conducted visitor use counts via direct observation for a minimum of 16 hours at trail counters located at primary access trailheads: Adirondack Loj, the Garden,<sup>7</sup> and Upper Works. Direct observation counts were not conducted at the South Meadows trailhead due to the relatively low share of visitor use volume at this location. Appendix C includes a copy of the log form used to record visitor use counts via direct observation, and Appendix D includes the protocols for data collection. The direct observation counts (or “calibration counts”) were used to correct and adjust (i.e., calibrate) the raw infrared trail counter data, as described in Section 3.4.1 of this report.

<sup>6</sup> Trail counters deployed at high elevations (Van Hoesenberg Trail after Hopkins Trail Junction and Van Hoesenberg Trail after Phelps Trail Junction) were removed during mid-October to protect the equipment from winter weather conditions.

<sup>7</sup> The trail counter at the Garden trailhead was located on the Phelps Trail toward Johns Brook Lodge.



**Figure 4** Visitor use counting equipment deployment example

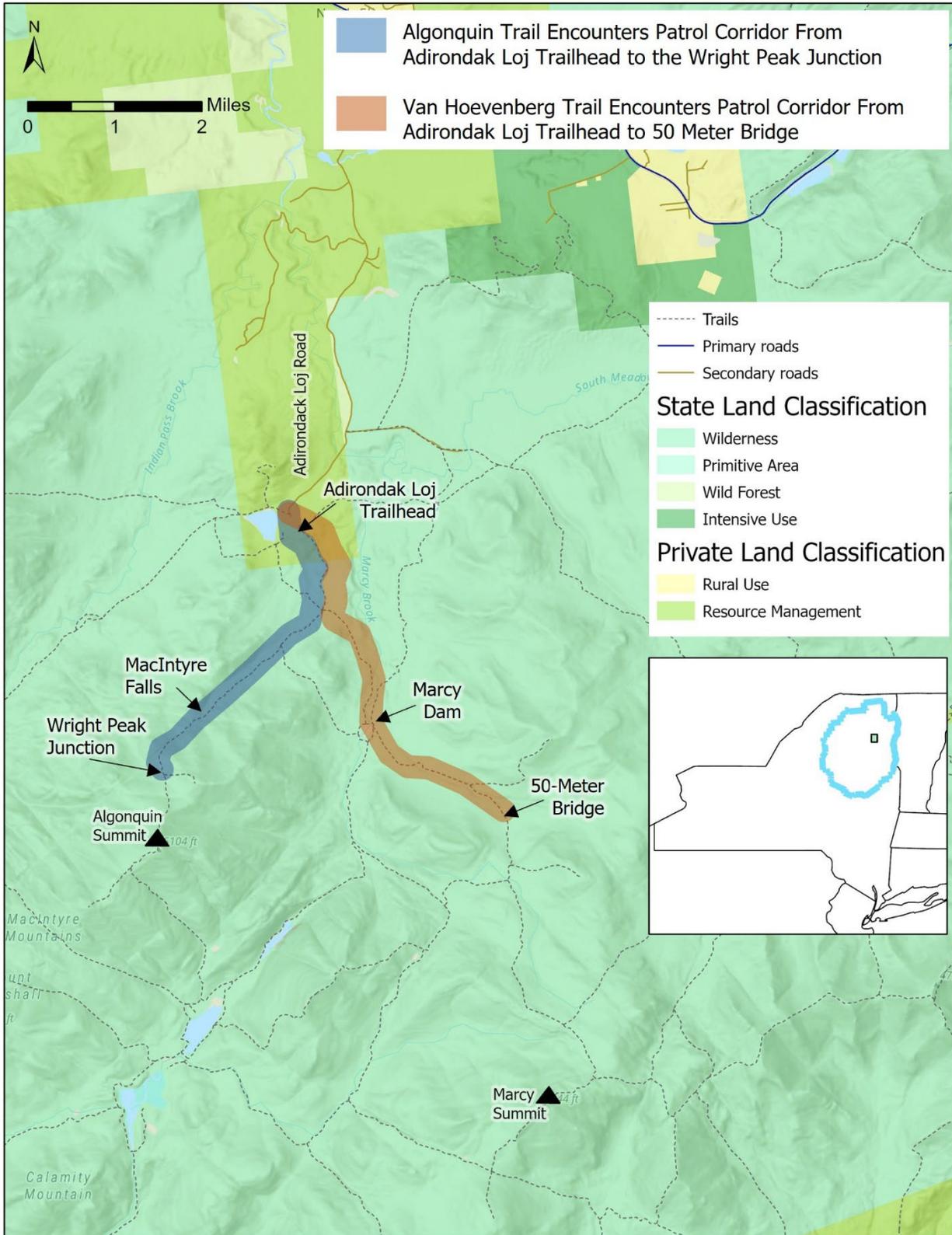
### 2.3.3. Encounters on Trails

Intergroup encounter patrols were conducted along two trail corridors each day during the sampling period by the same field technician using an approach similar to one developed for the USDA Forest Service (Broom and Hall 2009). Encounter patrols alternated trail corridors between the morning and afternoon period of each sampling day. Each patrol started at the Adirondak Loj trailhead and followed either the Algonquin trail toward the Algonquin summit or the Van Hoevenberg trail toward the Marcy summit (Figure 5). The goal of the encounter patrol was to document the number of visitor groups encountered during a simulated but typical visitor experience. As a result, the technician was directed to hike inbound at a normal pace for approximately two hours before turning around to hike outbound for approximately two hours and return to the Adirondak Loj trailhead, for a total patrol length of approximately four hours per trail corridor. The turnaround location along the Algonquin trail corridor was the junction with the trail to Wright Peak, while the turnaround location along the Van Hoevenberg trail was the 50-meter bridge located just after passing the junction with the Phelps Mountain Trail (Figure 5). The technician was encouraged to take any natural breaks for water, food, or rest as part of the simulated visitor experience. An encounter was defined by visual contact (i.e., any groups heard but not seen were not recorded) and included all visitor groups the technician passed along the trail or that passed the technician, as well as all visitor groups that were resting on the trail and were passed by the technician or that passed the technician while the technician was resting on the trail. Visitor groups encountered hiking at a similar pace were also considered an encounter and were logged as a repeat encounter each time the visitor group passed out and then back into sight of the technician. Any visitor groups seen at campsites or other off-trail locations were not recorded as encounters. For each encounter with a visitor group along the trail corridor, the technician recorded the time of the encounter, approximate group size, direction of travel, and indicated if the visitor group had been encountered before using the log form provided in Appendix E. Appendix F includes the protocols for data collection via intergroup encounter patrols.

In addition to documenting intergroup encounters on trail corridors, the field technician also collected instantaneous counts at a specific destination where visitors tend to congregate on each trail corridor. For the Algonquin trail corridor, the field technician collected an instantaneous count of visitors at MacIntyre Falls as the technician traveled in the inbound and outbound direction (Figure 5). The encounter patrol was paused at the start of the MacIntyre Falls area to avoid double-counting visitor groups as encounters

and as part of the instantaneous count. The technician counted all visitors in the open area and along the falls in the instantaneous count and then resumed the encounter patrol as the technician exited the MacIntyre Falls area (Figure 6).

For the Van Hoevenberg Trail corridor, the field technician collected an instantaneous count of visitors at Marcy Dam as the technician traveled in the inbound and outbound direction (Figure 5). While traveling in the inbound direction, the technician paused the encounter patrol just before the washed-out dam structure (Figure 7) to avoid double-counting visitor groups as encounters and as part of the instantaneous count. The technician roved through the eastern side of the Marcy Dam area to include all visitors on the dam structure, down near the water, and along all shores in the instantaneous count. The technician did not resume the encounter patrol until after following the rerouted trail across the bridge and arriving at the Marcy Dam trail register. Similarly, while traveling in the outbound direction, the technician paused the encounter patrol at the Marcy Dam trail register, followed the rerouted trail across the bridge, conducted the instantaneous count by roving through the eastern side of the Marcy Dam area, and then resumed the encounter patrol. For both trail corridors, the instantaneous count was recorded for each location, by direction, in the supplemental log form provided in Appendix G. Intergroup encounter data were post-processed to derive an hourly group encounter rate per patrol and trail corridor.



**Figure 5 Intergroup encounter patrol trail corridors**



**Figure 6** Algonquin trail instantaneous count at MacIntyre Falls (inbound direction)



**THRESHOLD TO PAUSE  
ENCOUNTER PATROL COUNT**

**Figure 7 Van Hoevenberg trail instantaneous count at Marcy Dam (inbound direction)**

#### **2.3.4. Summit People-at-One-Time (PAOT) Counts**

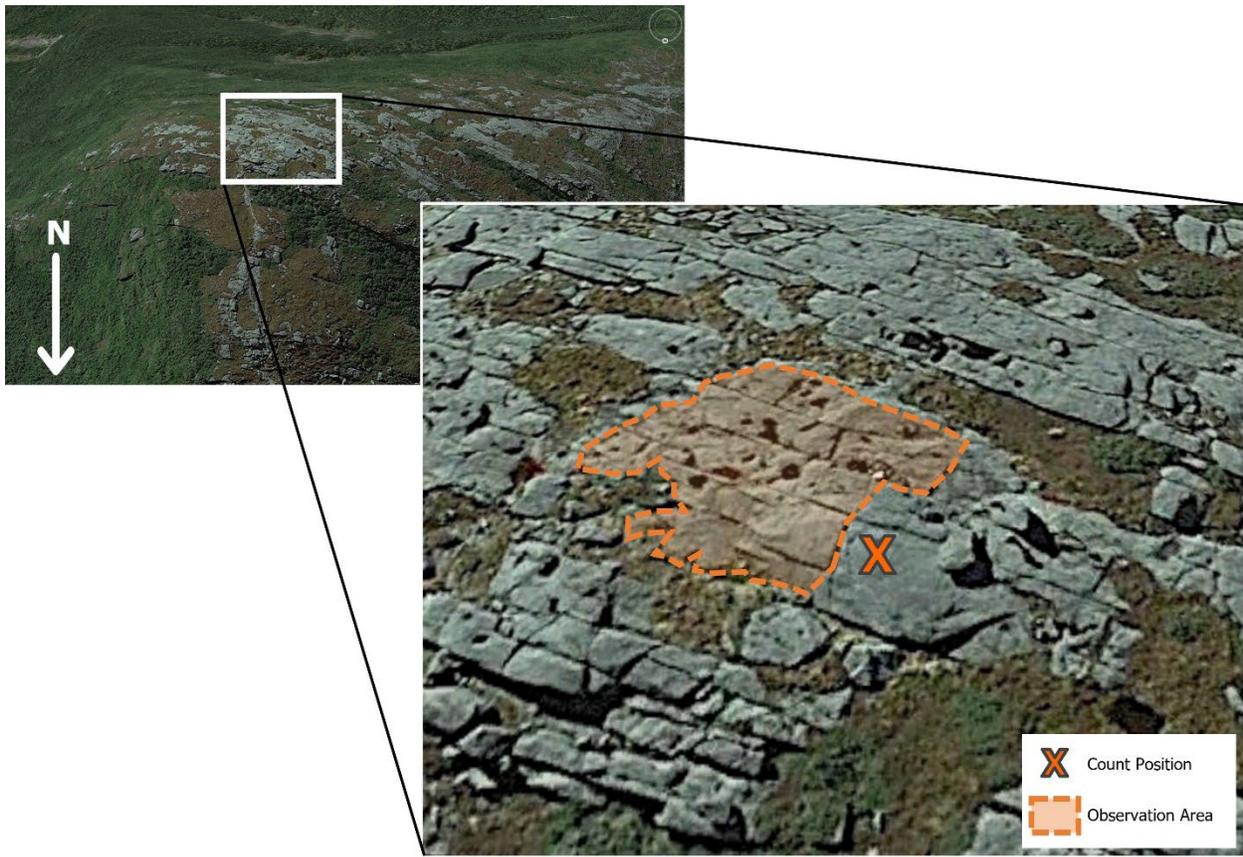
People-at-one-time (PAOT) counts were conducted on the Algonquin summit and the Marcy summit using direct observation. Two types of PAOT counts were conducted on each summit: a summit count and an observation area count. Both counts were recorded as instantaneous counts once every 10-minutes for approximately six hours per day. The PAOT counts started between 8:00 a.m. and 9:00 a.m. during the first sampling weekend and were adjusted to start at 10:00 a.m. to better capture the daily visitor use period for all remaining sampling weekends. Adirondack Mountain Club Summit Stewards were included in all counts if present and visible during the count interval. The PAOT counting procedures for each summit and type of count are described in the subsections below. Appendix H includes a copy of the log form used to collect PAOT counts, and Appendix I includes the protocols for data collection for both summits.

##### **Algonquin Summit**

Given the expansive and rocky nature of the Algonquin summit, the summit count approximates the number of visitors on the summit during the count interval. To conduct the summit count, the field technician was positioned at the highest point on the summit (denoted by “X” in Figure 8). The field technician was instructed to instantaneously count all visitors in sight during each count interval by rotating a full 360° from left to right in their position.

PAOT counts were also conducted to describe visitor use conditions for a subarea on the Algonquin summit that provides usable and attractive space for visitors but excludes sensitive vegetation, referred to hereafter as the “observation area.” The observation area was selected during scoping and in consultation with the Adirondack Council (Figure 8). The same field technician systematically conducted the PAOT counts for the summit and observation area during each count interval by using separate tally counters, rotating from left to right, and beginning the count with the observation area followed by the summit count.

PAOT counts on the Algonquin summit were conducted on 14 days during the sampling period, and a total of 450 observations were recorded for each of the summit and observation area (Table 2).



**Figure 8** Algonquin summit PAOT count procedure

**Table 2 Summary of people-at-one-time (PAOT) sampling effort<sup>8</sup>**

Date	Algonquin		Marcy	
	Summit	Observation Area	Summit	Observation Area
7/02/2021	24	24	12	--
7/03/2021	36	36	37	--
7/04/2021	36	36	39	--
7/16/2021	36	36	35	15
7/17/2021	36	36	35	35
7/18/2021	12	12	2	2
7/30/2021	18	18	--	--
7/31/2021	36	36	35	21
8/01/2021	--	--	16	16
8/06/2021	36	36	36	36
8/07/2021	36	36	35	35
8/08/2021	36	36	27	27
8/13/2021	36	36	36	36
8/14/2021	36	36	36	36
8/15/2021	36	36	36	36
9/03/2021	--	--	35	35
9/04/2021	--	--	36	36
9/05/2021	--	--	21	21
Total	450	450	509	387

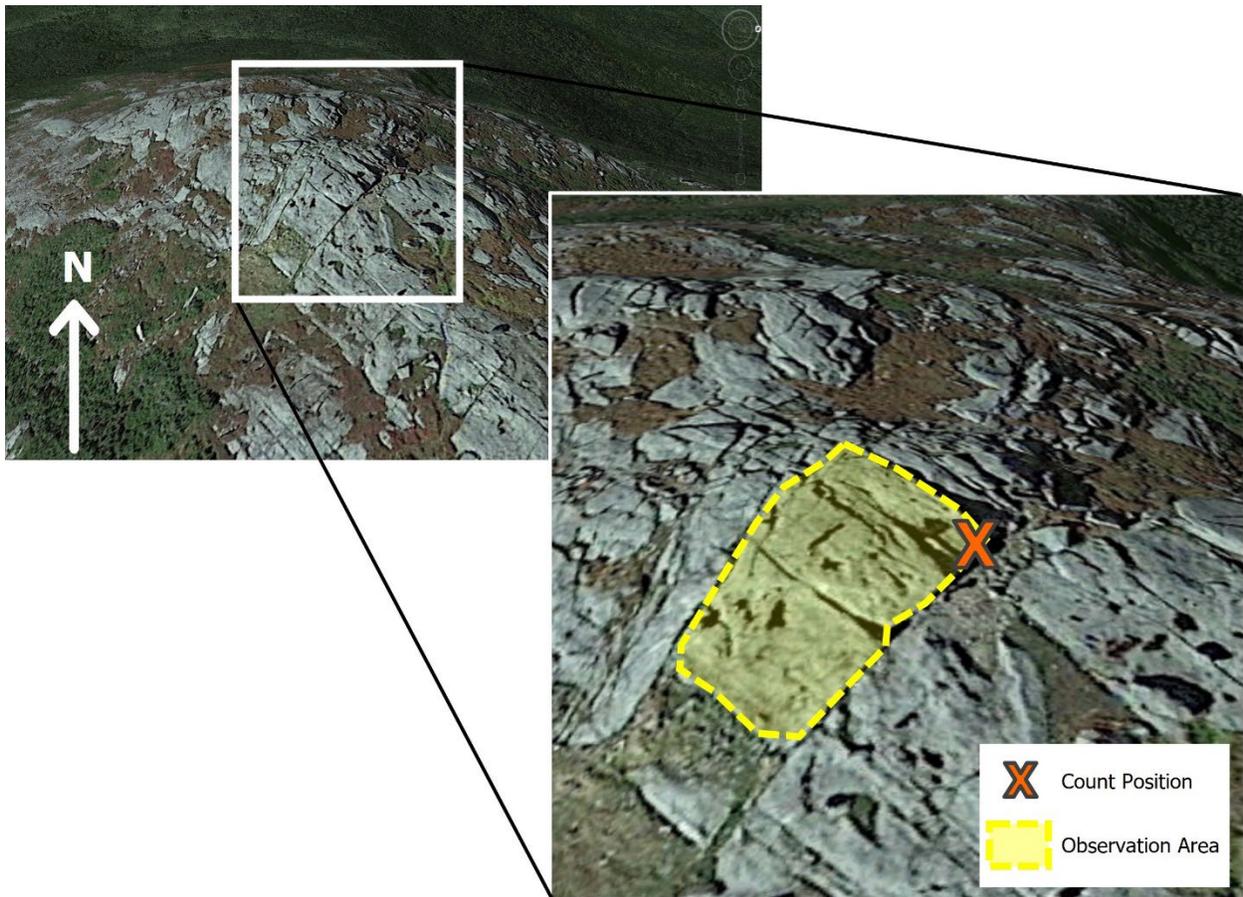
**Marcy Summit**

The Marcy summit is similarly expansive and rocky in nature, and likewise included a summit count to approximate the number of visitors on the summit during the count interval. To conduct the summit count, the field technician was positioned at the highest point on the summit (denoted by “X” in Figure 9). The field technician was instructed to instantaneously count all visitors in sight during each count interval by rotating a full 360° from left to right in their position.

PAOT counts were also conducted to describe visitor use conditions for a subarea on the Marcy summit that provides usable and attractive space for visitors but excludes sensitive vegetation, referred to hereafter as the “observation area.” The observation area was selected during scoping and in consultation with the Adirondack Council (Figure 9). The same field technician systematically conducted the summit count and the count in observation area during each count interval by using separate tally counters, rotating from left to right, and beginning the count with the observation area followed by the summit count.

PAOT counts on the Marcy summit were conducted on 14 days during the sampling period, and on three additional days following the sampling period. A total of 509 observations were recorded for the summit, and a total of 387 observations were recorded for the observation area (Table 2).

<sup>8</sup> There are fewer than 36 observations of PAOT on some dates due to a combination of staff comfort breaks, weather events, and a medical incident. In addition, PAOT observations were not collected on Algonquin summit 9/03/2021 – 9/05/2021 due to staff availability.



**Figure 9** Marcy summit PAOT count procedure

## Section 3. Results

This section of the report presents summary statistics for the descriptive data collected in High Peaks Wilderness study area during the 2021 summer season. Results are also presented for various regression analyses conducted to model relationships among the descriptive data. It should be noted, the percentages in the tables and figures of results in this section of the report may not sum to 100% due to rounding.

### 3.3. Parking Conditions

This sub-section of the report describes parking conditions along the Adirondack Loj Road and in the Adirondack Loj parking lot, using data provided by the Adirondack Mountain Club.

#### 3.3.1. Roadside Parking Observations

Statistical summaries of roadside parking observations, recorded hourly, are presented in Table 3. These data suggest:

- On average, the last parked vehicle was located further down the Adirondack Loj Road on Saturdays and Sundays, compared to Fridays.
- At most, the last parked vehicle was located just over one-half mile (0.54 mi) back down the Adirondack Loj Road from the junction with South Meadows Road. This observation occurred at 12:00 p.m. on a Saturday in late July.

**Table 3 Mean and maximum distance (miles) of roadside parking by day type**

Day of Week	Mean Distance	Maximum Distance	Hour Maximum Distance Was Observed
Friday	0.02	0.06	2:00 p.m.
Saturday	0.23	0.54	12:00 p.m.
Sunday	0.27	0.53	8:00 a.m.

#### 3.3.2. Adirondack Loj Parking Lot Conditions and Roadside Parking Observations

Summary statistics of parking conditions in the Adirondack Loj parking lot are presented below to provide context to the roadside parking conditions observed as part of this study (Table 4). These data suggest:

- There were eight days during the sampling period when the Adirondack Loj parking lot was at capacity. On all eight of those days, roadside parking was observed.
- Roadside parking was observed on five additional days during the sampling period, but the Adirondack Loj parking lot was not at capacity on those days.
- On two days during the sampling period, no roadside parking was observed and the Adirondack Loj parking lot was not at capacity.

**Table 4 Adirondack Loj parking lot conditions on days when roadside parking was observed**

Condition	Number of Sampling Days	Percent
Roadside parking; Adirondack Loj parking lot at capacity	8	53%
Roadside parking; Adirondack Loj parking lot not at capacity	5	33%
No roadside parking; Adirondack Loj parking lot not at capacity	2	13%
Total	15	99%

## 3.4. Visitor Use Counts

### 3.4.1. Calibration

Regression analyses were conducted to model the relationship between raw mechanical traffic counter data and the calibration counts collected via direct observation for the three trail counters located at primary access trailheads: Adirondack Loj, the Garden, and Upper Works. The purpose of these analyses was to derive an empirical basis to convert raw traffic counter data to estimates of actual visitor use. First, separate regression models were estimated for each counter, with direct observation counts of total (arrival and departure) visitor use as the dependent variable and corresponding infrared trail counter data of total visitor use as the independent variable. The regression scatterplots were visually inspected and determined to contain no suspect outlier values. The regression results suggest that there are strong statistical relationships between the direct observation counts of total visitor use and total visitor use counts recorded by the infrared trail counters.

- Regression models with y-intercept terms were selected as the best fitting regression models for all three trail counters, and were the models used to calibrate trail counter data.
- Adjusted R<sup>2</sup> values ranged from 0.84 to 0.97.
- Coefficients ranged from 0.89 to 1.07.
- Y-intercept terms ranged from 0.31 to 1.88.
- The p-values for all three regression models were less than 0.001.

These results provide a high degree of confidence that applying the correction factors to calibrate the raw total visitor use counts recorded by the infrared trail counters (i.e., adjusting the infrared trail counter data using the corresponding parameter estimates from the regression models) results in very accurate estimates of visitor use in the High Peaks Wilderness study area. After the correction factors were applied to the total raw visitor use counts, all total hourly counts were screened for statistical (extreme) and substantive outlier values using a time series analysis that considered hourly, daily, and monthly trends. The calibrated trail counter data were used for analysis and results presented in this report when available. Results are presented as raw trail counter data for locations where observation counts were not conducted, and regression models were not estimated.

### 3.4.2. Arrival and Departure Volumes

Calibrated trail counter data were modeled to estimate visitor arrival and departure volumes by trail counter location. Although SensMax trail counters record directional counts, the variability of the directional split between arrival and departure counts across hours of the day during the counting period was determined to be inconsistent with observed data, and not reliable for establishing relationships with visitor experience indicators (Appendix J reports the average proportion of visitor arrivals by time period and location). This study recommends further testing of the SensMax directional counts functionality. Instead, arrival volumes were calculated as the average proportion of visitor arrivals per time period<sup>9</sup> and by location using direct observation counts (i.e., calibration counts) where available. Where observation data are not available, results are presented as total trail volumes instead of arrival and departure volumes. For the results presented for visitor use volumes, all days with 25% or more combined hours of missing or outlier values during maximum daylight hours (defined as 5:00 a.m. to 9:00 p.m.) are excluded from the daily summaries for each trail counter. All days with fewer than 25% of combined hours of

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<sup>9</sup> Observation counts were pooled across time periods: 7:00 – 10:59 a.m., 11:00 a.m. – 2:59 p.m., and 3:00 – 6:59 p.m. For hours prior to 7:00 a.m., 95% of the total volume was assumed to be visitor arrivals, while 95% of the total volume was assumed to be visitor departures from 7:00 p.m. through midnight.

missing or outlier values are included in the daily summaries for each trail counter using imputed values as needed.<sup>10</sup> All days are included in hourly summaries, with missing or outlier hourly values excluded (i.e., no imputed values were included in hourly summaries). The following summaries of visitor use volumes at the Adirondak Loj trail counter are presented in this sub-section:

- Daily visitor arrivals, by date during the counting period.
- Hourly visitor arrivals, by date during the counting period.
- Hourly visitor arrivals, by date and day of week during the sampling period.
- Mean hourly visitor arrivals and departures, by day of week during the sampling period.

Summaries of visitor use volumes at all other trail counter locations are provided in Appendix K.

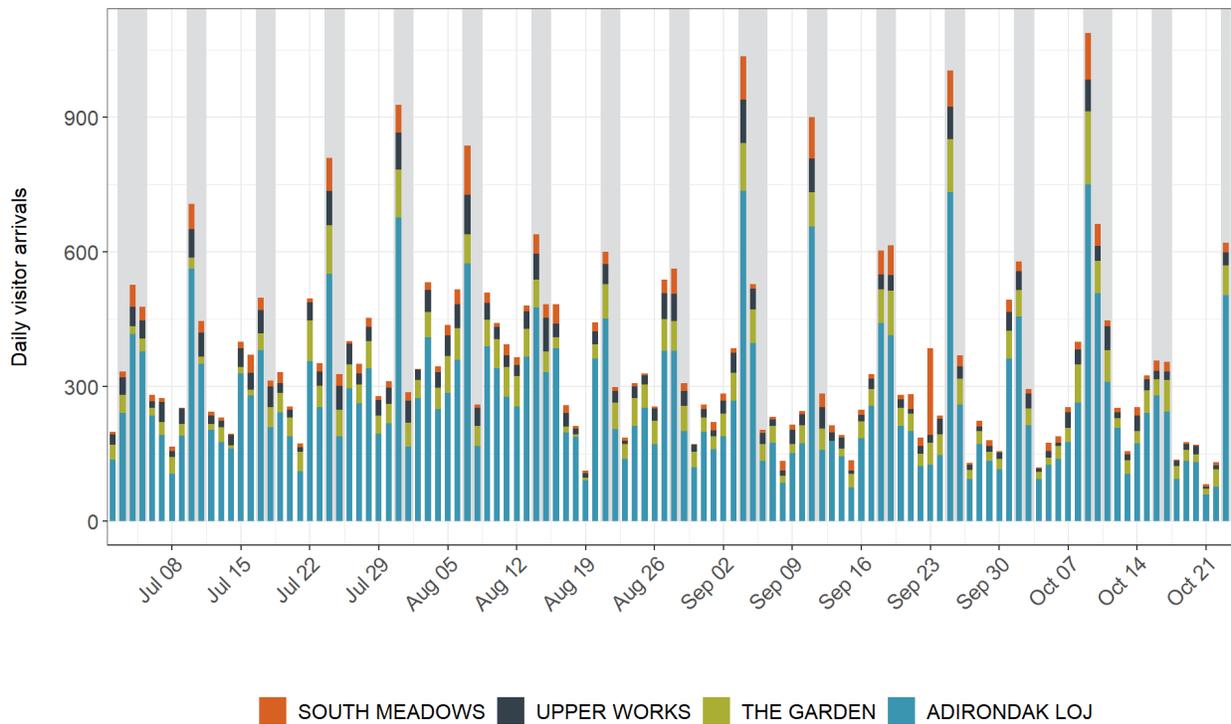
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<sup>10</sup> Imputed values were calculated as the average of all calibrated counts by counter location, hour, day of week category (i.e., weekend/holiday or weekday), and month.

### 3.4.2.1. Daily Visitor Arrivals

Figure 10 presents total daily visitor arrivals across the four primary trailheads that access trails to the summits of Algonquin and Marcy, by date during the counting period. These data suggest:

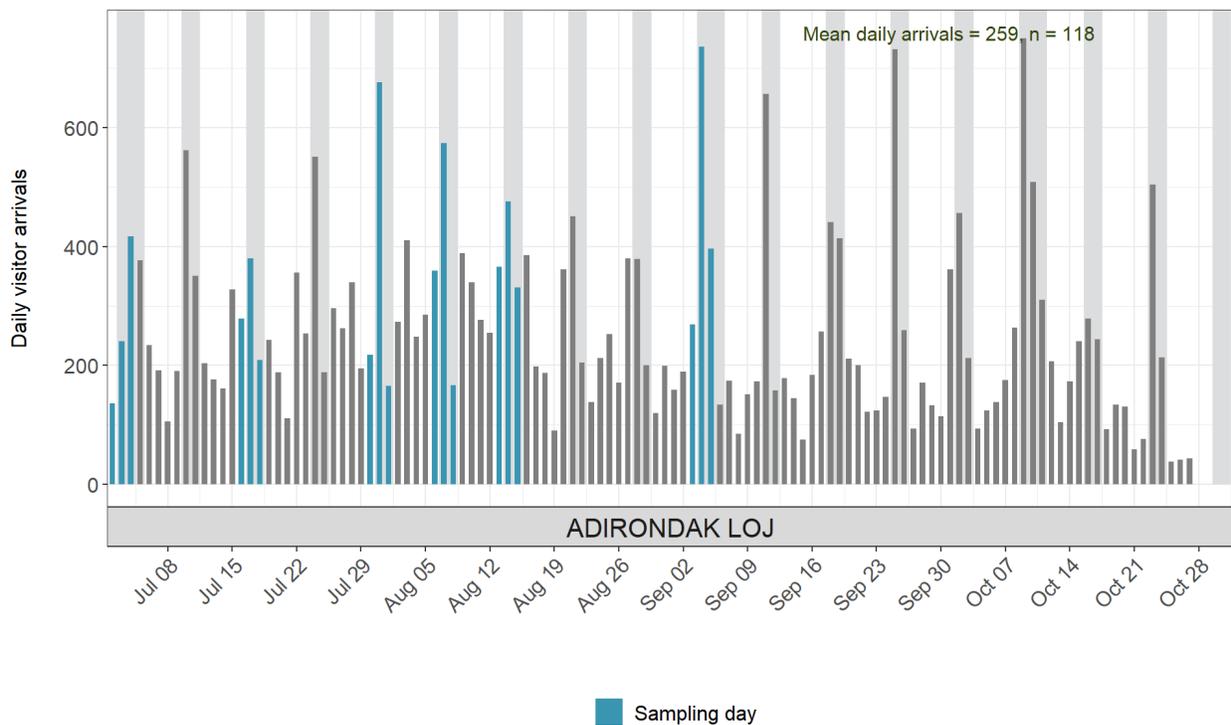
- The vast majority of visitor arrivals in the High Peaks Wilderness study area originated at the Adirondak Loj.
- Smaller shares of visitor arrivals occurred at South Meadows, Upper Works, and the Garden.
- On Saturdays compared to other days of the week, there was generally a higher number of visitor arrivals to the High Peaks Wilderness study area.
- On Saturdays, there was also a greater share of visitor arrivals at South Meadows, Upper Works, and the Garden compared to other days of the week.



**Figure 10 Daily visitor arrivals by primary access location and date (gray shading indicates weekends/holidays)**

Figure 11 presents total daily visitor arrivals at the Adirondack Loj during the counting period. These data suggest:

- Daily visitor arrivals were variable during the counting period and ranged from a low of about 100 visitors to more than 500 visitors per day. On average, around 260 visitors arrived per day at the Adirondack Loj.
- Daily visitor arrivals were typically higher on weekend days and holidays compared to weekdays. On many Saturdays, visitor arrivals exceeded 600 per day.
- The sampling period included the majority of the highest-volume visitor-use days during July, August, and the first weekend in September.

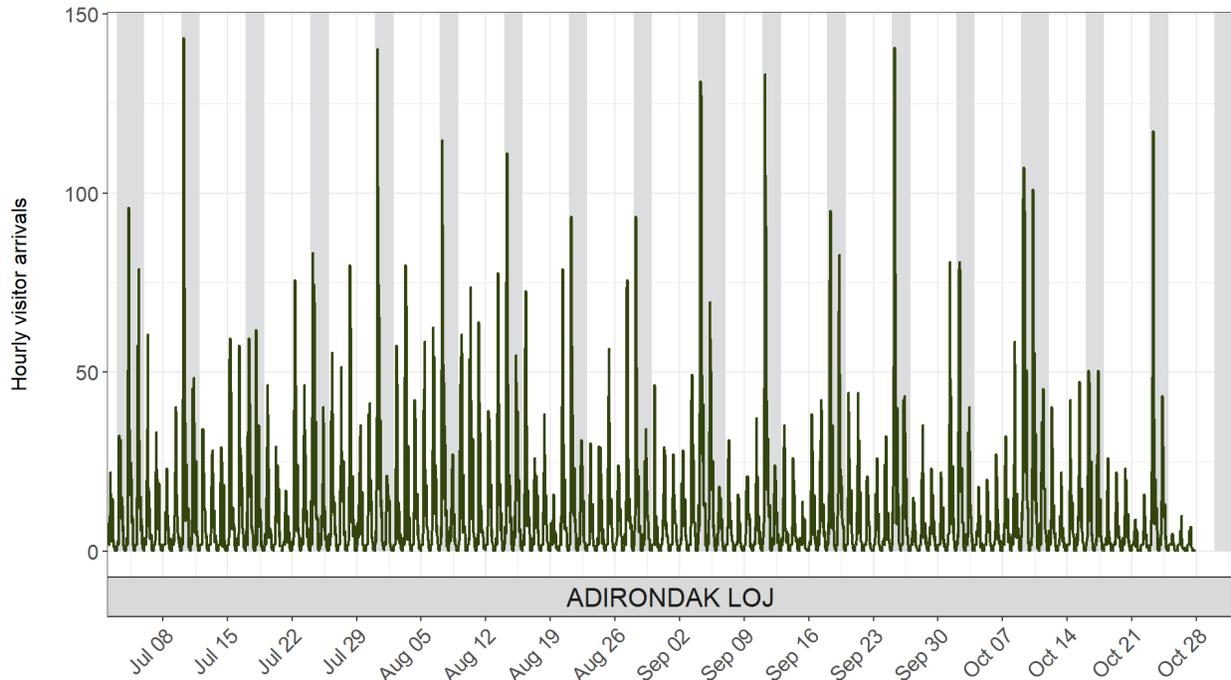


**Figure 11 Daily visitor arrivals by date: Adirondack Loj (gray shading indicates weekends/holidays)**

### 3.4.2.2. Hourly Visitor Arrivals

Figure 12 presents hourly arrivals at the Adirondak Loj during the counting period. This plot provides a “macro view” of hourly patterns of visitor arrivals across the days of the counting period. These data suggest:

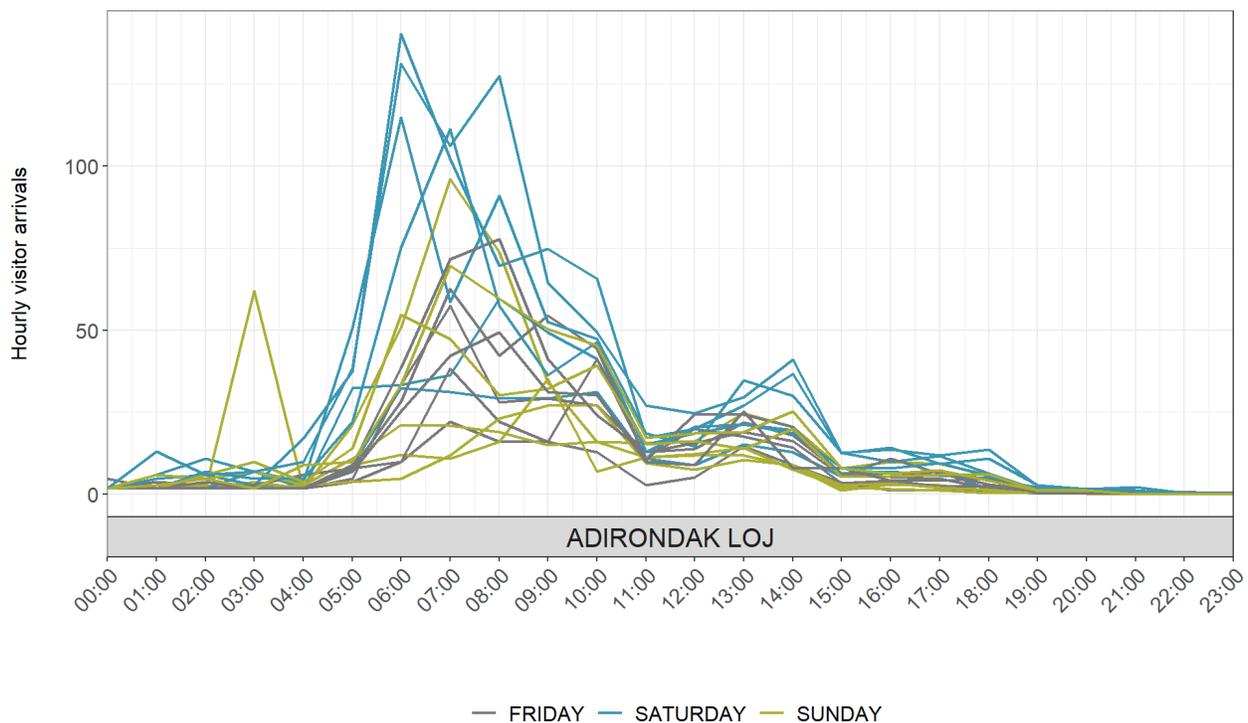
- Peak hourly arrivals were higher on weekend days and holidays compared to weekdays.
- On weekdays, peak hourly arrivals ranged from around 12 to 80 visitors.
- On Saturdays, peak hourly arrivals were especially high and ranged from around 50 to 140 visitors.



**Figure 12 Hourly visitor arrivals by date: Adirondak Loj (gray shading indicates weekends/holidays)**

Figure 13 presents hourly arrivals at the Adirondack Loj by day of week during the sampling period in a complementary format to the plot in Figure 12 (separate lines, rather than a single continuous line, for each date displayed in the plot). Figure 13 provide a “micro view” of hourly patterns of visitor arrivals across the hours of each day of the sampling period. These data suggest:

- Hourly arrivals increased steadily through the early morning starting around 4:00 a.m. and peaked between 6:00 a.m. and 8:00 a.m. on most days. Hourly arrivals declined through the remainder of the morning but increased slightly again between 12:00 p.m. and 2:00 p.m. before declining through the remainder of the day.
- Peak hourly arrivals were higher on Saturdays and ranged between 60-140 arrivals per hour. On Fridays and Sundays, peak hourly arrivals were lower and ranged between 20-95 arrivals per hour.

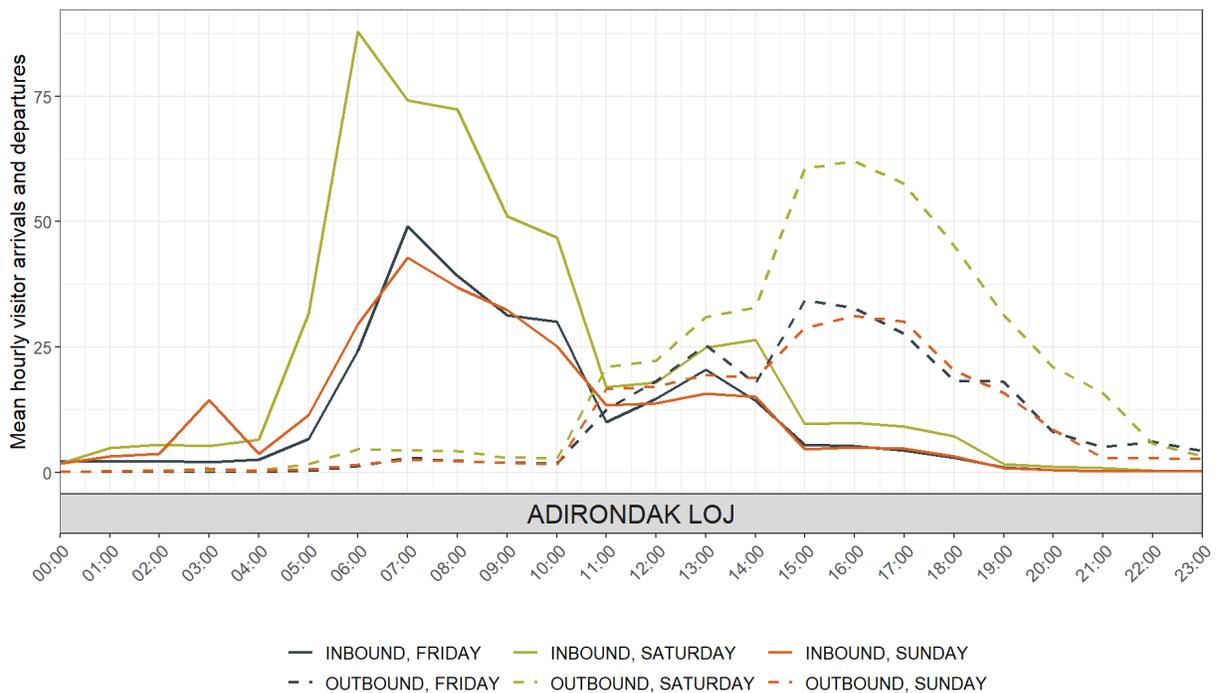


**Figure 13 Hourly visitor arrivals by date and day of week: Adirondack Loj**

### 3.4.2.3. Mean Hourly Arrivals and Departures

Figure 14 presents mean hourly visitor arrivals and departures at the Adirondak Loj by day of week during the sampling period. These data suggest:

- Mean hourly arrivals increased sharply starting at 4:00 a.m. on all three days of the week. On Saturdays, mean hourly arrivals peaked at 87 arrivals at 6:00 a.m., while on Fridays and Sundays mean hourly arrivals peaked one hour later at 7:00 a.m. and were slightly lower at around 40-50 arrivals. Mean hourly arrivals decreased after the peak through 11:00 a.m., increased slightly again 1:00 – 2:00 p.m., and then decreased through the remainder of the day on all three days of the week.
- Mean hourly departures increased steadily between 10:00 a.m. and 2:00 p.m. on all three days of the week. On Saturdays, mean hourly departures peaked at around 62 departures at 4:00 p.m., while mean hourly departures peaked one hour earlier on Fridays at 3:00 p.m. and were slightly lower at around 35 departures. On Sundays, mean hourly departures peaked at 4:00 p.m., similar to Saturdays, but at around 30 departures which is more similar to Fridays. Mean hourly departures decreased gradually through the late evening.



**Figure 14 Mean hourly visitor arrivals and departures by day of week: Adirondak Loj**

### 3.5. Hiking Encounters on Trails

This sub-section of the report presents descriptive summaries of intergroup encounters based on data collected during encounter patrols along two trail corridors in the High Peaks Wilderness study area.

#### 3.5.1. Encounters Per Hour

Daily and average intergroup encounters per hour are presented in Figure 15 by trail corridor and for each of day of the sampling period. These data suggest:

- On the Algonquin trail, intergroup encounter rates ranged from just over one group per hour to around 17 groups per hour and averaged eight groups per hour during the sampling period.
- On the Van Hoevenberg trail, intergroup encounter rates ranged from approximately four groups per hour to around 19 groups per hour and averaged 10 groups per hour during the sampling period.

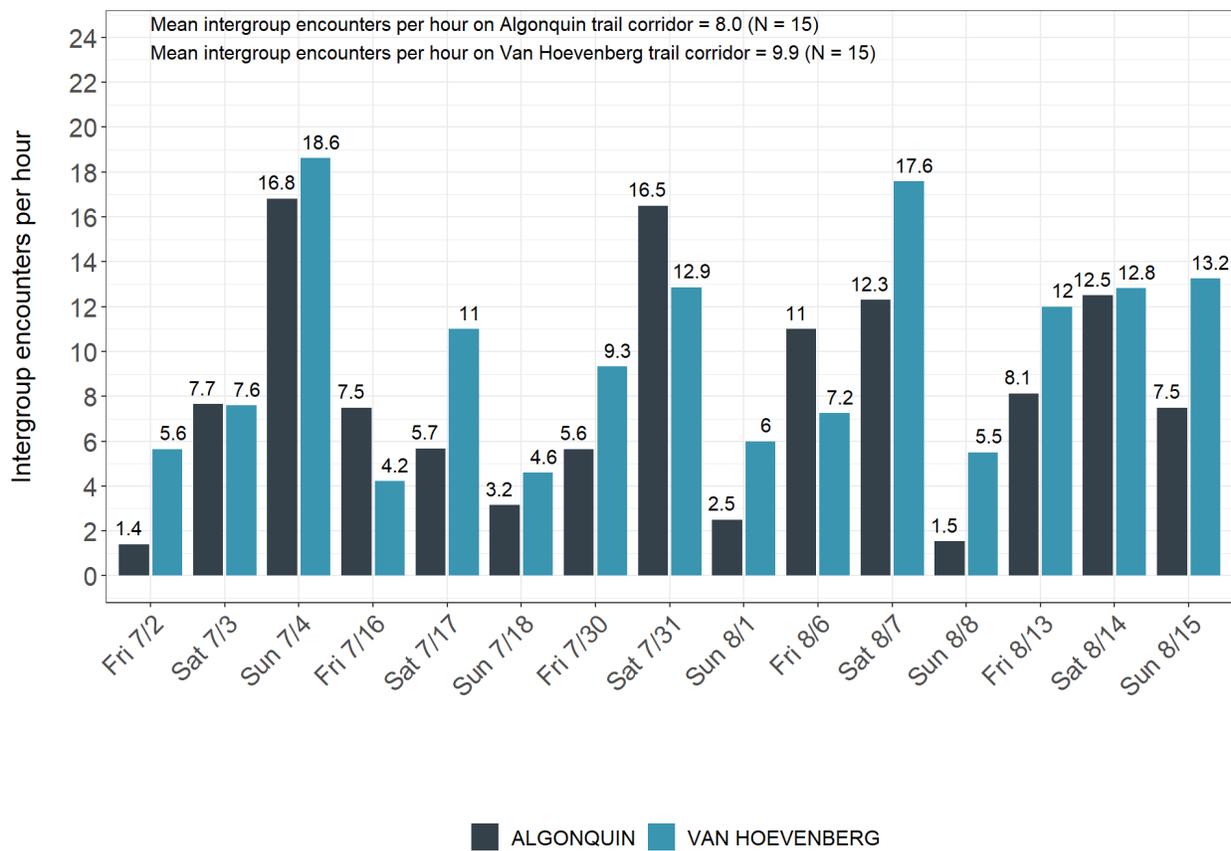


Figure 15 Intergroup encounters per hour, by trail corridor and sampling date

Based on the average intergroup encounter rate per hour presented in Figure 15, Table 5 estimates the number of intergroup encounters per day assuming various lengths of stay (hours) per day in the trail corridor. These results suggest:

- Assuming a length of stay of four hours along the Algonquin trail corridor, visitor groups may encounter approximately 32 other visitor groups that a day. Visitor groups may encounter around 64 other visitor groups if spending as much as eight hours in the Algonquin trail corridor.
- Assuming a length of stay of four hours along the Van Hoevenberg trail corridor, visitor groups may encounter approximately 40 other visitor groups that day. Visitor groups may encounter around 80 other visitor groups if spending as much as eight hours in the Van Hoevenberg trail corridor.

**Table 5 Estimated intergroup encounters per day, by trail corridor**

Estimated Length of Stay	Daily Intergroup Encounters	
	Algonquin Trail	Van Hoevenberg Trail
2 hours	16	20
4 hours	32	40
6 hours	48	59
8 hours	64	79

Intergroup encounters per hour were also estimated separately for the segment of each patrol that occurred between the Adirondak Loj trailhead and the instantaneous count destination, and for the portion of each patrol that occurred between the turnaround location and the instantaneous count destination (Figure 5). These results are presented in Table 6, and suggest:

- On the Algonquin trail segment between the Adirondak Loj trailhead and MacIntyre Falls, the average number of encounters per hour was around seven while the maximum was 15 groups per hour.
- In contrast, on the Algonquin trail segment between MacIntyre Falls and Wright Peak Junction, the average number of encounters per hour was slightly higher at around nine, while the maximum was also higher at 28 groups per hour. This segment of trail is closer to the Algonquin summit and is more likely to include visitor groups traveling inbound as well as outbound from the summit. However, the difference in number of encounters by trail corridor segment was not significant ( $t=-1.562$ ,  $p=0.130$ ).
- On the Van Hoevenberg trail segment between the Adirondak Loj trailhead and Marcy Dam, the average number of encounters per hour was around 11 while the maximum was 22 groups per hour.
- In contrast, on the Van Hoevenberg trail segment between Marcy Dam and the 50-Meter Bridge, the average number of encounters per hour was slightly lower at around eight, while the maximum was also lower at approximately 17 groups per hour. This segment of trail is further from the trailhead, is after the trail network branches into many different trails and is still some distance from the Marcy summit which suggests a lower concentration of visitor groups. However, the difference in number of encounters by trail corridor segment was not significant ( $t=1.066$ ,  $p=0.299$ ).

**Table 6 Mean, standard deviation, and maximum intergroup encounters per hour, by trail corridor segment**

Trail Corridor	Segment	N	Mean	St. Dev.	Max.
Algonquin Trail	Adirondak Loj Trailhead <> MacIntyre Falls	15	6.7	4.1	15.2
Algonquin Trail	MacIntyre Falls <> Wright Peak Junction	15	9.1	7.7	27.7
Van Hoesenberg Trail	Adirondak Loj Trailhead <> Marcy Dam	15	11.3	5.4	21.8
Van Hoesenberg Trail	Marcy Dam <> 50-Meter Bridge	15	8.4	4.5	16.7

### 3.5.2. Characteristics of Intergroup Encounters

Intergroup encounters were characterized as a repeat encounter if the group had been previously encountered on the same trail corridor during the same sampling day. The percent of intergroup encounters that were characterized as repeat encounters is presented in Table 7 by trail corridor. These data suggest:

- On average on the Algonquin trail, 7% of encounters per patrol were repeat encounters with the same visitor group. At most, around 22% of encounters per patrol were repeat encounters with the same visitor group.
- On average on the Van Hoesenberg trail, 5% of encounters per patrol were repeat encounters with the same visitor group. At most, 17% of encounters per patrol were repeat encounters with the same visitor group.

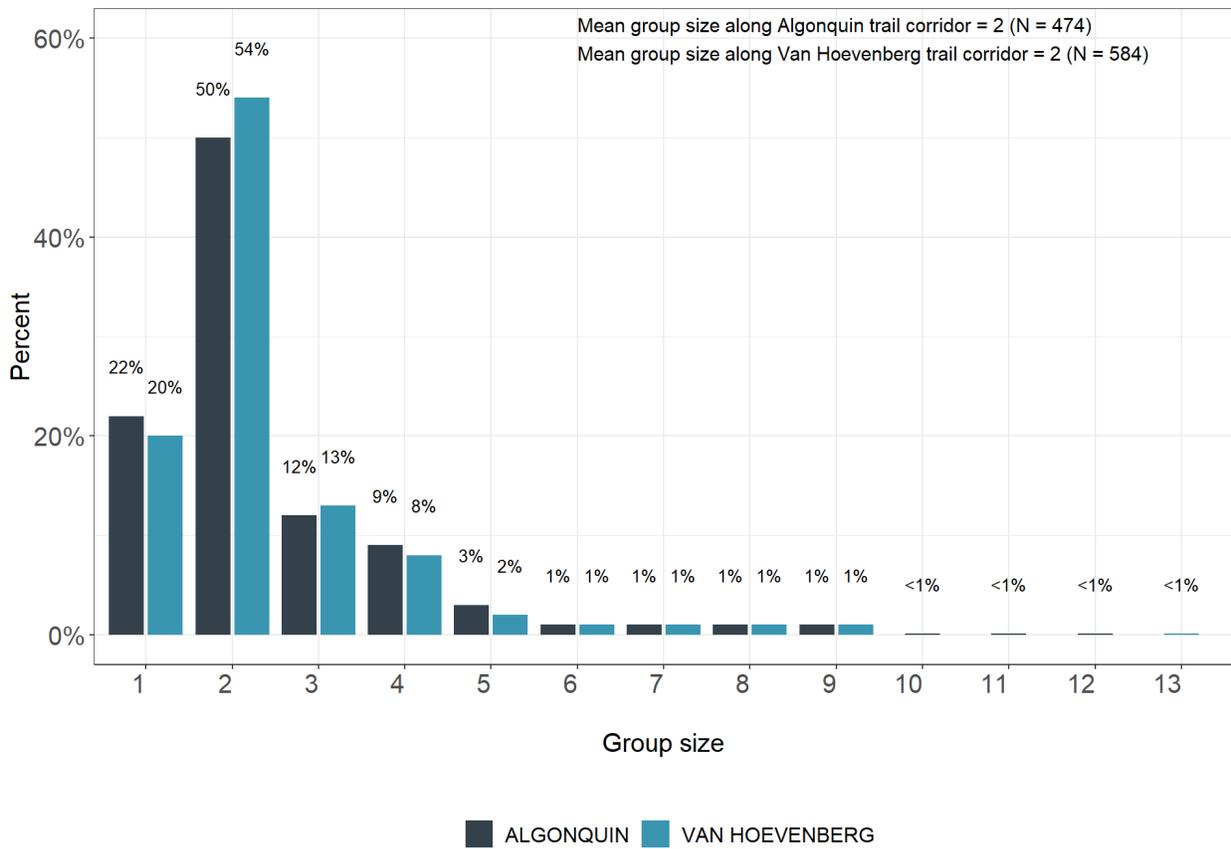
**Table 7 Mean and maximum percent of repeat visitor group encounters per patrol, by trail corridor**

Trail Corridor	N	Mean	Maximum
Algonquin Trail	15	7.0%	21.5%
Van Hoesenberg Trail	15	4.9%	17.0%

The frequency distributions of group size<sup>11</sup> by trail corridor are presented in Figure 16. These results suggest:

- The average group size for both trail corridors was two people per group.
- On the Algonquin trail, just over one-fifth (22%) of groups consisted of only one person, while half (50%) of groups consisted of two people.
- On the Van Hoesenberg trail, one-fifth (20%) of groups consisted of only one person, while just over half (54%) of groups consisted of two people.
- There was no significant difference in group size by trail corridor ( $t=0.763$ ,  $p=0.446$ ).

<sup>11</sup> Group size was recorded based on the field technician's observations.



**Figure 16 Group size frequency distribution of encountered groups, by trail corridor**

The average and maximum time between each intergroup encounter are presented in Table 8 by trail corridor. These data suggest:

- The average time between intergroup encounters along the Algonquin trail was approximately seven minutes, and the maximum time between intergroup encounters was 88 minutes.
- The average time between intergroup encounters along the Van Hoevenberg trail was approximately six minutes, and the maximum time between intergroup encounters was 90 minutes.
- There was no significant difference in the time between intergroup encounters by trail corridor ( $t=1.451, p=0.147$ ).

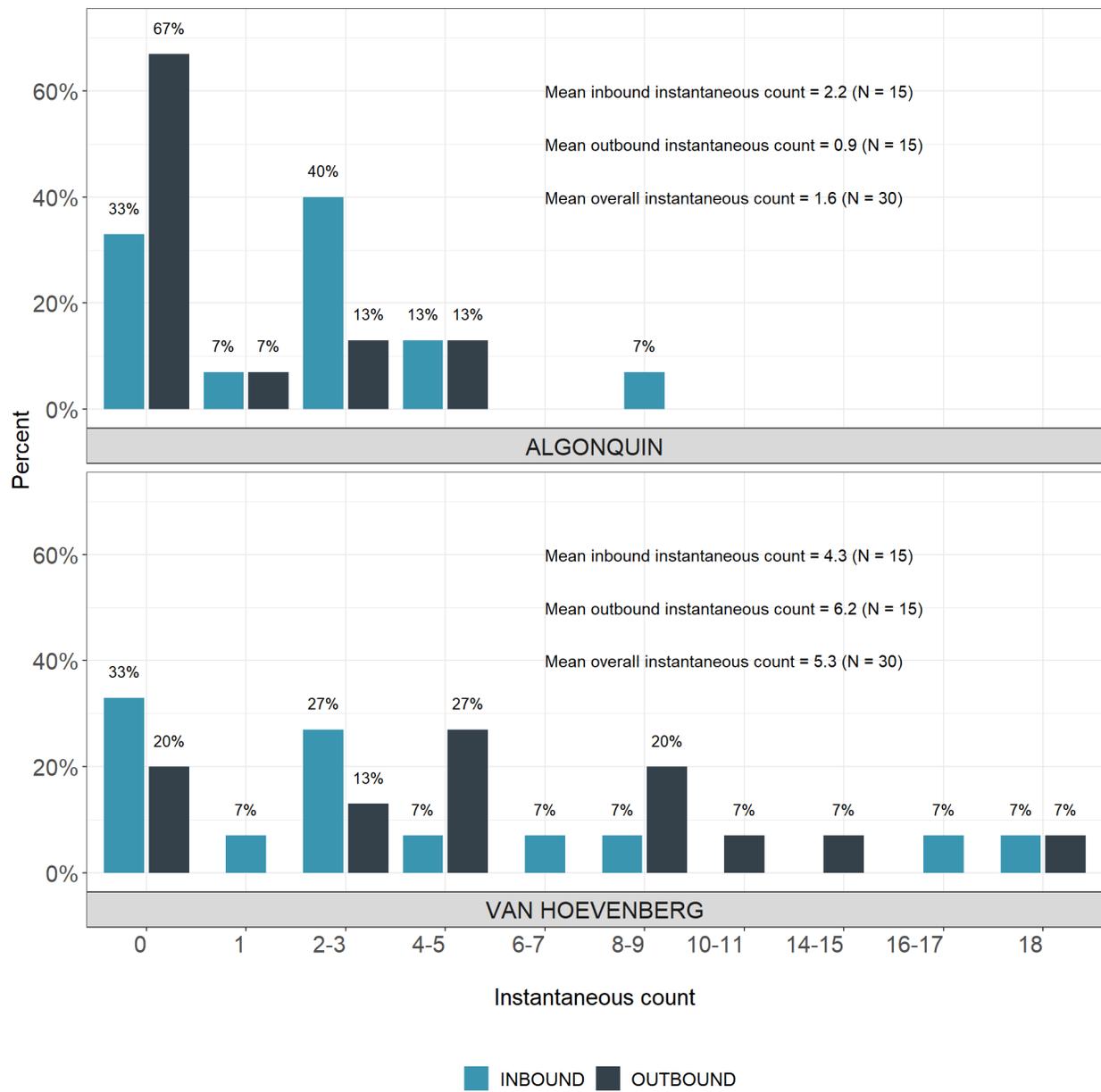
**Table 8 Mean, standard deviation, and maximum time between intergroup encounters, by trail corridor (in minutes)**

Trail Corridor	N	Mean Time	Standard Deviation	Maximum Time
Algonquin Trail	459	6.6	10.5	88
Van Hoevenberg Trail	569	5.7	8.9	90

### 3.5.3. Instantaneous Counts of Visitors At-One-Time

The means and frequency distributions of the destination-based instantaneous count, by the technician's direction of travel and by trail corridor, are presented in Figure 17. These data suggest:

- Overall, there were around two visitors observed on average in the MacIntyre Falls area, and a maximum of nine visitors observed in the MacIntyre Falls area.
- On average, there were slightly more visitors observed in the MacIntyre Falls area when the technician traveled in the inbound direction (approximately two visitors) compared to the outbound direction (approximately one visitor) along the Algonquin trail. This difference was not significant ( $t=1.666$ ,  $p=0.109$ ).
- Overall, there were around five visitors observed on average in the Marcy Dam area, and a maximum of 18 visitors observed in the Marcy Dam area.
- On average, there were fewer visitors observed in the Marcy Dam area when the technician traveled in the inbound direction (approximately four visitors) compared to the outbound direction (approximately six visitor) along the Van Hoevenberg trail. This difference was not significant ( $t=-0.903$ ,  $p=0.374$ ).



**Figure 17** Frequency distribution of destination-based instantaneous counts, by trail corridor and direction

### 3.6. Summit People-at-One-Time (PAOT) Counts

This sub-section of the report presents descriptive summaries of PAOT counts conducted in the Algonquin summit and observation area, as well as the Marcy summit and observation area.

#### 3.6.1. Mean and Maximum PAOT on the Algonquin Summit and in the Observation Area

Daily mean and maximum PAOT on the Algonquin summit and in the observation area are presented in Table 9. These data suggest:

- The daily mean PAOT on the summit ranged from zero to 20 PAOT, and the daily maximum PAOT ranged from 2 to 42 PAOT.
- The daily mean PAOT in the observation area ranged from zero to four PAOT, and the daily maximum PAOT ranged from zero to 15 PAOT. As a point of reference, the maximum PAOT count in the observation area on the majority of days (64%) results in a density of people in that area approximately equivalent to a Pedestrian Level of Service (LOS) Class B. Pedestrian LOS Class B is considered somewhat crowded for an urban environment, such as a downtown walkway or plaza (Transportation Research Board 2016).

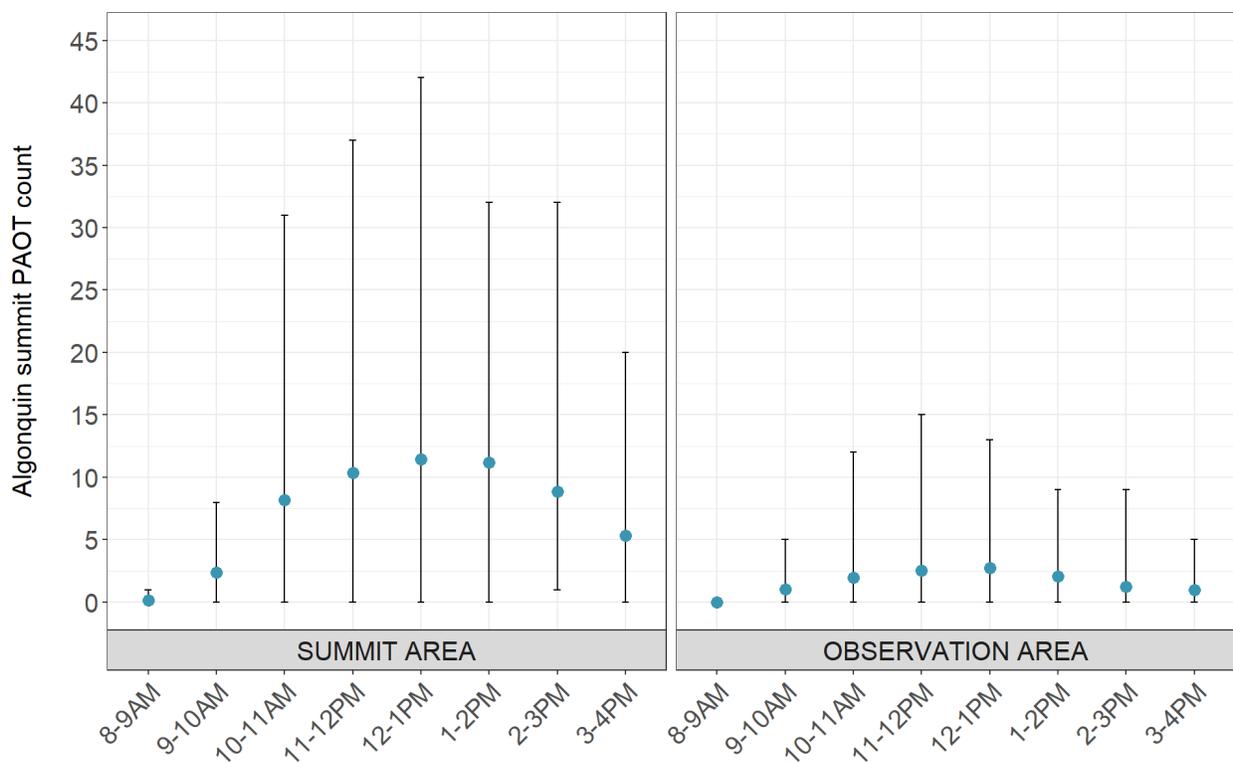
**Table 9 Mean, standard deviation, and maximum number of people-at-one-time: Algonquin summit and observation area<sup>12</sup>**

Date	N	Summit PAOT			Observation Area PAOT		
		Mean	Standard Deviation	Maximum	Mean	Standard Deviation	Maximum
7/02/2021	24	1	2	5	0	1	3
7/03/2021	36	5	4	14	2	2	9
7/04/2021	36	7	7	22	2	4	15
7/16/2021	36	8	5	19	2	2	7
7/17/2021	36	8	5	17	2	2	10
7/18/2021	12	0	1	2	0	0	0
7/30/2021	18	1	2	7	0	1	3
7/31/2021	36	20	7	32	4	3	9
8/06/2021	36	8	4	15	1	1	6
8/07/2021	36	12	8	31	3	3	12
8/08/2021	36	2	1	5	0	1	3
8/13/2021	36	8	5	20	2	2	6
8/14/2021	36	20	11	42	4	4	13
8/15/2021	36	10	4	19	1	1	4

<sup>12</sup> Mean and standard deviation values were rounded to the nearest whole number.

Statistical summaries of the range of PAOT counts on the Algonquin summit and in the observation area, by hour of the day, are presented in Figure 18. The points represent mean hourly PAOT values and the vertical lines represent the full range of PAOT values observed, from the minimum value at the bottom of the vertical line to the maximum value at the top of the vertical line. These data suggest:

- PAOT on the summit ranged widely across the hours of the day, with hourly mean PAOT values ranging from less than one to 11 PAOT, and hourly maximum values ranging from one to 42 PAOT.
- PAOT in the observation area varied across the hours of the day, with hourly mean PAOT values ranging from zero to three PAOT, and hourly maximum values ranging from zero to 15 PAOT.
- On the summit and in the observation area, PAOT increased during 10:00 a.m., peaked during 12:00 p.m. and 1:00 p.m., and remained high through 2:00 p.m. before declining between 2:00 p.m. and 3:00 p.m.



**Figure 18** Hourly average, minimum, and maximum number of people-at-one-time on the Algonquin summit and in the observation area

### 3.6.2. Mean and Maximum PAOT on the Marcy Summit and in the Observation Area

Daily mean and maximum PAOT on the Marcy summit and in the observation area are presented in Table 10. These data suggest:

- The daily mean PAOT on the summit ranged from zero to 32 PAOT, and the daily maximum PAOT ranged from 2 to 56 PAOT.
- The daily mean PAOT in the observation area ranged from zero to 11 PAOT, and the daily maximum PAOT ranged from zero to 31 PAOT. As a point of reference, the maximum PAOT count in the observation area on the majority of days (70%) results in a density of people in that area approximately equivalent to a Pedestrian LOS Class B. Pedestrian LOS Class B is considered somewhat crowded for an urban environment. The overall maximum PAOT count in the observation area results in a density of people equivalent to a Pedestrian LOS Class C, which is considered moderately crowded for an urban environment such as a downtown walkway or plaza (Transportation Research Board 2016).

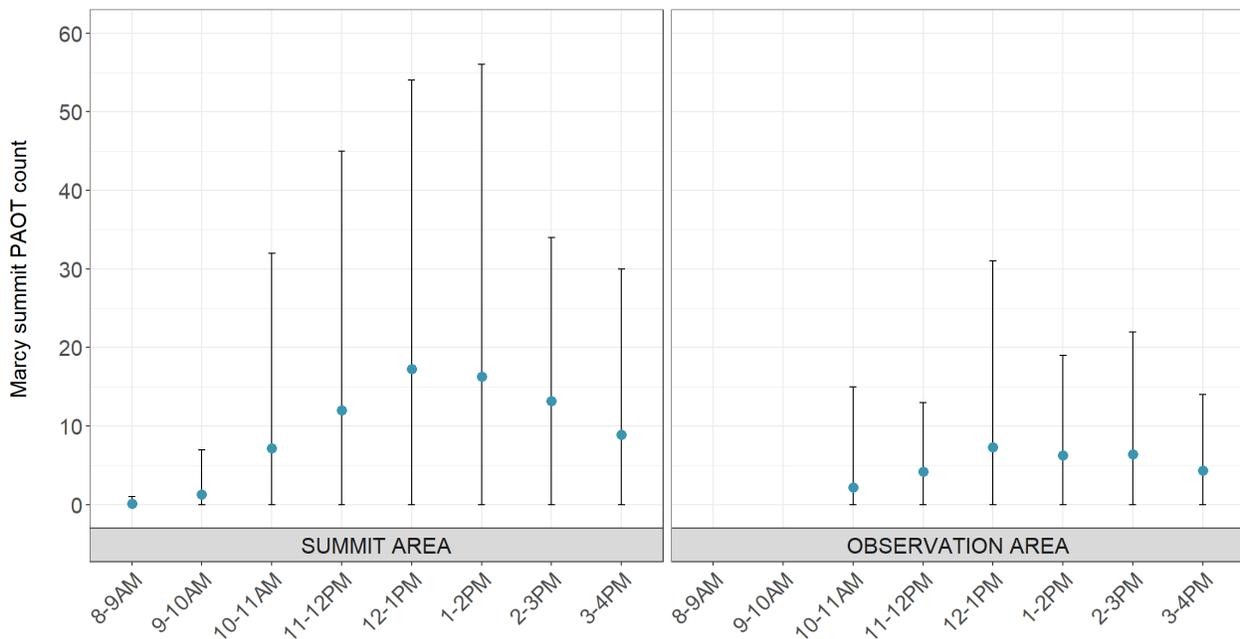
**Table 10 Mean, standard deviation, and maximum number of people-at-one-time: Marcy summit and observation area<sup>13</sup>**

Date	N	Summit PAOT			Observation Area PAOT			
		Mean	Standard Deviation	Maximum	N	Mean	Standard Deviation	Maximum
7/02/2021	12	0	1	3	--	--	--	--
7/03/2021	37	4	3	13	--	--	--	--
7/04/2021	39	13	11	40	--	--	--	--
7/16/2021	35	4	3	13	15	2	2	5
7/17/2021	35	10	5	24	35	3	4	13
7/18/2021	2	0	0	0	2	0	0	0
7/31/2021	35	24	7	38	21	8	4	16
8/01/2021	16	2	3	9	16	0	1	3
8/06/2021	36	15	8	33	36	7	3	15
8/07/2021	35	16	10	38	35	8	6	22
8/08/2021	27	7	3	12	27	4	3	11
8/13/2021	36	13	10	32	36	5	5	19
8/14/2021	36	13	7	26	36	5	4	15
8/15/2021	36	15	6	30	36	7	4	16
9/03/2021	35	2	1	5	35	0	1	3
9/04/2021	36	32	13	56	36	11	8	31
9/05/2021	21	7	5	23	21	2	4	17

<sup>13</sup> Mean and standard deviation values were rounded to the nearest whole number.

Statistical summaries of the range of PAOT counts on the Marcy summit and in the observation area, by hour of the day, are presented in Figure 19. The points represent mean hourly PAOT values and the vertical lines represent the full range of PAOT values observed, from the minimum value at the bottom of the vertical line to the maximum value at the top of the vertical line. These data suggest:

- PAOT on the summit ranged widely during the hours of the day, with hourly mean PAOT values ranging from less than one to 17 PAOT, and hourly maximum values ranging from one to 56 PAOT.
- PAOT in the observation area varied across the hours of the day, with hourly mean PAOT values ranging from two to seven PAOT, while hourly maximum values were more variable and ranged from 14 to 31 PAOT.
- On the summit, PAOT increased starting at 10:00 a.m., peaked between 12:00 p.m. and 1:00 p.m., and remained high through 2:00 p.m. before declining after 3:00 p.m. In the observation area, PAOT was variable throughout the day and highest between 12:00 p.m. and 1:00 p.m.



**Figure 19** Hourly average, minimum, and maximum number of people-at-one-time on the Marcy summit and in the observation area

### 3.7. Statistical Modeling of Study Data

This sub-section of the report presents the results of various exploratory analyses conducted to model relationships among the following visitor-use related measures and indicators of the visitor experience:

- Daily visitor arrivals at the Adirondak Loj trailhead and Adirondak Loj parking lot occupancy at 12:00 p.m.
- Daily visitor arrivals at the Adirondak Loj trailhead and whether the Adirondak Loj parking lot was at capacity that day.
- Daily visitor arrivals at the Adirondak Loj trailhead and intergroup encounters per hour.
- Daily visitor arrivals at the Adirondak Loj trailhead and maximum daily instantaneous counts at specific destinations.
- Daily visitor arrivals at the Adirondak Loj trailhead and maximum hourly PAOT.

The majority of visitors to the High Peaks Wilderness study area access the area at the Adirondak Loj trailhead (Figure 10). Therefore, daily visitor arrivals at the Adirondak Loj trailhead was used as the primary input to examine relationships among visitor use levels and indicators of the visitor experience in the High Peaks Wilderness study area. Model selection considered scatterplots and compared prediction errors,<sup>14</sup> and rejected models with a significant, negative intercept term to avoid negative estimates of non-negative variables.

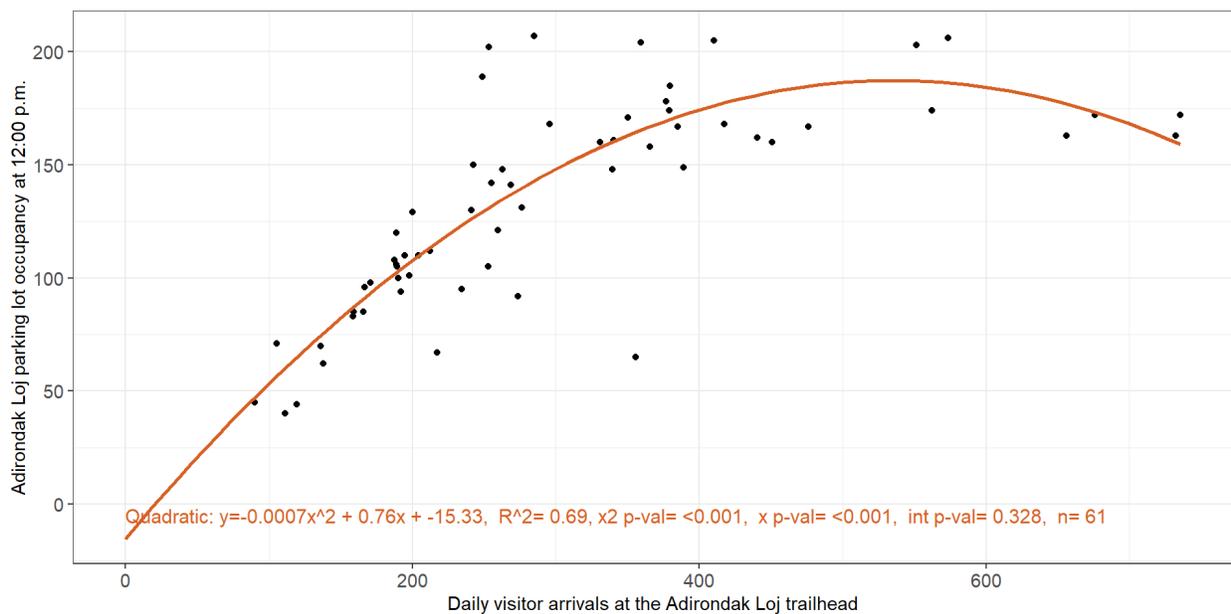
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<sup>14</sup> The measure of prediction error was the mean absolute percentage error, which was calculated as the average of the absolute percentage difference between the actual value of the dependent variable and the predicted value of the dependent variable.

### 3.7.1. Daily Visitor Arrivals at the Adirondak Loj Trailhead and Adirondack Loj Parking Lot Conditions

Regression results in Figure 20 suggest there is a strong statistical relationship between daily visitor arrivals at the Adirondak Loj trailhead and Adirondack Loj parking lot occupancy at 12:00 p.m. The relationship is nonlinear and was best fit with a quadratic functional form.<sup>15</sup> The results of the quadratic regression model suggest:

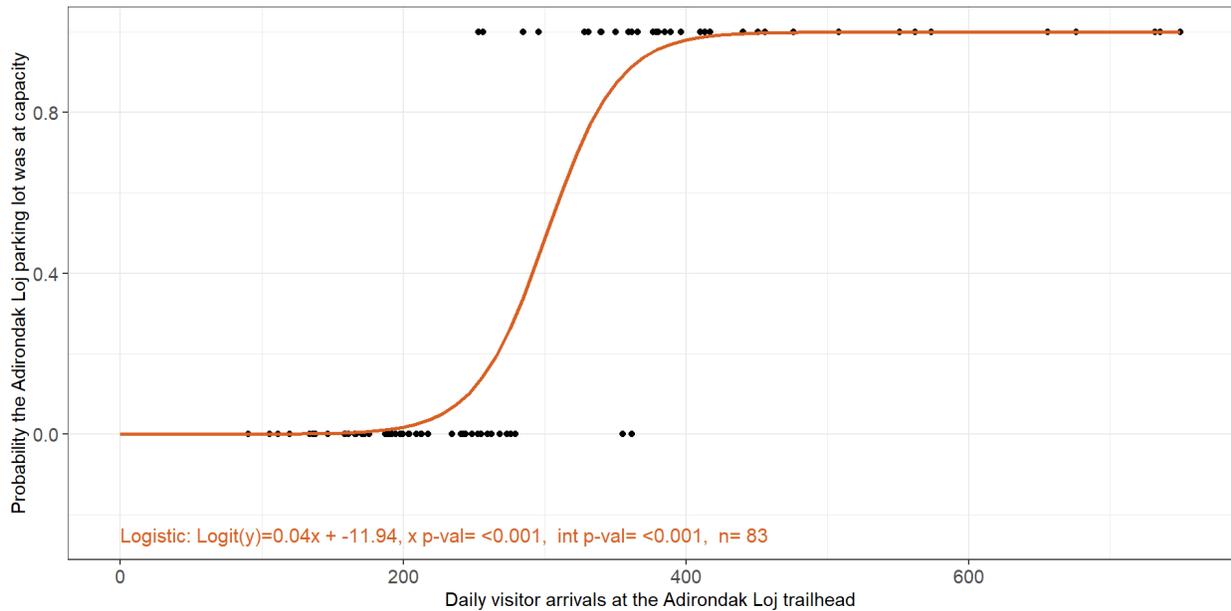
- For days with 100 daily visitor arrivals at the Adirondak Loj trailhead, there are approximately 54 vehicles at 12:00 p.m. in the Adirondack Loj parking lot. Similarly, on days with 400 daily visitor arrivals at the Adirondak Loj trailhead there are roughly 177 vehicles parked at 12:00 p.m. in the Adirondack Loj parking lot.
- The number of vehicles parked at 12:00 p.m. at the Adirondack Loj parking lot increases based on the number of daily visitor arrivals at the Adirondack Loj trailhead up to a certain threshold. Based on the change in the slope of the curve at approximately 400-500 daily visitor arrivals, the relationship between daily visitor arrivals and parking occupancy at 12:00 p.m. begins to degrade at higher levels of visitor use.



**Figure 20** Daily visitor arrivals at the Adirondack Loj trailhead and Adirondack Loj parking lot occupancy at 12:00 p.m.

<sup>15</sup> A quadratic regression was identified through analysis as the best fitting functional form to model the relationship between Adirondack Loj parking lot occupancy at 12:00 p.m. and daily visitor arrivals at the Adirondack Loj trailhead based on the scatterplot and mean absolute percent error values for alternative model specifications.

Regression results in Figure 21 suggest there is a strong statistical relationship between daily visitor arrivals at the Adirondak Loj trailhead, and whether the Adirondak Loj parking lot was at capacity on that day. The relationship was fitted with a logistic regression curve and represents the probability the parking lot will fill based on various levels of daily visitor arrivals. The results of the logistic regression model suggest that on days with approximately 300 or more daily visitor arrivals at the Adirondak Loj trailhead, the Adirondak Loj parking lot is likely to be at capacity, based on a value of 0.50 on the y-axis.

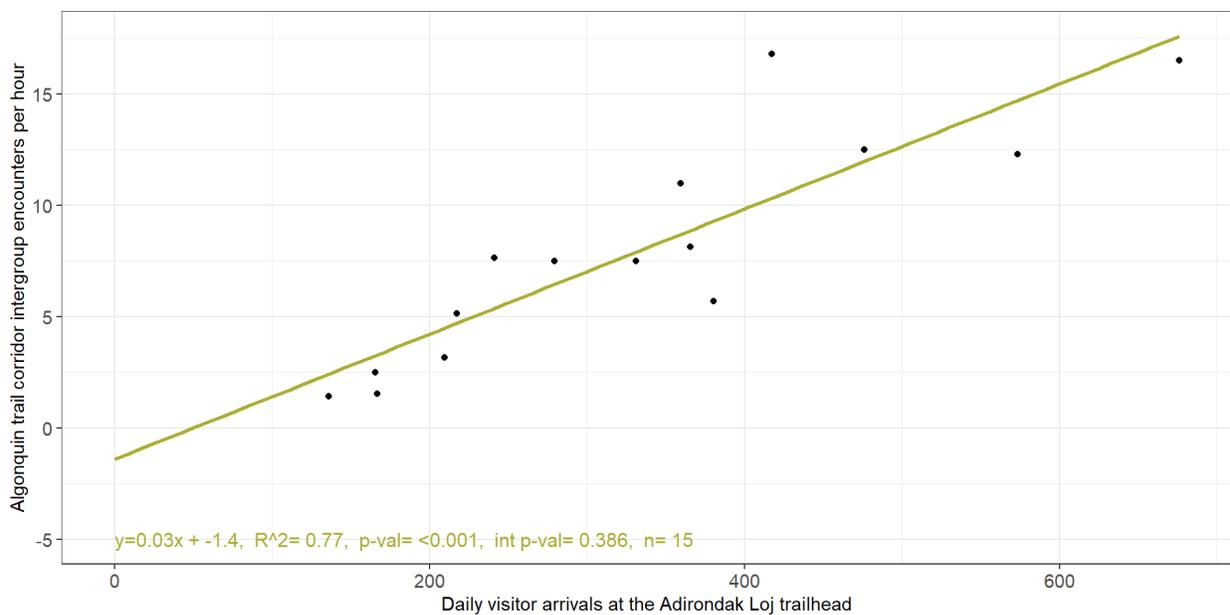


**Figure 21 Daily visitor arrivals at the Adirondak Loj trailhead and whether the Adirondak Loj parking lot filled that day**

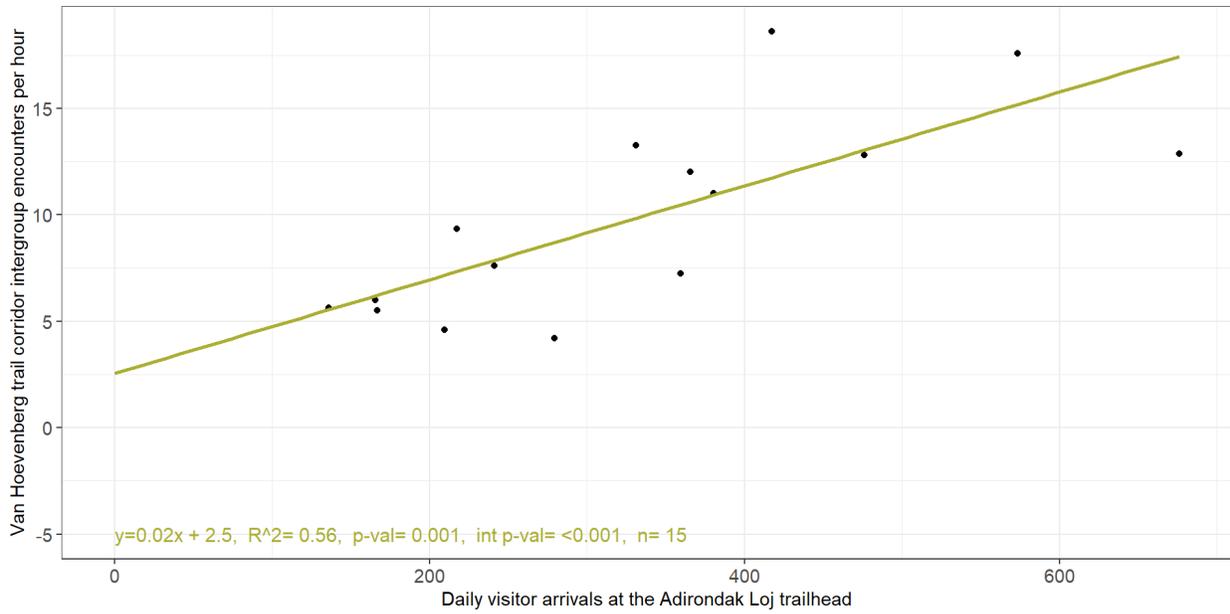
### 3.7.2. Daily Visitor Arrivals at the Adirondak Loj Trailhead and Intergroup Encounters Per Hour

Regression results in Figure 22 and Figure 23 suggest there are strong statistical relationships between daily visitor arrivals at the Adirondak Loj trailhead and intergroup encounters per hour for the Algonquin and Van Hoevenberg trail corridors. These linear model results suggest:

- For the first 100 daily visitor arrivals at the Adirondak Loj trailhead, visitor groups will encounter approximately two other visitor groups per hour on the Algonquin trail. Similarly, for the first 300 daily visitor arrivals at the Adirondak Loj trailhead, visitor groups will encounter approximately eight other visitor groups per hour on the Algonquin trail.
- For the first 100 daily visitor arrivals at the Adirondak Loj trailhead, visitor groups will encounter approximately five other visitor groups per hour on the Van Hoevenberg trail. Similarly, for the first 300 daily visitor arrivals at the Adirondak Loj trailhead, visitor groups will encounter approximately nine other visitor groups per hour on the Van Hoevenberg trail.



**Figure 22 Daily visitor arrivals at the Adirondak Loj trailhead and intergroup encounters per hour: Algonquin trail corridor**

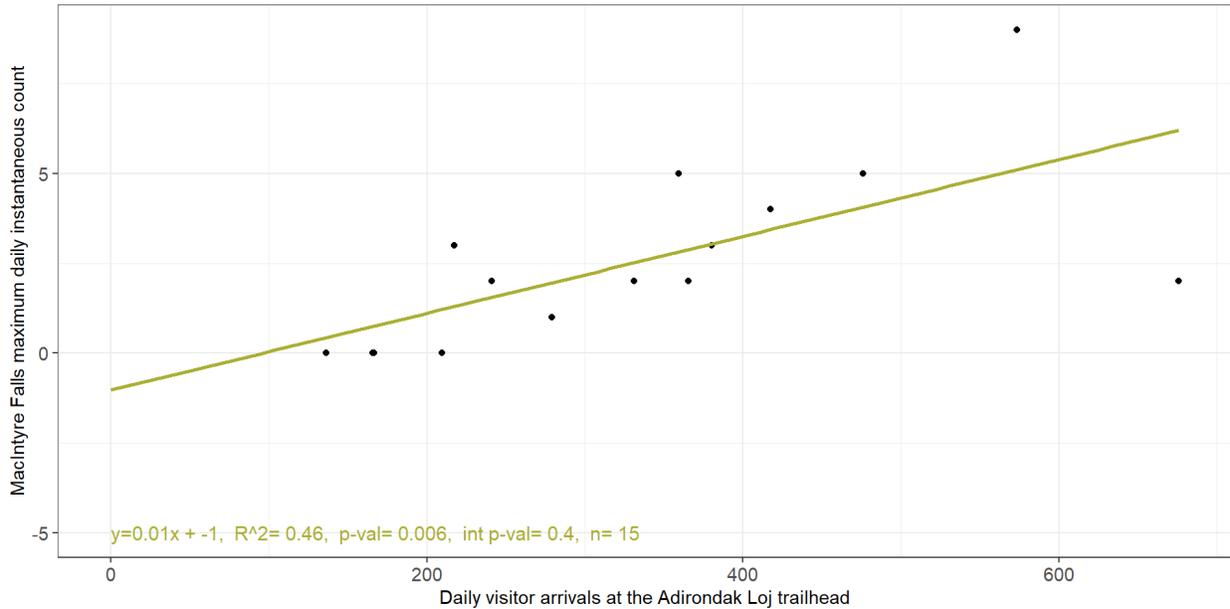


**Figure 23** Daily visitor arrivals at the Adirondak Loj trailhead and intergroup encounters per hour: Van Hoevenberg trail corridor

### 3.7.3. Daily Visitor Arrivals at the Adirondak Loj Trailhead and Maximum Daily Instantaneous Counts of Visitors-at-One-Time at Specific Destinations.

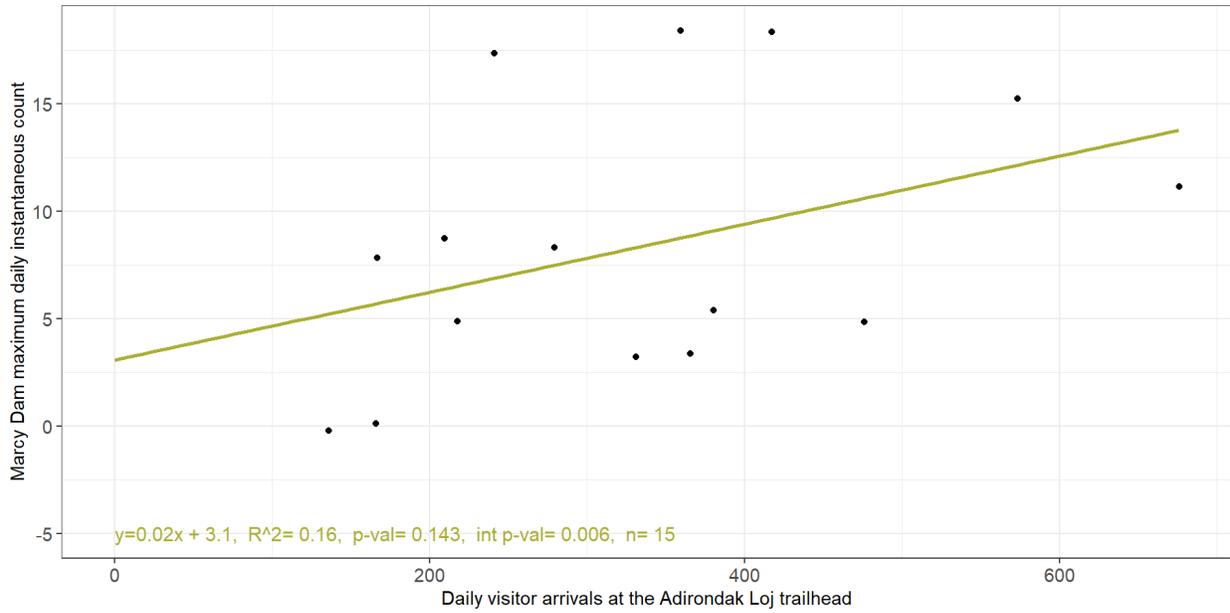
Regression results in Figure 24 suggest there is a significant statistical relationship between daily visitor arrivals at the Adirondak Loj trailhead and maximum daily instantaneous counts of visitors at-one-time at Macintyre Falls along the Algonquin trail corridor. The linear model results suggest:

- For the first 300 daily visitor arrivals at the Adirondak Loj trailhead, the daily maximum visitors at-one-time at MacIntyre Falls is approximately 2 visitors.



**Figure 24 Daily visitor arrivals at the Adirondak Loj trailhead and instantaneous counts of visitors at MacIntyre Falls**

In contrast, regression results in Figure 25 suggest that instantaneous counts of visitors at-one-time at Marcy Dam along the Van Hoevenberg trail corridor are not sensitive to changes in visitor use levels. Visitors at-one-time at Marcy Dam should not be estimated based on visitor use levels at the Adirondak Loj trailhead given the indicator's lack of sensitivity to visitor use levels.

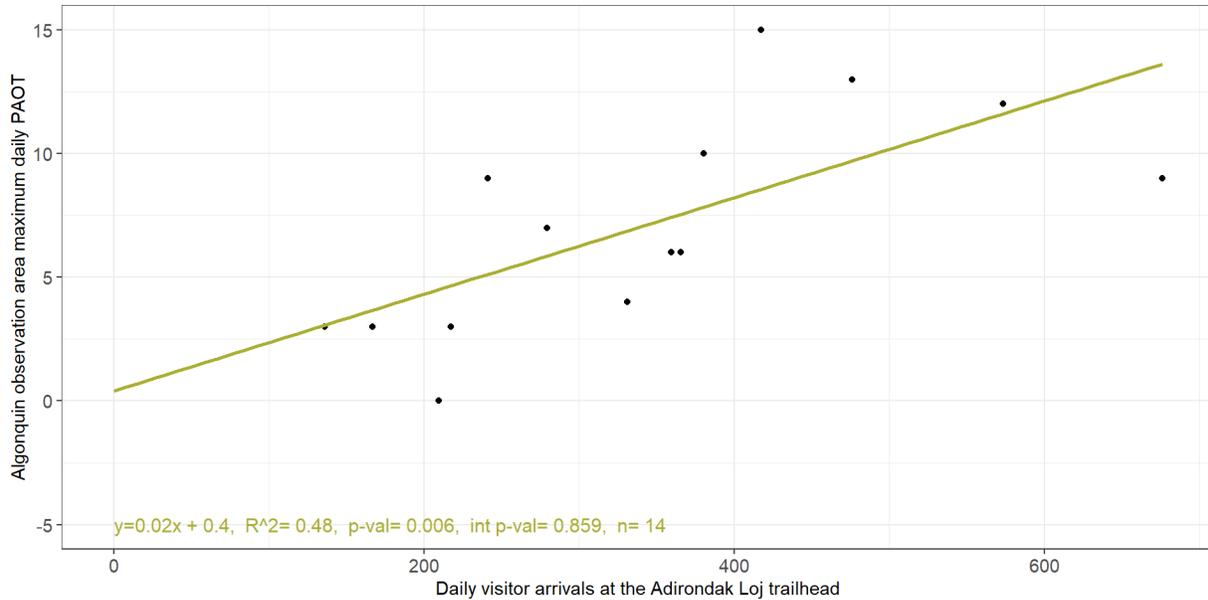


**Figure 25 Daily visitor arrivals at the Adirondak Loj trailhead and instantaneous counts of visitors at Marcy Dam**

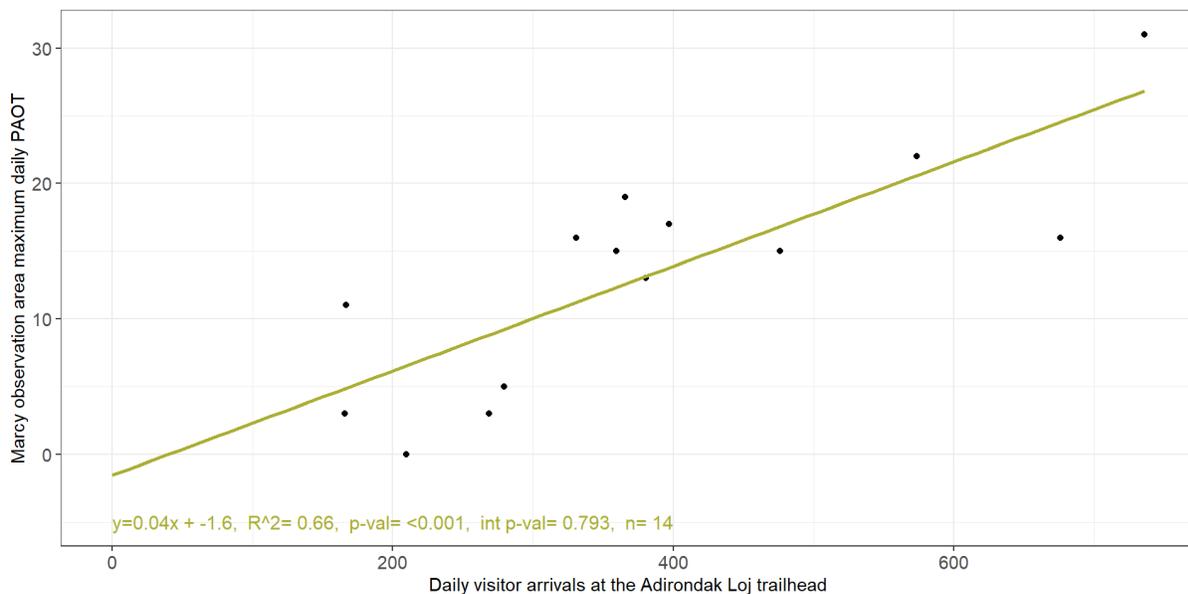
### 3.7.4. Daily Visitor Arrivals at the Adirondak Loj Trailhead and Maximum Daily PAOT

Regression results in Figure 26 and Figure 27 suggest there are strong statistical relationships between daily visitor arrivals at the Adirondak Loj trailhead and maximum daily PAOT in the observation areas on each summit. These linear model results suggest:

- For the first 300 daily visitor arrivals at the Adirondak Loj trailhead, there is a daily maximum of approximately 6 PAOT in the Algonquin observation area.
- For the first 300 daily visitor arrivals at the Adirondak Loj trailhead, there is a daily maximum of approximately 10 PAOT in the Marcy observation area.



**Figure 26** Daily visitor arrivals at the Adirondak Loj trailhead and maximum daily PAOT in the Algonquin observation area.



**Figure 27** Daily visitor arrivals at the Adirondak Loj trailhead and maximum daily PAOT in the Marcy observation area.

## Section 4. Conclusions and Recommendations

This section of the report presents concluding insights based on data-driven estimates of visitor use conditions, and established relationships among visitor use levels and indicators of the visitor experience for the High Peaks Wilderness study area. Bear in mind the study area includes a relatively small portion (approximately 4%) of the larger High Peaks Wilderness Complex. As such, the results of this study are intended to apply only to the study area and the visitors and use types included as part of this study. Therefore, the conclusions and recommendations presented below focus on parking facilities, trailheads, trails, and summits proximate to the Adirondak Loj. The small portion of the larger High Peaks Wilderness Complex included in the study area highlights the opportunity and critical need for future research and landscape-scale planning in this region.

Overall, the results of this study presented in Section 3 of this report support the intergroup encounters and visitor crowding-related indicators recommended in the DEC-APA draft management guidance. These proved to be important indicators of the visitor experience, as they are significantly related to visitor use, responsive to management, and related to management objectives and desired conditions for the High Peaks Wilderness study area (Whittaker and Shelby 1992; Whittaker 1992; Manning 2007). In addition, this study examined parking-related indicators and recommends the DEC-APA consider including this type of indicator in the draft management guidance. As a next step in the VUM and planning framework to develop long-term monitoring and management strategies, this section provides recommendations for refining thresholds related to each indicator.

### **PARKING CONDITIONS**

The results of this study suggest a significant relationship between visitor use levels at the Adirondak Loj trailhead and parking conditions in the Adirondak Loj parking lot and along the Adirondack Loj roadside. Based on the statistical modeling results presented in Section 3, the number of vehicles parked at 12:00 p.m. at the Adirondak Loj parking lot increases based on the number of daily visitor arrivals at the Adirondak Loj trailhead on days with around 400-500 or less daily visitor arrivals. The relationship begins to degrade on days with greater than 400-500 visitor arrivals, possibly due to visitors parking outside the lot or a shift in visitor arrivals to earlier in the morning that results in higher total daily visitor arrivals but fewer vehicles parked in the lot at 12:00 p.m. Related, statistical modeling results suggest that the Adirondak Loj parking lot is likely to fill on days with approximately 300 or more daily visitor arrivals at the Adirondak Loj trailhead. Finally, results suggest parking along the Adirondack Loj roadside is correlated with the Adirondak Loj parking lot filling to capacity, but other factors contribute to roadside parking on days the Adirondak Loj parking lot did not fill.

- This study recommends that DEC-APA draft management guidance consider including visitor experience-related indicators associated with parking conditions in the High Peaks Wilderness study area. Instances of roadside parking, parking in undesignated areas, and parking accumulation more generally are frequently selected as indicators of the visitor experience based on an important, significant relationship to visitor use levels (Manning et al. 2014).
- This study recommends developing thresholds for visitor experience-related indicators associated with parking conditions in the High Peaks Wilderness study area. Such thresholds are often based on the physical limits of the parking area but can be informed by management judgement and based on desired conditions. Adopting parking facilities as the basis for managing visitor access in the High Peaks Wilderness region is consistent with the 1999 HPWC-UPM.

## TRAIL CONDITIONS

### Intergroup Encounters

The results of this study suggest important and significant relationships between visitor use levels at the Adirondak Loj trailhead and the number of intergroup encounters per hour on the Algonquin trail corridor and the Van Hoevenberg trail corridor. Baseline conditions suggest that on average, intergroup encounters *per hour* on both trail corridors (eight on the Algonquin trail and 10 on the Van Hoevenberg trail) are similar to the DEC-APA threshold of *90% of visitors reporting less than 10 other groups encountered per day*. Maximum observed intergroup encounters *per hour* on both trail corridors (17 on the Algonquin trail and 19 on the Van Hoevenberg trail) were almost double the DEC-APA threshold *per day*. Based on the statistical modeling results presented in Section 3, every additional 100 daily visitor arrivals at the Adirondak Loj trailhead resulted in three additional encounters per hour on the Algonquin trail, and two additional encounters per hour on the Van Hoevenberg trail. Both trails are located in Wilderness, where visitors should have the opportunity to experience solitude.

- The number and rate of intergroup encounters is an extremely salient indicator of the visitor experience for designated Wilderness areas (Manning 2011). A low intergroup encounter rate indicates opportunities for solitude, a key characteristic of state and federally designated Wilderness areas, whereas a higher intergroup encounter rate suggest that opportunities for solitude may not be available under certain conditions (Manning 2011).
- Visitor use levels vary along different trail corridor segments in the High Peaks Wilderness study area based on their proximity to access points and the types of recreational experiences they provide. As the DEC-APA continue to develop and refine thresholds related to intergroup encounters, they could consider developing thresholds specific to different recreation zones or trail segments, such as a separate threshold for the Algonquin trail and the Van Hoevenberg trail examined as part of this study. While defining thresholds is ultimately a management judgement, thresholds can be informed and supported by a visitor experience survey and existing literature. The DEC-APA draft management guidance provides examples of visitor survey questions that begin to quantify the acceptable types and extent of encounters that could inform a series of thresholds for the High Peaks Wilderness study area. This study recommends the design and administration of a visitor experience survey, and potential focus groups with managers and decision-makers, as part of a next phase of work to refine thresholds for intergroup encounter rates in the High Peaks Wilderness study area.

### Instantaneous Counts of Visitors At-One-Time

Results suggest a significant relationship between visitor use levels at the Adirondak Loj trailhead and the instantaneous count of visitors at-one-time at MacIntyre Falls. In contrast, the instantaneous count of visitors at-one-time at Marcy Dam was not sensitive to visitor use levels at the Adirondak Loj trailhead. Based on the statistical modeling results presented in Section 3, every additional 100 daily visitor arrivals at the Adirondak Loj trailhead resulted in one additional visitor at MacIntyre Falls. At most, nine visitors were observed at-one-time at MacIntyre Falls. MacIntyre Falls is located in Wilderness, where visitors should have the opportunity to experience solitude.

- The number of people-at-one-time (PAOT) is an important and common crowding-related indicator of the visitor experience, especially for Wilderness settings (Manning 2011). These findings suggest that PAOT at MacIntyre Falls could be adopted as an indicator. However, PAOT at MacIntyre Falls is likely a lower priority for monitoring and managing visitor use because of the limited sensitivity of the indicator to overall levels of visitor use and limited responsiveness to management actions, when compared to other measures included in this study.

- The design and administration of a visitor experience survey that presents a series of photo simulations of PAOT levels at MacIntyre Falls would be an important component of a next phase of data collection to inform a threshold and provide a numeric basis to evaluate conditions of crowding.

### **SUMMIT CONDITIONS**

Results suggest significant relationships between visitor use levels at the Adirondak Loj trailhead and PAOT in the observation areas on the summit of Algonquin and the summit of Marcy. Based on the statistical modeling results presented in Section 3, every additional 100 daily visitor arrivals at the Adirondak Loj trailhead resulted in two additional PAOT on the summit of Algonquin, and four additional PAOT on the summit of Marcy. Both summits are remote destinations located in Wilderness, where visitors should have the opportunity to experience solitude.

- PAOT at recreation destinations, such as scenic high-elevation summits, is a primary crowding-related indicator of the visitor experience (Manning 2011). PAOT is especially appropriate as a crowding-related indicator in Wilderness settings, where opportunities for solitude are essential and visitors' tolerance for crowding may be low (Manning 2011).
- As a point of reference, the maximum PAOT in each summit's observation area resulted in a density of people equivalent to Pedestrian LOS Classes B and C, which characterized conditions on the summits as somewhat to moderately crowded conditions for an urban environment, such as a downtown walkway or plaza (Transportation Research Board 2016). While the Pedestrian LOS framework was developed to describe operational conditions of transportation systems, this framework has been used to examine and establish thresholds for indicators of visitor crowding for parks and protected areas with developed transportation footprints (Pettengill et al. 2009). Given the Pedestrian LOS framework's focus on urban transportation systems, it may not be the best framework to evaluate crowding conditions on Wilderness summits.
- A more appropriate basis for developing and refining thresholds with respect to crowding on Wilderness summits would be a visitor experience survey that presents a series of photo simulations of PAOT levels to provide a numeric basis to evaluating conditions of crowding.

This descriptive phase of work provides a data-driven foundation for understanding current use conditions in parking areas, along trail corridors, and on high-elevation summits in the High Peaks Wilderness study area. This descriptive phase also provides support for the indicators of the visitor experience recommended by the DEC-APA draft management guidance based on significant relationships among visitor use levels and indicators. The next phase of work for the High Peaks Wilderness study area could be evaluative in nature and focused on developing and refining numeric thresholds for the selected indicators that reflect desired conditions, and developing long-term management strategies as part of a VUM and planning framework.

## Section 5. Literature Cited

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# Appendix A: Roadside Parking Log Form

## ADKHP Roadside Parking (VAOT) Log Form

Date: \_\_\_/\_\_\_/\_\_\_ (mm/dd/yy)

Initials: \_\_\_\_\_

Start Time: \_\_\_\_:\_\_\_\_ (use 24-hr clock *hh:mm*)

Weather: Sunny / Overcast / Rainy / Stormy (*circle one*)

End Time: \_\_\_\_:\_\_\_\_ (use 24-hr clock *hh:mm*)

Special Event: No / Yes: \_\_\_\_\_

Row ID	Count Interval	Coordinates of Last Parked Vehicle		Comments
		East side of road (Outbound to Route 73)		
		Latitude (N)	Longitude (W)	
1	:00			
2	:00			
3	:00			
4	:00			
5	:00			
6	:00			
7	:00			
8	:00			
9	:00			
10	:00			

Enter the hour value for when the data were recorded using the 24-hr clock (e.g., record "14:00" for the interval starting at 2:00 PM).

Do not leave any cells blank.

Draw a line through any extra rows at the start or end of the day if the count periods were not used.

Write "NONE" in the respective latitude and longitude coordinate fields if there are no vehicles parked along the east side of the Adirondack Loj Road at the time the count is recorded.

If the data are not collected right on the hour, please update the time interval to indicate exactly when the data were collected.

# Appendix B: Roadside Parking Data Collection Protocols

## ADKHP Roadside Parking (VAOT) Record Instructions

This document describes the procedure for recording the location of the last vehicle parked along both lanes of the Adirondack Loj roadside as part of the Adirondack Park High Peaks Visitor Use Study.

### General Instructions

#### 1. BEFORE HEADING INTO THE FIELD

Make sure you have all the necessary equipment and supplies for data collection:

- a. Field grade GPS unit
- b. Clipboard
- c. Correct log form
- d. Mechanical pencils/pens
- e. Digital wristwatch
- f. Large plastic bag (to store supplies, and useful for recording data in the rain)
- g. A copy of the instructions (this document)
- h. Uniform items
- i. Personal safety items (e.g., sunscreen, food, water, etc.)
- j. Copy of the research permit
- k. Project contact list

#### 2. ARRIVING TO THE DATA COLLECTION LOCATION

- a. Arrive to the area at least 10-minutes prior to the start of data collection. The first round of data collection should be conducted on the hour (i.e., 8:00, 9:00, and so forth, with the last record at the 16:00 hour).
- b. Set up the clipboard with log forms and pencil/pen.
- c. Complete the **header information** on the log form.
- d. Review the instructions (this document).

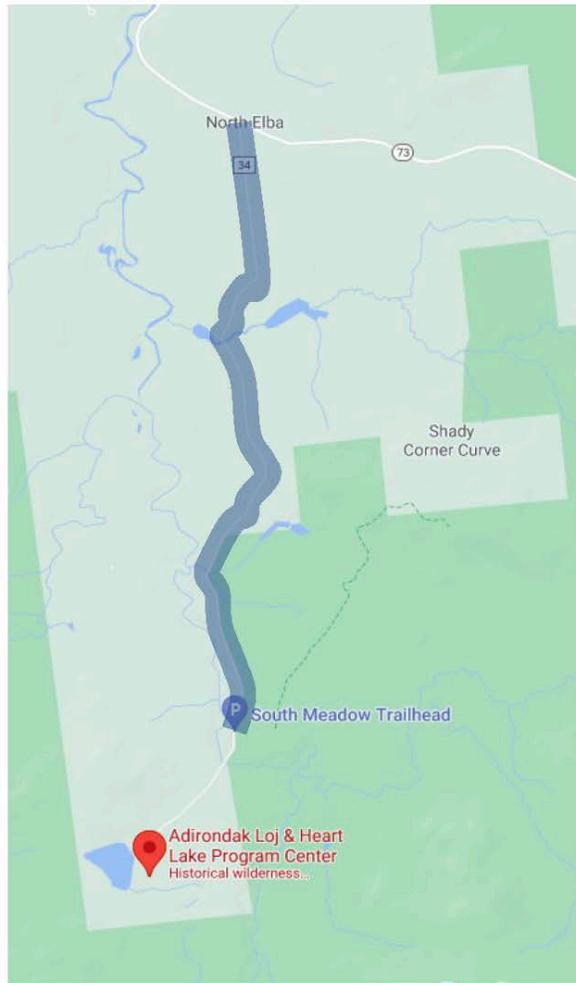
#### 3. GENERAL DATA COLLECTION PROCEDURES

- a. On each hour, start at the junction of the Adirondack Loj Road and the South Meadows Road, and drive along the Adirondack Loj Road until you reach the last parked vehicle (i.e., the vehicle parked furthest North/closest to Route 73; see Figure 1 below for reference) on either side (west or east) of the road.
- b. Record the hour associated with each count in the “Count Interval” column using a 24-hr clock (e.g., for 1PM use “13”).
- c. With the field grade GPS unit in your possession, record the latitude and longitude coordinates of the last parked vehicle in the designated fields on the log form.
  - i. Only parked vehicles are candidates for “last vehicle parked”. Moving vehicles along the road are not to be considered.



- ii. Vehicles that are parked along the “No parking zone” between the Adirondack Loj and the South Meadows Road on Adirondack Loj Road are not “last parked vehicle” candidates (see Figure 1 below as a reference).
- iii. Record latitude (N) and longitude (W) coordinates exactly as displayed on the field grade GPS unit in the fields provided.

**Figure 1: Site schematic for roadside parking data collection along the Adirondack Loj Road. The count corridor is highlighted.**



# Appendix C: Calibration Log Form

## ADKHP Trail Counter Calibration Log Form

Counter Location: ADK Loj / Garden / Upper Works (*circle one*)

Date: \_\_\_/\_\_\_/\_\_\_ (mm/dd/yy)

Initials: \_\_\_\_\_

Start Time: \_\_\_\_\_:\_\_\_\_\_ (use 24-hr clock *hh:mm*)

Weather: Sunny / Overcast / Rainy / Stormy (*circle one*)

End Time: \_\_\_\_\_:\_\_\_\_\_ (use 24-hr clock *hh:mm*)

Special Event: No / Yes: \_\_\_\_\_

Row ID	Start	End	Arrivals	Departures	Comments
1	:00:00	:09:59			
2	:10:00	:19:59			
3	:20:00	:29:59			
4	:30:00	:39:59			
5	:40:00	:49:59			
6	:50:00	:59:59			
7	:00:00	:09:59			
8	:10:00	:19:59			
9	:20:00	:29:59			
10	:30:00	:39:59			
11	:40:00	:49:59			
12	:50:00	:59:59			
13	:00:00	:09:59			
14	:10:00	:19:59			
15	:20:00	:29:59			
16	:30:00	:39:59			
17	:40:00	:49:59			
18	:50:00	:59:59			
19	:00:00	:09:59			
20	:10:00	:19:59			
21	:20:00	:29:59			
22	:30:00	:39:59			
23	:40:00	:49:59			
24	:50:00	:59:59			
25	:00:00	:09:59			
26	:10:00	:19:59			
27	:20:00	:29:59			
28	:30:00	:39:59			
29	:40:00	:49:59			
30	:50:00	:59:59			

**IMPORTANT: See page 2 for detailed instructions and to complete counts for the day.**

Row ID	Start	End	Arrivals	Departures	Comments
31	:00:00	:09:59			
32	:10:00	:19:59			
33	:20:00	:29:59			
34	:30:00	:39:59			
35	:40:00	:49:59			
36	:50:00	:59:59			
37	:00:00	:09:59			
38	:10:00	:19:59			
39	:20:00	:29:59			
40	:30:00	:39:59			
41	:40:00	:49:59			
42	:50:00	:59:59			
43	:00:00	:09:59			
44	:10:00	:19:59			
45	:20:00	:29:59			
46	:30:00	:39:59			
47	:40:00	:49:59			
48	:50:00	:59:59			
49	:00:00	:09:59			
50	:10:00	:19:59			
51	:20:00	:29:59			
52	:30:00	:39:59			
53	:40:00	:49:59			
54	:50:00	:59:59			

Enter the hour value for each calibration count interval using 24-hr clock (e.g., record “14:10:00” for the interval starting at 2:10 PM).

Draw a line through any extra rows at the start or end of the day if the count periods were not used.

Draw a line through the Arrivals/Departures count cell if a count period was missed and write in the Comments cell why the count was missed (e.g., you took shelter from a thunderstorm, bathroom break, etc).

Enter a ZERO (0) in the appropriate Arrivals/Departures count cell if no visitors were observed arriving/departing in the count area during the count period – do not leave any cells blank.

# Appendix D: Calibration Data Collection Protocols

## ADKHP Trail Counter Calibration Instructions

This document describes the procedure for conducting trail counter calibration counts as part of the Adirondack Park High Peaks Visitor Use Study.

### General Instructions

#### 1. BEFORE HEADING INTO THE FIELD

Make sure you have all the necessary equipment and supplies for calibration:

- a. Tally counters (two for counting)
- b. Clipboard
- c. Correct log form
- d. Mechanical pencils/pens
- e. Digital wristwatch
- f. Large plastic bag (to store supplies, and useful for recording counts in the rain)
- g. A copy of the instructions (this document)
- h. Uniform items
- i. Personal safety items (e.g., sunscreen, food, water, etc.)
- j. Copy of the research permit
- k. Project contact list

#### 2. ARRIVING TO THE COUNT LOCATION

- a. Arrive to the count area at least 10-minutes prior to the start of your first count.
- b. Set up the clipboard with log forms and pencils/pens.
- c. Complete the **header information** on the calibration log form.
- d. Review the instructions (this document)

#### 3. PURPOSE OF CALIBRATING COUNTING

Electronic counters generate estimates of trail use. Because of their design, these estimates are never perfectly accurate. However, the efficiency provided by electronic counters and the relative ease with which their data can be corrected makes them valuable management tools. Calibration corrects the counts generated by electronic counters to produce more accurate data on trail use.

#### 4. COLLECTING CALIBRATION COUNTS

- a. Station yourself at an unobtrusive location (so that typical visitor flow is not disrupted), within sight of, but not directly next to, each counter. Do not position yourself in a way that will trigger electronic counter counts. If possible, avoid triggering a count (i.e. passing in front of the counter) upon arrival at the counter location.
- b. Observe trail use passing the counter. Use the tally counters to count every person passing the counter in 10-minute intervals, by direction (one tally counter to count arrivals and a second tally counter to count departures). On the log form, record 10-minute interval arrival and departure counts in their respective columns, and record the



hour associated with the 10-minute interval counts in the “Start” and “End” columns using a 24-hr clock (e.g., for 1PM use 13). For example, if the person is traveling from the ADK Loj counter location toward Marcy Dam on the Van Hovenburg Trail, tally this as an “Arrival” and record the total count in the “Arrivals” column of the calibration log form. If the person is traveling away from Marcy Dam on the Van Hovenburg Trail toward the ADK Loj counter location (i.e., toward the trailhead and parking lot), tally this as a “Departure” and record the total count in the “Departures” column of the calibration log form.

- i. If the same person passes a counter multiple times, they must be counted on each pass. In essence, the staff member is recording the number and direction of passes that each counter ought to count if it were able to count perfectly.
  - ii. If two people pass the counter at the same time side by side, record two people in the calibration count.
  - iii. If a person sits or stands in front of the counter for an extended period of time, then record only one tally in the calibration count and note the person’s behavior in the “comments” cell (i.e., person standing in front of counter). Do not ask the person blocking the beam to move, as you are just an observer; DO not influence the situation.
- c. Start each calibration data collection period on the hour. At the end of the data collection period for that day, draw a line through any rows on the log form for count periods that are not used.
  - d. If no one passes the counter during a given count interval, record a zero (0) in the appropriate arrivals/departures cells on the calibration log form. Do not leave the space blank; record a zero (0).
  - e. Avoid missing any count intervals, if possible, in order to record continuous counts throughout the sampling day. If an interruption in data collection is necessary, do your best to minimize the number of intervals missed. Draw a line through the arrivals/departures count cells on the calibration form if a count period (or portion of) was missed, and write the reason for missing the count period in the “comments” cell (e.g., you took shelter from a thunderstorm, bathroom break, etc.).
  - f. For days when you are conducting calibration counts at two locations, start a fresh log form for the second location (i.e., record data from only one location on each log form).
  - g. At the end of the calibration period, all spaces on the calibration form should be filled with count values, lines, or comments. No cells should be left blank.



# Appendix E: Encounter Patrol Log Form

ADKHP Trail Encounters Log Form

Initials: \_\_\_\_\_ Page \_\_\_\_ of \_\_\_\_

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_ (mm/dd/yy)

Count Corridor: Algonquin/Marcy (circle one)

Record the following on page 1 only; indicate NA otherwise  
 Patrol Start Time: \_\_\_\_\_:\_\_\_\_\_ (use 24-hr clock *hh:mm*)    Weather: Sunny / Overcast / Rainy / Stormy (circle one)  
 Patrol End Time: \_\_\_\_\_:\_\_\_\_\_ (use 24-hr clock *hh:mm*)    Special Event: No / Yes: \_\_\_\_\_

Row ID	Time hh:mm	Group Size	Direction of encountered group's travel I/O	Direction of your travel I/O	Repeat? Y/N
1	:				
2	:				
3	:				
4	:				
5	:				
6	:				
7	:				
8	:				
9	:				
10	:				
11	:				
12	:				
13	:				
14	:				
15	:				
16	:				
17	:				
18	:				
19	:				
20	:				
21	:				
22	:				
23	:				
24	:				
25	:				
26	:				
27	:				
28	:				
29	:				
30	:				
31	:				
32	:				
33	:				
34	:				
35	:				
36	:				
37	:				
38	:				

Do not leave any cells blank.

Draw a line through any extra rows not used to record group encounters.

ADKHP Trail Encounters Log Form

Initials: \_\_\_\_\_ Page \_\_\_\_ of \_\_\_\_

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_ (mm/dd/yy)

Count Corridor: Algonquin/Marcy (circle one)

Record the following on page 1 only; indicate NA otherwise

Patrol Start Time: \_\_\_\_:\_\_\_\_ (use 24-hr clock *hh:mm*) Weather: Sunny / Overcast / Rainy / Stormy (circle one)

Patrol End Time: \_\_\_\_:\_\_\_\_ (use 24-hr clock *hh:mm*) Special Event: No / Yes: \_\_\_\_\_

Row ID	Time hh:mm	Group Size	Direction of encountered group's travel I/O	Direction of your travel I/O	Repeat? Y/N
39	:				
40	:				
41	:				
42	:				
43	:				
44	:				
45	:				
46	:				
47	:				
48	:				
49	:				
50	:				
51	:				
52	:				
53	:				
54	:				
55	:				
56	:				
57	:				
58	:				
59	:				
60	:				
61	:				
62	:				
63	:				
64	:				
65	:				
66	:				
67	:				
68	:				
69	:				
70	:				
71	:				
72	:				
73	:				
74	:				
75	:				
76	:				

Do not leave any cells blank.

Draw a line through any extra rows not used to record group encounters.





# Appendix F: Encounter Patrol and Instantaneous Count Data Collection Protocols

## ADKHP Trail Encounter Patrol Instructions

This document describes the procedure for conducting trail encounter patrols along trail corridors as part of the Adirondack Park High Peaks Visitor Use Study.

### General Instructions

#### 1. BEFORE HEADING INTO THE FIELD

Make sure you have all the necessary equipment for trail encounter patrols:

- a. Clipboard
- b. Correct log forms
- c. Mechanical pencils/pens
- d. Digital wristwatch
- e. Large plastic bag (to store supplies, and useful for recording counts in the rain)
- f. A copy of the instructions (this document)
- g. Uniform items
- h. Personal safety items (e.g., sunscreen, food, water, etc.)
- i. Copy of the research permit
- j. Project contact list

#### 2. ARRIVING TO THE LOCATION

- a. Arrive to the start location at least 10-minutes prior to the start of your patrol.
- b. Set up the clipboard with log forms and pencil/pen.
- c. Complete the **header information** (excluding Patrol Start Time and Patrol End Time) on the log form.
- d. Review the instructions

#### 3. GENERAL PROCEDURES

- a. After you sign the trail registry, record **Patrol Start Time** and begin your hike from the trailhead. Do not record encounters with groups while you wait to sign the registry.
- b. Hike inbound for approximately 2 hours and 15 minutes, and outbound for approximately 1 hour and 45 minutes for each patrol. We will iterate on the exact timing of the patrol during training.
- c. Hike at a normal hiking pace. We are trying to replicate the typical visitor experience. As such, you should take any natural breaks for water, food, or to rest.
- d. Record each group you encounter on the trail in a separate row, including:
  - i. Groups you pass on the trail
  - ii. Groups that pass you on the trail
  - iii. Groups you pass that are resting on the side of the trail
  - iv. Groups that pass you if you are breaking for water, food or to rest
  - v. Groups encountered hiking at a similar pace, even if you do not pass them
- e. For each group encounter, record the following in a new row:
  - i. Time of encounter
  - ii. Group size
    1. Use your judgement to define the group; if you are unsure if a number of individuals encountered are in one or more groups, count as separate



- groups with individual group sizes. If you cannot determine the group size, record DK (don't know)
- iii. Direction of encountered group's travel (I for Inbound/O for Outbound/DK for don't know)
  - iv. Direction of your travel (I for Inbound/O for Outbound)
  - v. If you encounter a group you have seen before (to the best of your recollection), record this encounter in a new row and indicate Y in the "Repeat?" column. If this is the first time you have encountered this group, record this encounter in a new row and indicate a N in the "Repeat?" column. If you are not sure if you have, or haven't encountered the group before, record DK (don't know)
  - vi. Record group encounters the entire time you are on the trail, from when you leave the trailhead until you return to the trailhead.
  - vii. Use the first two sheets with numbered rows for the first 76 encounters. Use the sheets where Row ID is "77" and "78" to record the 77<sup>th</sup> and 78<sup>th</sup> encounter. Fill in the Row ID starting with "79" for additional encounters beyond the 78<sup>th</sup> encounter.
- f. When you reach the specified on-trail destination (Marcy Dam/MacIntyre Falls), flip to the supplemental sheet and record the following:
- i. Time
  - ii. Location
  - iii. Direction of your travel (I for Inbound/O for Outbound)
  - iv. Instantaneous count of the number of people-at-one-time (not groups). The boundaries of the count area will be defined during scoping/training.
  - v. Any comments pertinent to the count
- g. Record an instantaneous count as you travel in both directions.
- h. Record the **Patrol End Time** when the patrol is complete and you have returned to the trailhead.
- i. **Do not leave any spaces blank on the log form.**
- j. **Draw a line** through any extra rows not used to record group encounters.
- k. **Use a separate log form** for the separate count corridors.



# Appendix G: Encounter Patrol Instantaneous Count Log Form

ADKHP Trail Encounters Log Form-Supplemental

Initials: \_\_\_\_\_

Page \_\_\_\_ of \_\_\_\_

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_ (mm/dd/yy)

Count Corridor: Algonquin/Marcy (*circle one*)

Record the following on page 1 only; indicate NA otherwise

Patrol Start Time: \_\_\_\_:\_\_\_\_ (use 24-hr clock *hh:mm*)    Weather: Sunny / Overcast / Rainy / Stormy (*circle one*)

Patrol End Time: \_\_\_\_:\_\_\_\_ (use 24-hr clock *hh:mm*)    Special Event: No / Yes: \_\_\_\_\_

Row ID	Time hh:mm	Location <sup>1</sup>	Direction of your travel I/O	Count
1111	:			
2222	:			
3333	:			
4444	:			

<sup>1</sup> Location: MD Marcy Dam; MF MacIntyre Falls

# Appendix H: People-at-One-Time (PAOT) log form

## ADKHP PAOT Count Log Form

Count Area: Marcy Summit / Algonquin Summit (*circle one*)

Date: \_\_\_/\_\_\_/\_\_\_ (mm/dd/yy)

Initials: \_\_\_\_\_

Start Time: \_\_\_\_:\_\_\_\_ (use 24-hr clock *hh:mm*)

Weather: Sunny / Overcast / Rainy / Stormy (*circle one*)

End Time: \_\_\_\_:\_\_\_\_ (use 24-hr clock *hh:mm*)

Special Event: No / Yes: \_\_\_\_\_

Row ID	Start	Whole Area	Density Area	Comments
1	:00:00			
2	:10:00			
3	:20:00			
4	:30:00			
5	:40:00			
6	:50:00			
7	:00:00			
8	:10:00			
9	:20:00			
10	:30:00			
11	:40:00			
12	:50:00			
13	:00:00			
14	:10:00			
15	:20:00			
16	:30:00			
17	:40:00			
18	:50:00			
19	:00:00			
20	:10:00			
21	:20:00			
22	:30:00			
23	:40:00			
24	:50:00			

Row ID	Start	Whole Area	Density Area	Comments
25	:00:00			
26	:10:00			
27	:20:00			
28	:30:00			
29	:40:00			
30	:50:00			
31	:00:00			
32	:10:00			
33	:20:00			
34	:30:00			
35	:40:00			
36	:50:00			
37	:00:00			
38	:10:00			
39	:20:00			
40	:30:00			
41	:40:00			
42	:50:00			
43	:00:00			
44	:10:00			
45	:20:00			
46	:30:00			
47	:40:00			
48	:50:00			

Enter the hour value for each PAOT count interval using the 24-hr clock (e.g., record "14:10:00" for the interval starting at 2:10 PM).

Draw a line through any extra rows at the start or end of the day if the count periods were not used.

Draw a line through the count cell if a count period was missed and write in the Comments cell why the count was missed (e.g., you took shelter from a thunderstorm, bathroom break, etc).

Enter a ZERO (0) in the appropriate count cell if no visitors were present in the count area during the count period – do not leave any cells blank.

# Appendix I: People-at-One-Time (PAOT) Data Collection Protocols

## ADKHP People-At-One-Time (PAOT) Count Instructions

This document describes the procedure for counting people-at-one-time at the Marcy and Algonquin summits as part of the Adirondack Park High Peaks Visitor Use Study.

### General Instructions

#### 1. BEFORE HEADING INTO THE FIELD

Make sure you have all the necessary equipment and supplies for counting:

- a. Clipboard
- b. Tally counters (one for counting, plus one extra)
- c. Correct count log form
- d. Mechanical pencils/pens
- e. Digital wristwatch
- f. Large plastic bag (to store supplies, and useful for recording counts in the rain)
- g. A copy of the instructions (this document)
- h. Uniform items
- i. Personal safety items (e.g., sunscreen, food, water, etc.)
- j. Copy of the research permit
- k. Project contact list

#### 2. ARRIVING TO THE COUNT LOCATION

- a. Arrive to the count area at least 10-minutes prior to the start of your first count.
- b. Set up the clipboard with log forms and pencils/pens.
- c. Complete the **header information** on the log form.
- d. Orient yourself to the count area.
  - i. Make sure you are standing in the correct spot for counting.
  - ii. Confirm landmarks demarcating the edge of the count area.
- e. Review PAOT count instructions, and make note of the following:
  - i. Time interval, including any breaks.
  - ii. Site-specific counting methods (e.g., direction of count).

#### 3. GENERAL COUNTING PROCEDURES

- a. There is one area within each site that needs to be counted. The boundaries of the area will be defined during scoping/training.
- b. Perform instantaneous counts of people visible in the area at the top of each 10-minute interval.
  - i. On the log form, record the hour associated with each 10-minute interval count in the "Start" column. Please use a 24-hr clock (e.g., for 1PM use 13)
  - ii. PAOT counts are instantaneous. Counts will be recorded at the start of each 10-minute interval and will end when the entire area has been counted. If you are



not in position for the first 10-minute interval of data collection, then start recording PAOT counts at the next 10-minute interval.

- c. Perform the counts by visually “sweeping” through the site and recording the count in the column labeled “Count.”
- d. Visitors who enter the area after you have visually “swept” past should not be included in the count.
- e. Use a tally counter to perform counts, even if only a few visitors are present.
- f. Be careful not to count the same visitor more than once.
- g. If no visitors were present in the count area during the count, enter a zero (0) in the appropriate space. **Do not leave the space blank.**
- h. You will be able to take bathroom/comfort breaks during the short intervals of time between the specified count times. If it is unavoidable to take a break that prevents a count at the specified time, then record the time/nature of the break in the “comments” column.
- i. Record any information necessary for data entry/analysis in the “comments” column. Do not record visitor behavior observations or weather conditions in this column; only record information relevant to the count data and necessary for data entry/analysis as “comments.”



## Appendix J: Proportion of Visitor Arrivals Based on SensMax Trail Counter Data

Table 11 presents the average proportion of visitor arrivals by time period and counter location. These data were derived from SensMax count values. This study recommends further testing of SensMax directional counts for reliability and accuracy.

**Table 11 Average proportion of visitor arrivals by time period and location, based on SensMax data**

Counter Location	Average Proportion of Visitor Arrivals by Time Period				
	12:00 – 6:59 a.m.	7:00 – 10:59 a.m.	11:00 a.m. – 2:59 p.m.	3:00 – 6:59 p.m.	7:00 – 11:59 p.m.
Adirondak Loj	0.878	0.841	0.390	0.112	0.183
MacIntyre	0.867	0.879	0.375	0.086	0.193
Van Hoevenberg Trail after Hopkins Trail Junction	0.768	0.735	0.438	0.278	0.244
Van Hoevenberg Trail after Phelps Trail Junction	0.866	0.866	0.443	0.132	0.208
The Garden	0.716	0.538	0.343	0.218	0.167
South Meadows	0.728	0.739	0.403	0.163	0.167
Upper Works	0.914	0.778	0.457	0.259	0.144

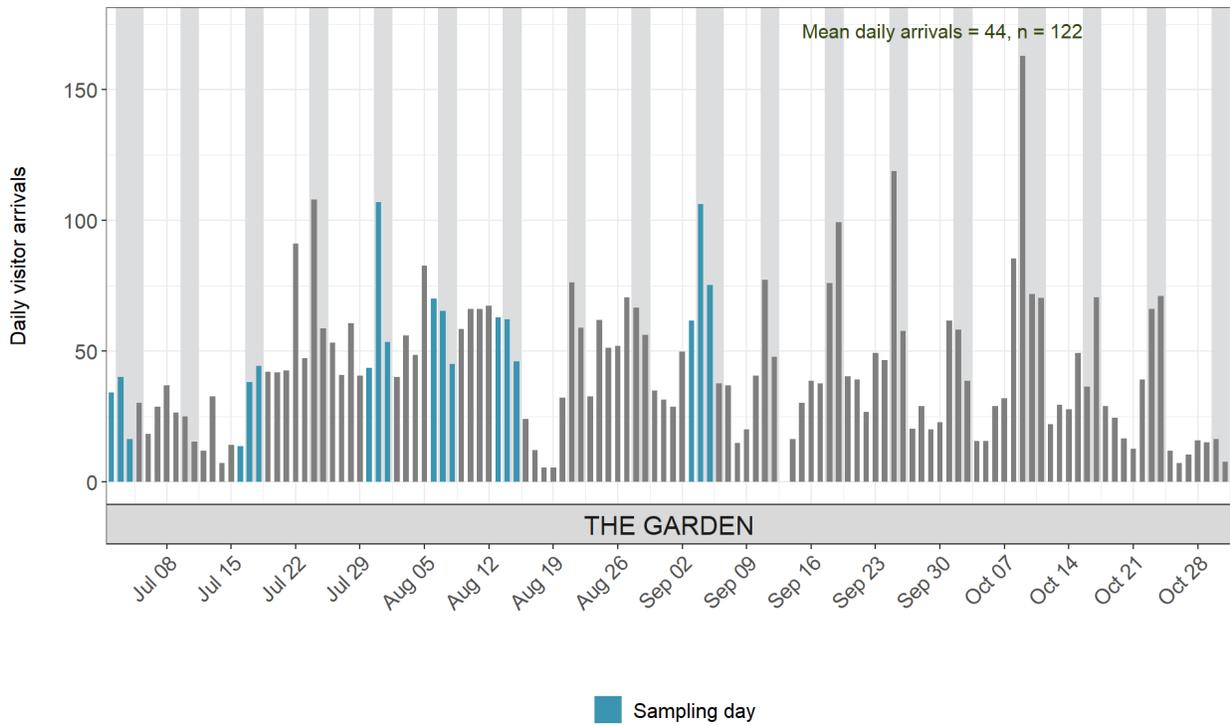
## Appendix K: Additional Visitor Use Volume Results

This appendix summarizes visitor use volumes for additional trail counter locations. Results are organized by location, and present visitor use volume data collected from July 2 through October 31, 2021.<sup>16</sup> For all daily results, gray shading indicates weekend days and holidays. See Section 3.4.2 for methods to address missing and outlier values for daily and hourly results.

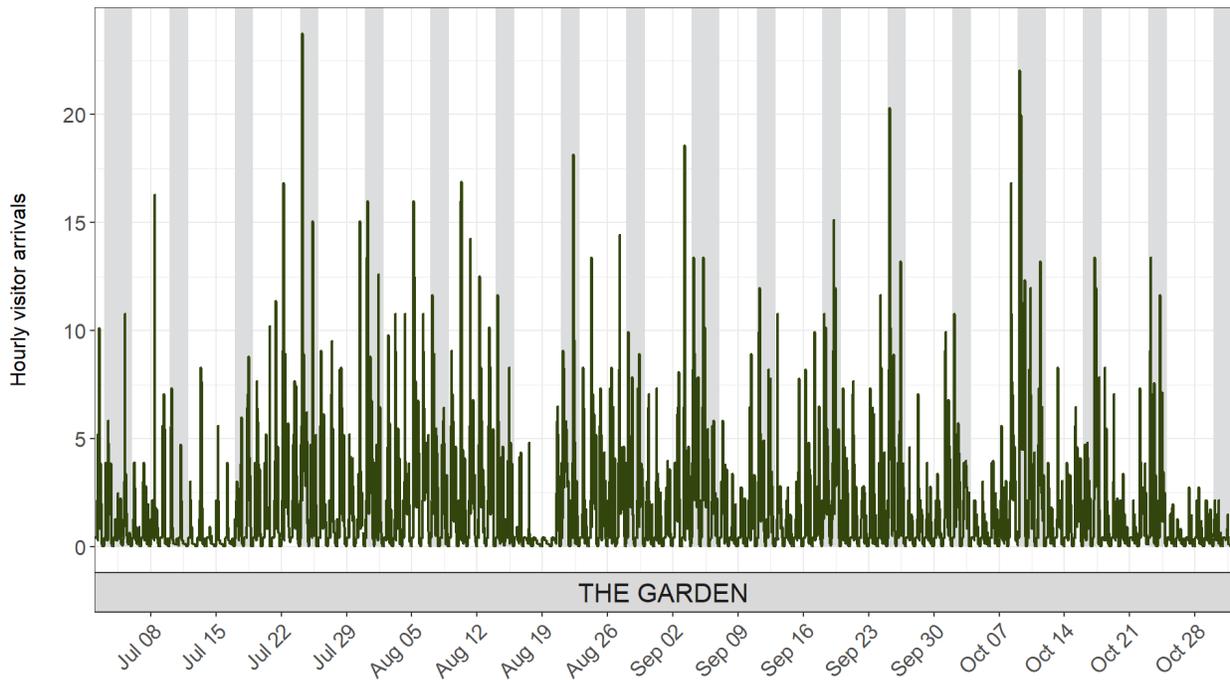
Figure 28 through Figure 35 present daily arrival volumes during the counting period, hourly arrival volumes during the counting period, hourly arrival volumes during the sampling period, and average hourly arrival and departure volumes during the sampling period based on calibrated trail counter data for the Garden and Upper Works locations.

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<sup>16</sup> Trail counters deployed at high elevations (Van Hoevenberg Trail after Hopkins Trail Junction and Van Hoevenberg Trail after Phelps Trail Junction) were removed during mid-October to protect the equipment from winter weather conditions.



**Figure 28 Daily visitor arrivals by date: The Garden (gray shading indicates weekends/holidays)**



**Figure 29 Hourly visitor arrivals by date: The Garden (gray shading indicates weekends/holidays)**

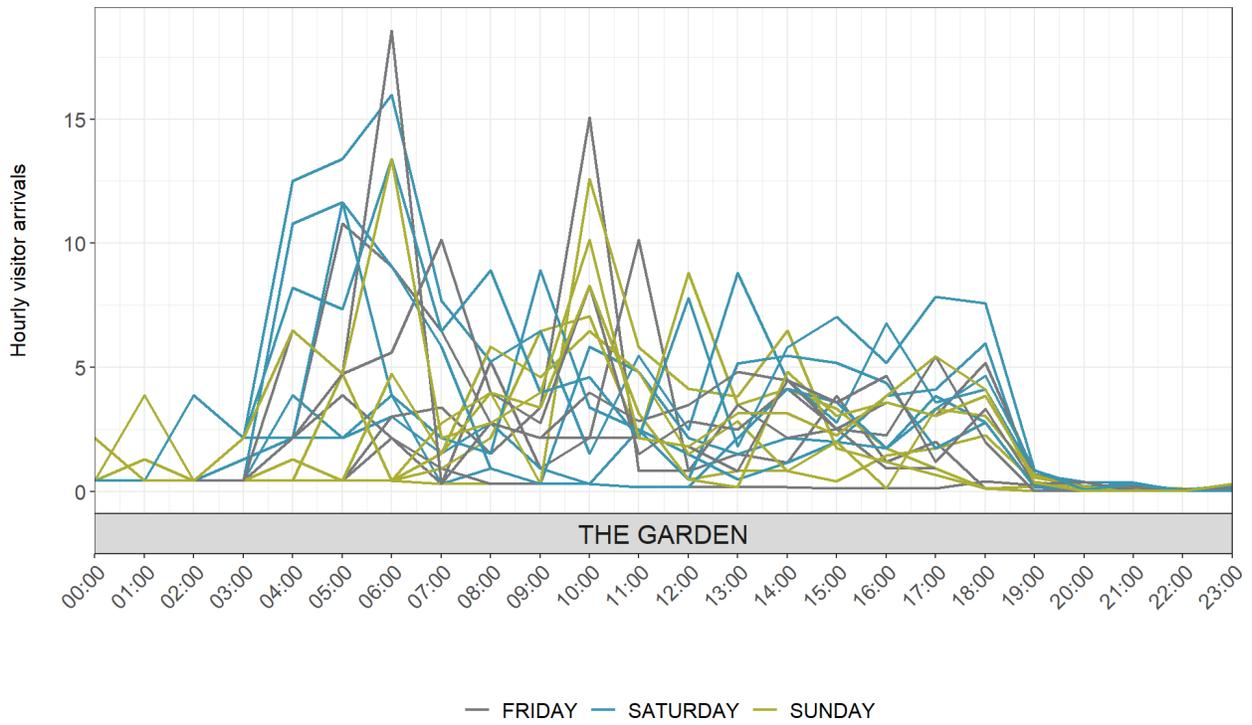


Figure 30 Hourly visitor arrivals by date and day of week: The Garden

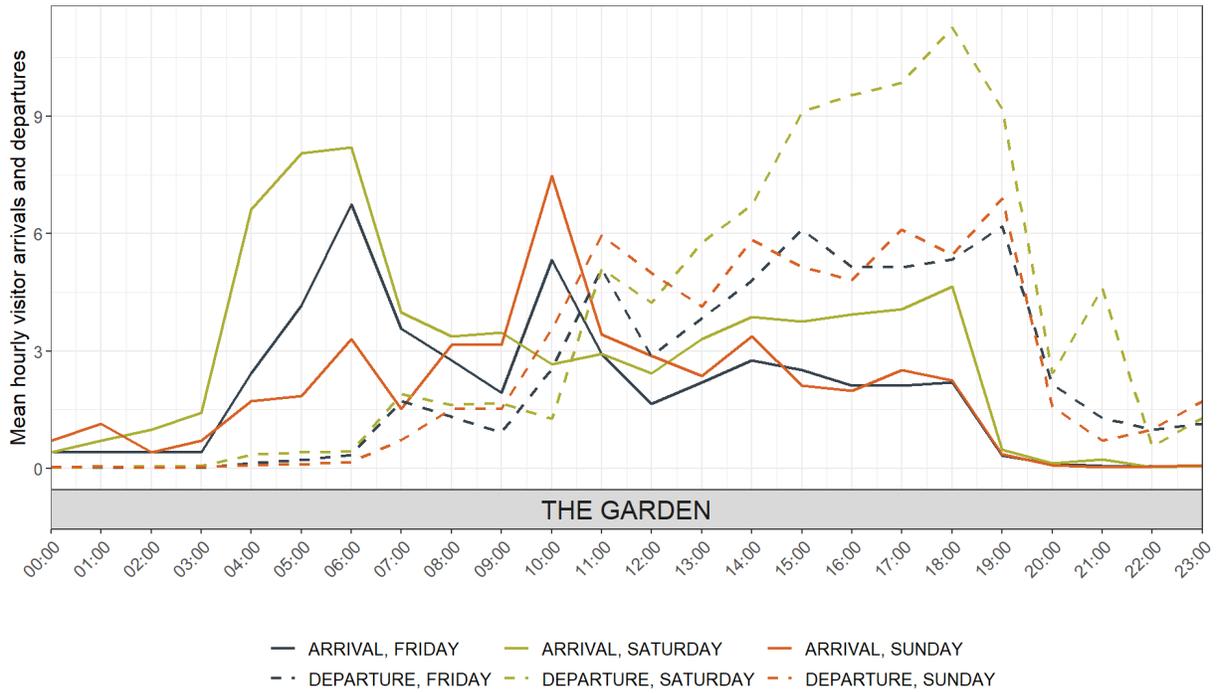
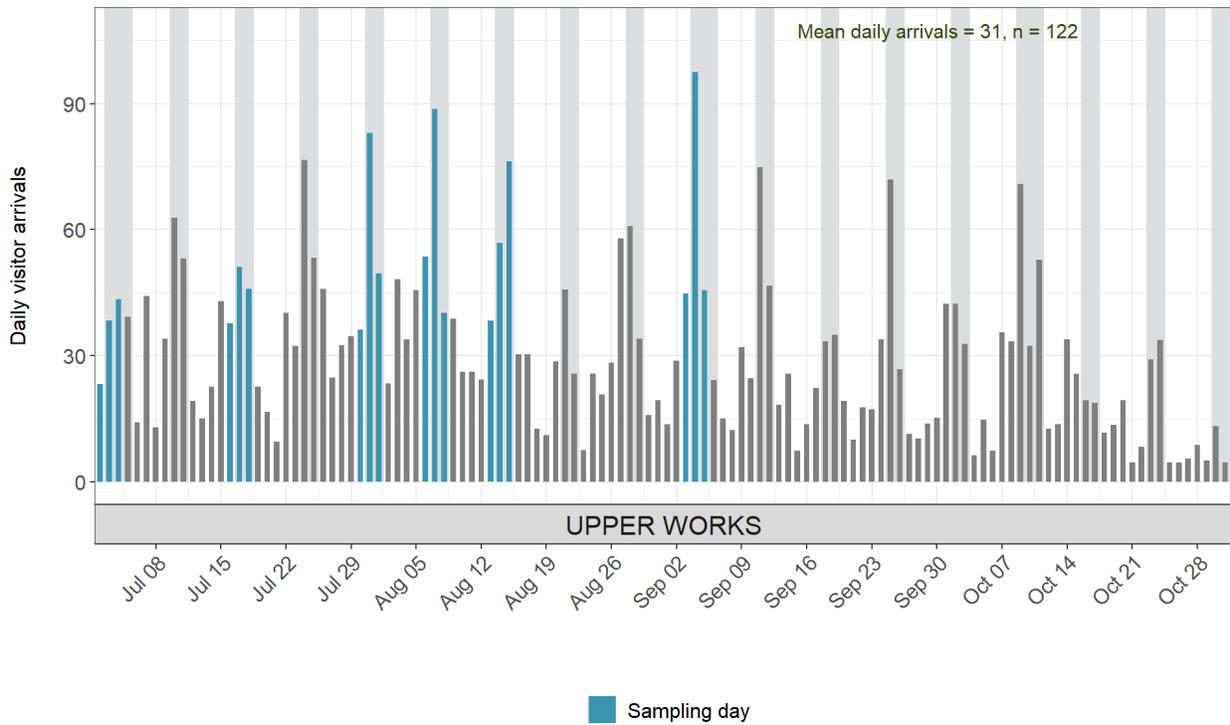
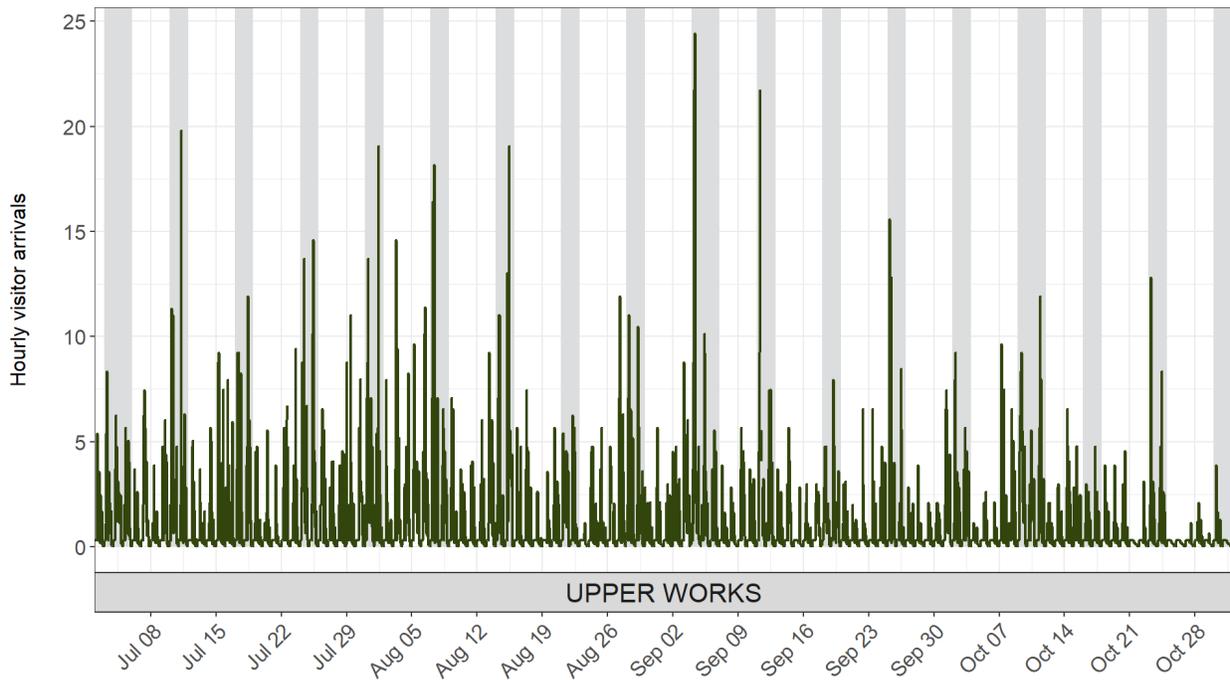


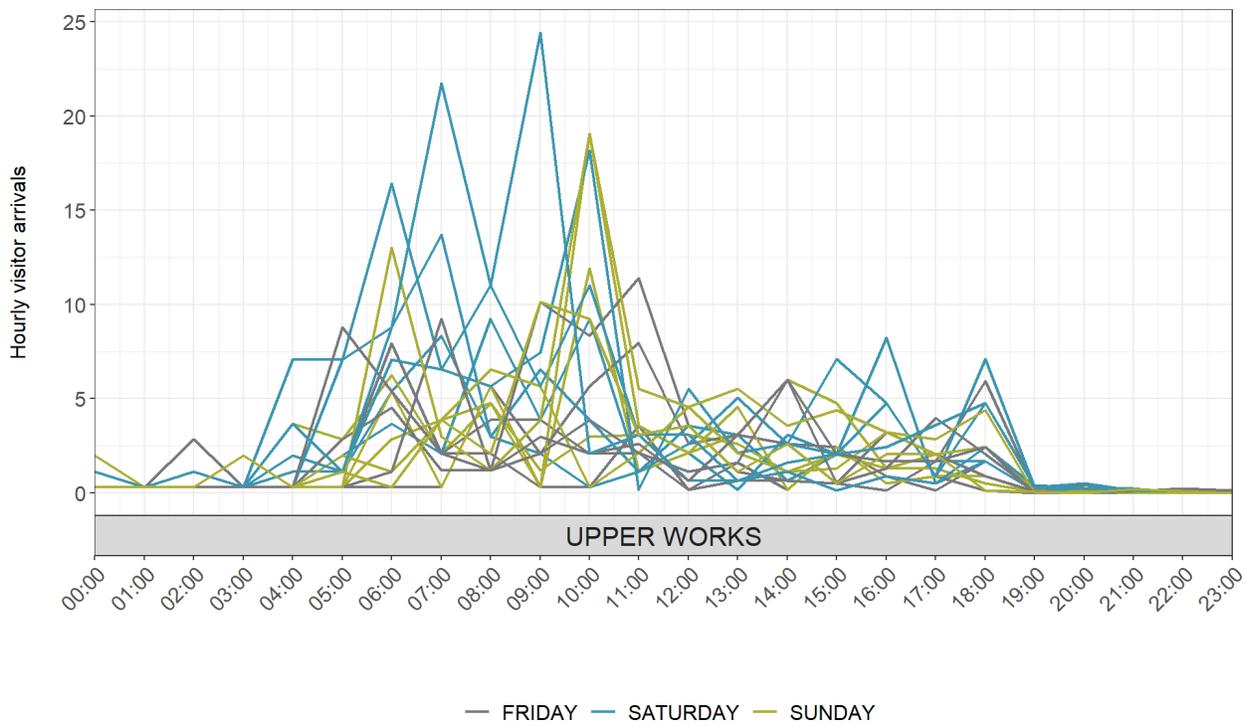
Figure 31 Mean hourly visitor arrivals and departures by day of week: The Garden



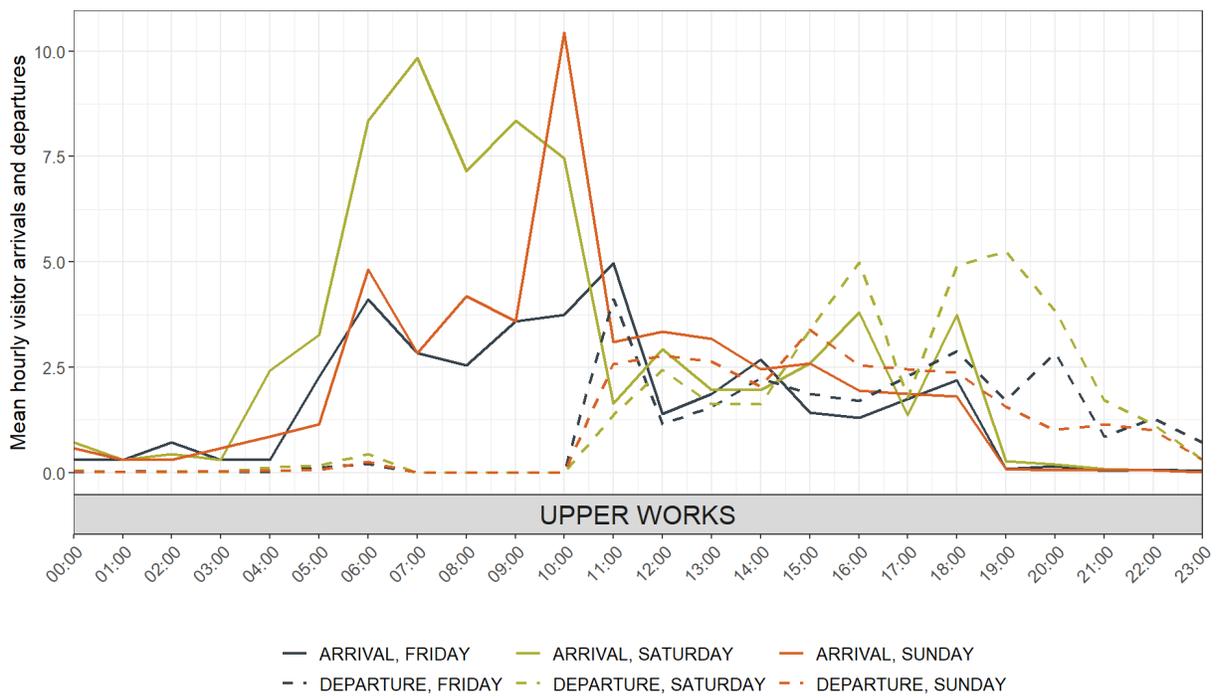
**Figure 32 Daily visitor arrivals by date: Upper Works (gray shading indicates weekends/holidays)**



**Figure 33 Hourly visitor arrivals by date: Upper Works (gray shading indicates weekends/holidays)**

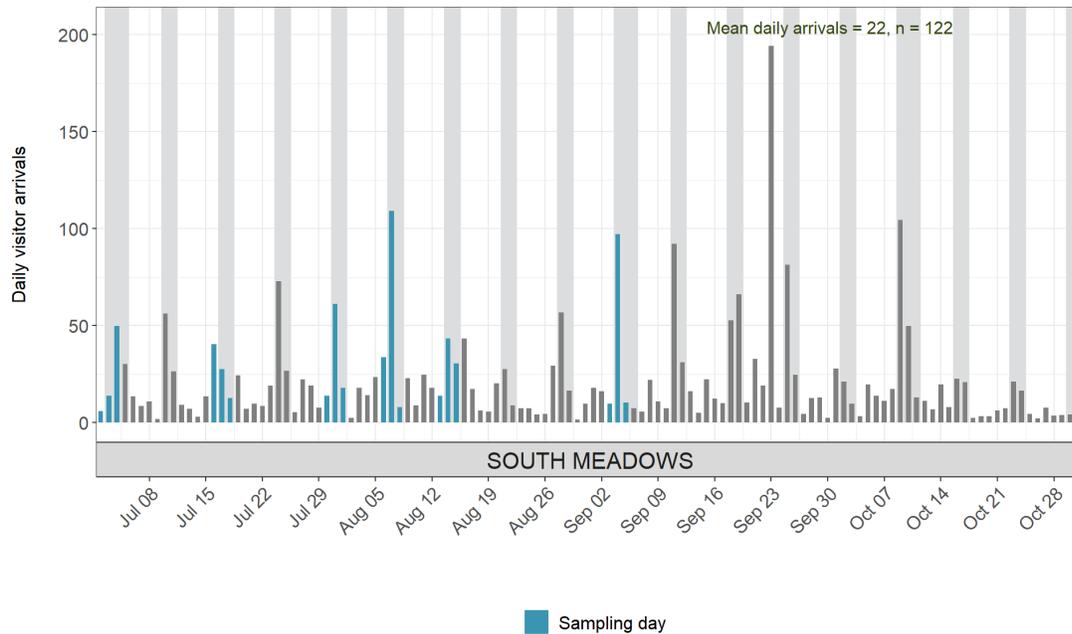


**Figure 34 Hourly visitor arrivals by date and day of week: Upper Works**

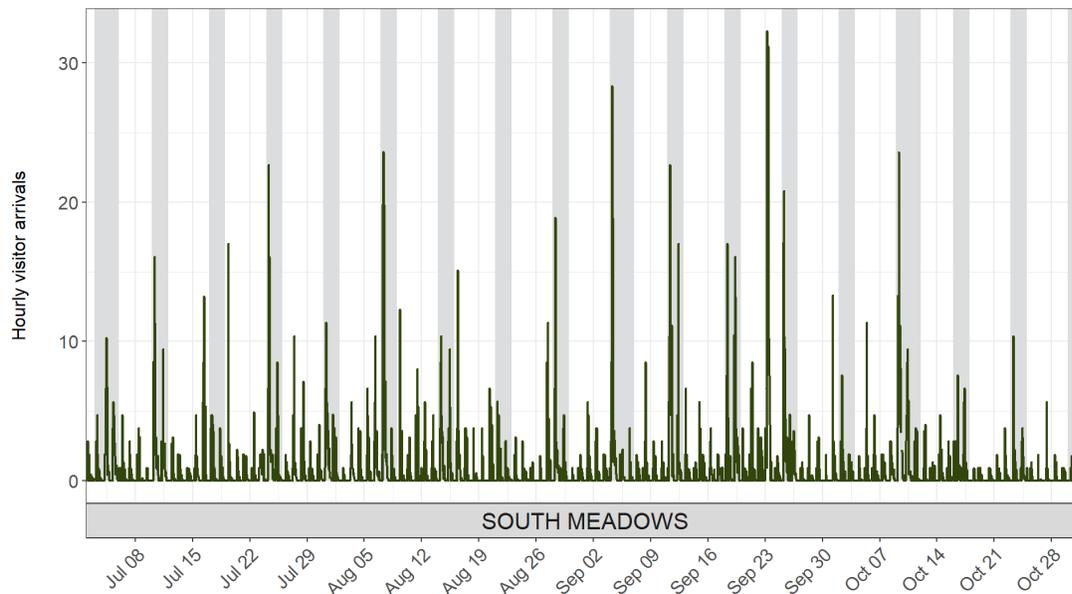


**Figure 35 Mean hourly visitor arrivals and departures by day of week: Upper Works**

Figure 36 through Figure 39 present daily arrival volumes during the counting period, hourly arrival volumes during the counting period, hourly arrival volumes during the sampling period, and average hourly arrival and departure volumes during the sampling period based on raw trail counter data for South Meadows. The average arrival proportions derived from the direct observation counts conducted at the Adirondak Loj trail counter were applied to the South Meadows trail counter to estimate arrival and departure volumes based on the assumption of similar use patterns at both locations.



**Figure 36 Daily visitor arrivals by date: South Meadows (gray shading indicates weekends/holidays)**



**Figure 37 Hourly visitor arrivals by date: South Meadows (gray shading indicates weekends/holidays)**

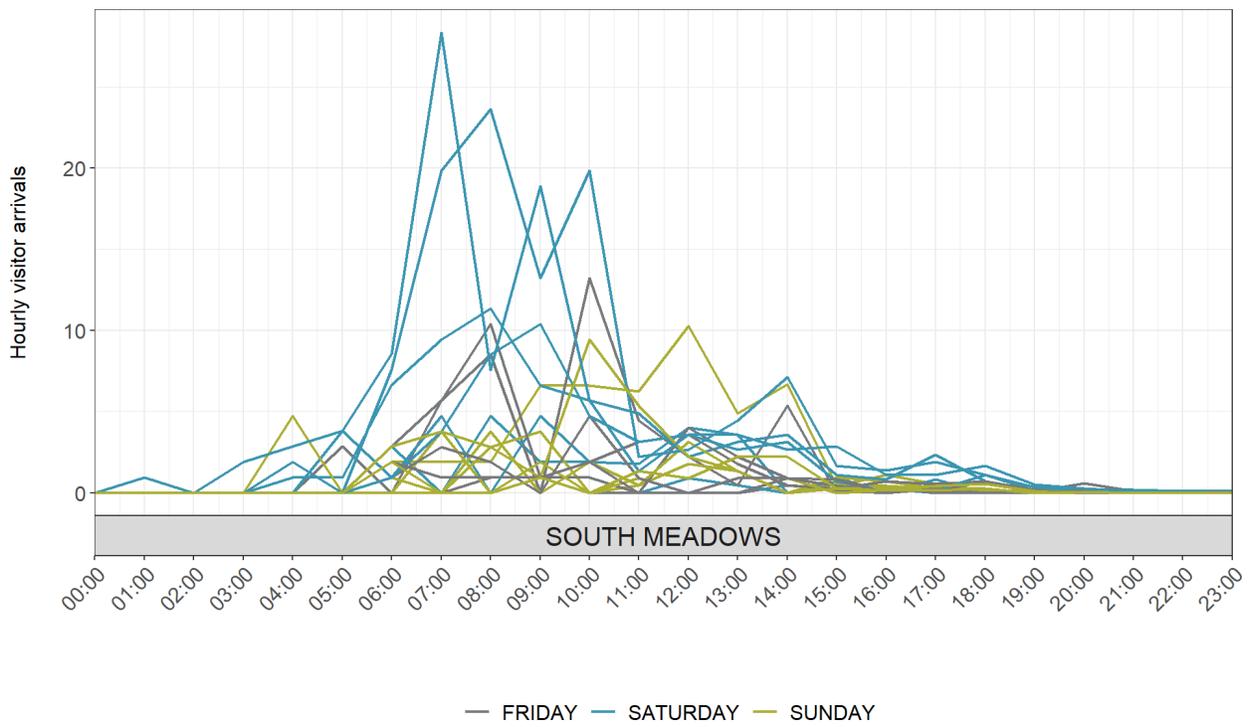


Figure 38 Hourly visitor arrivals by date and day of week: South Meadows

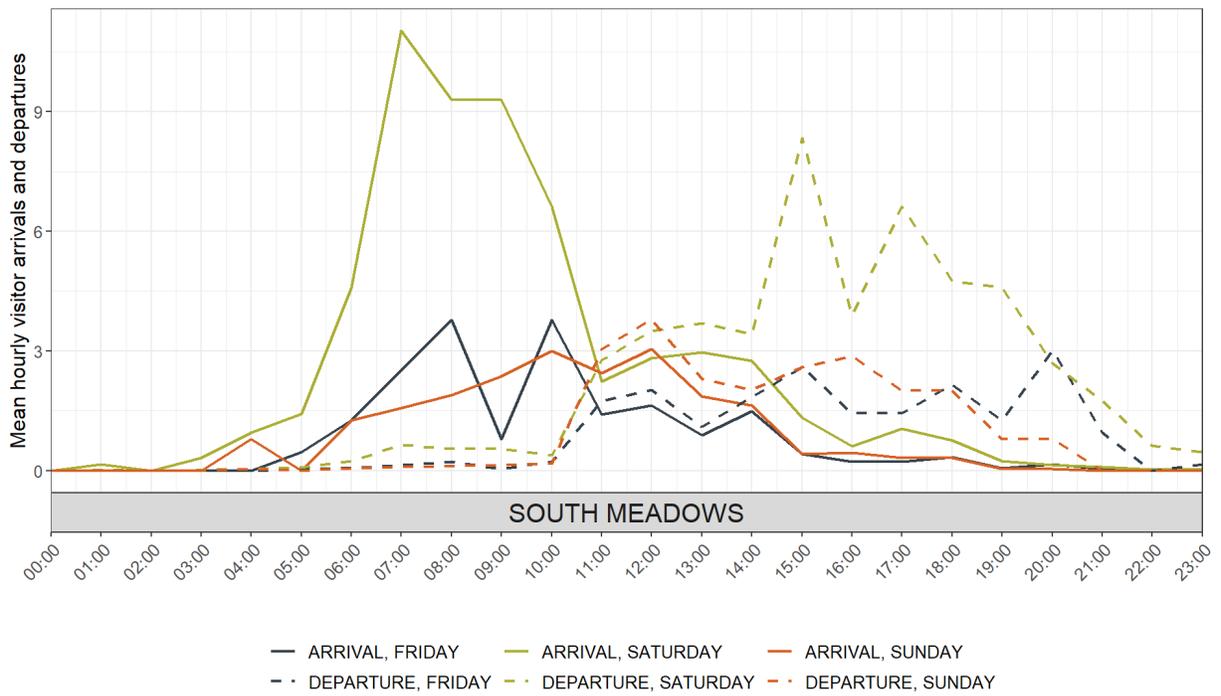
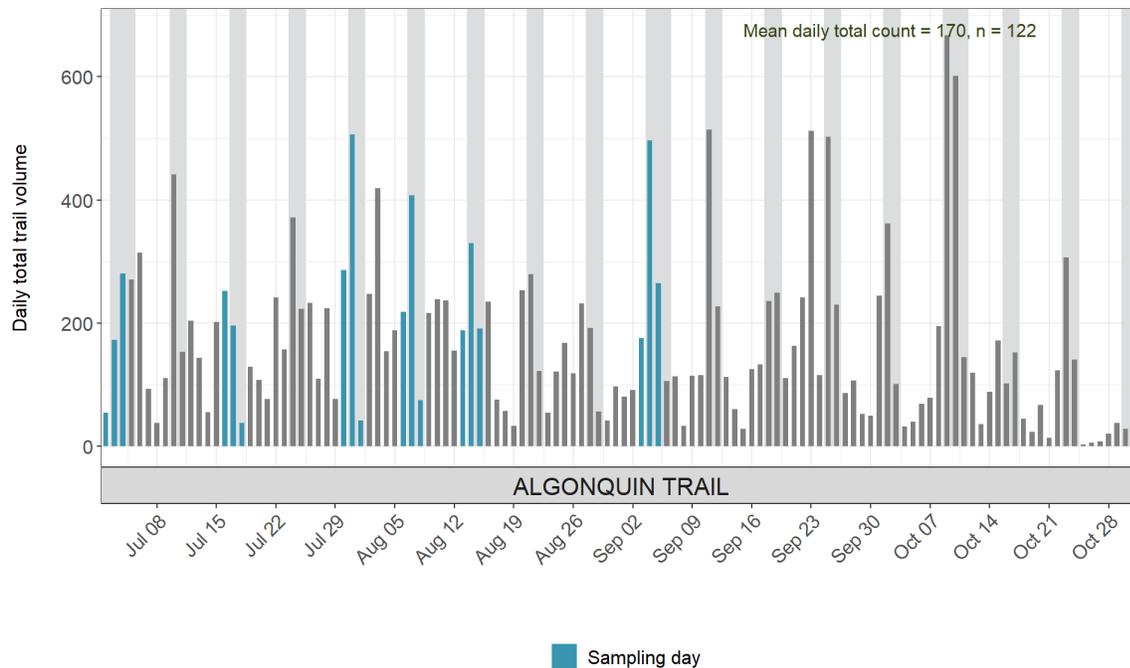
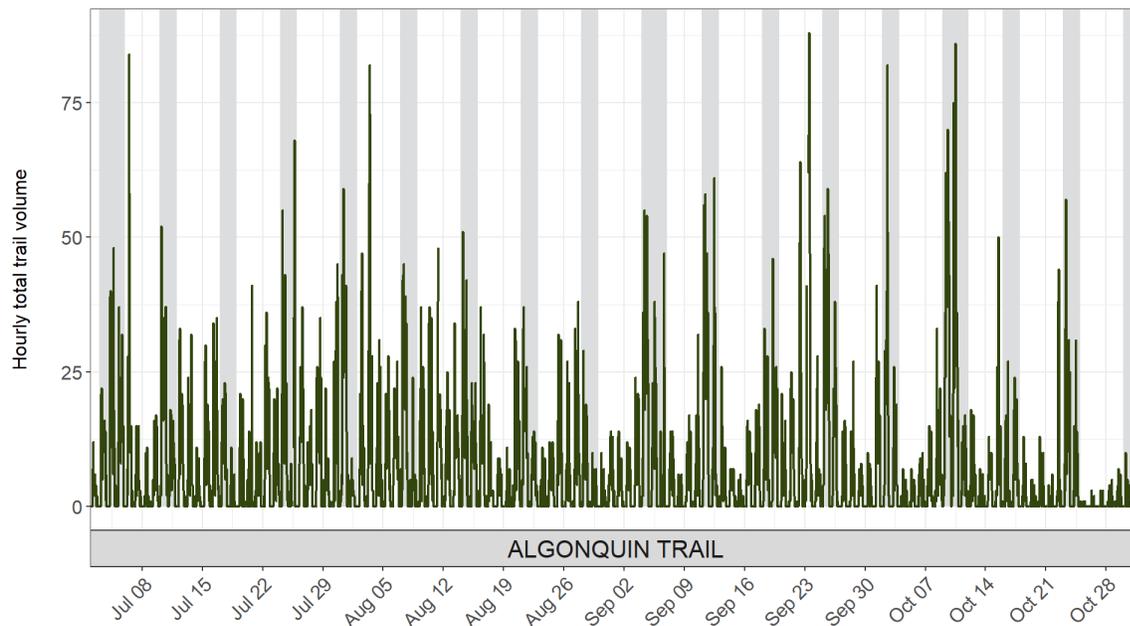


Figure 39 Mean hourly visitor arrivals and departures day of week: South Meadows

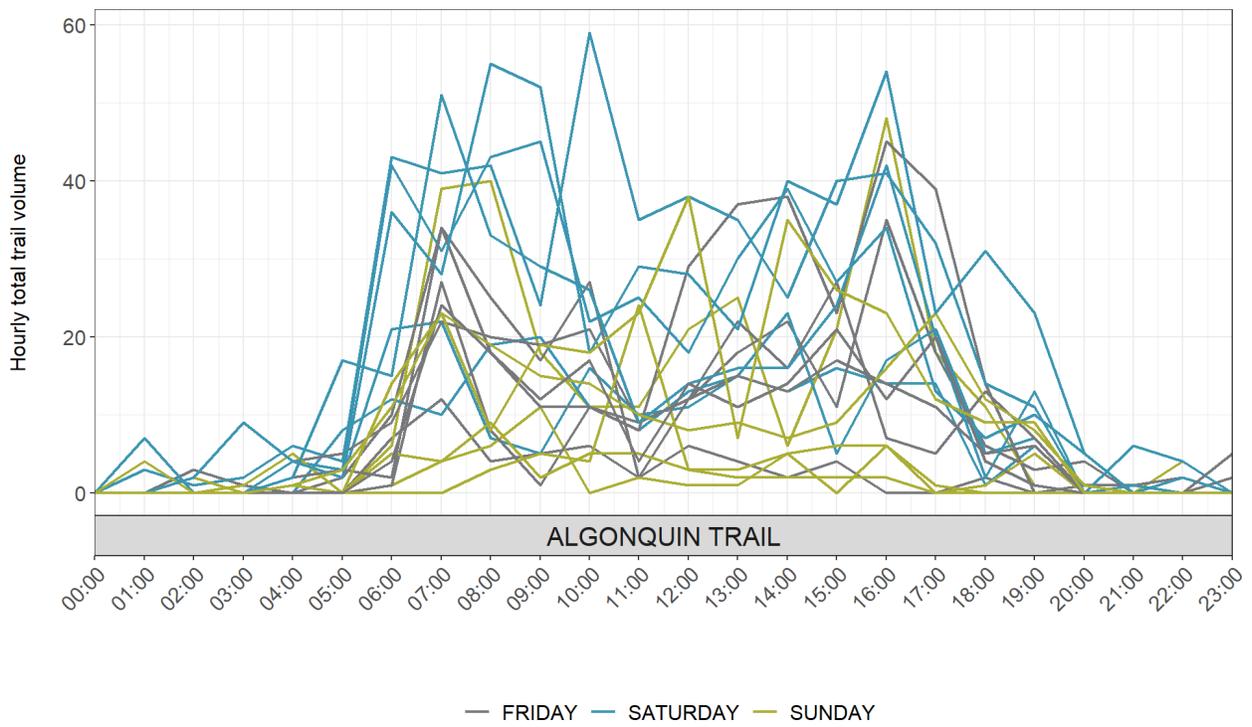
Figure 40 through Figure 51 present daily total trail use volumes during the counting period, hourly total trail use volumes during the counting period, hourly trail total trail use volumes by day of week during the sampling period, and average hourly total trail use volumes by day of week during the sampling period for the trail counters located on the Algonquin Trail, on the Van Hoevenberg Trail after the Hopkins Trail Junction, and on the Van Hoevenberg Trail after the Phelps Trail Junction.



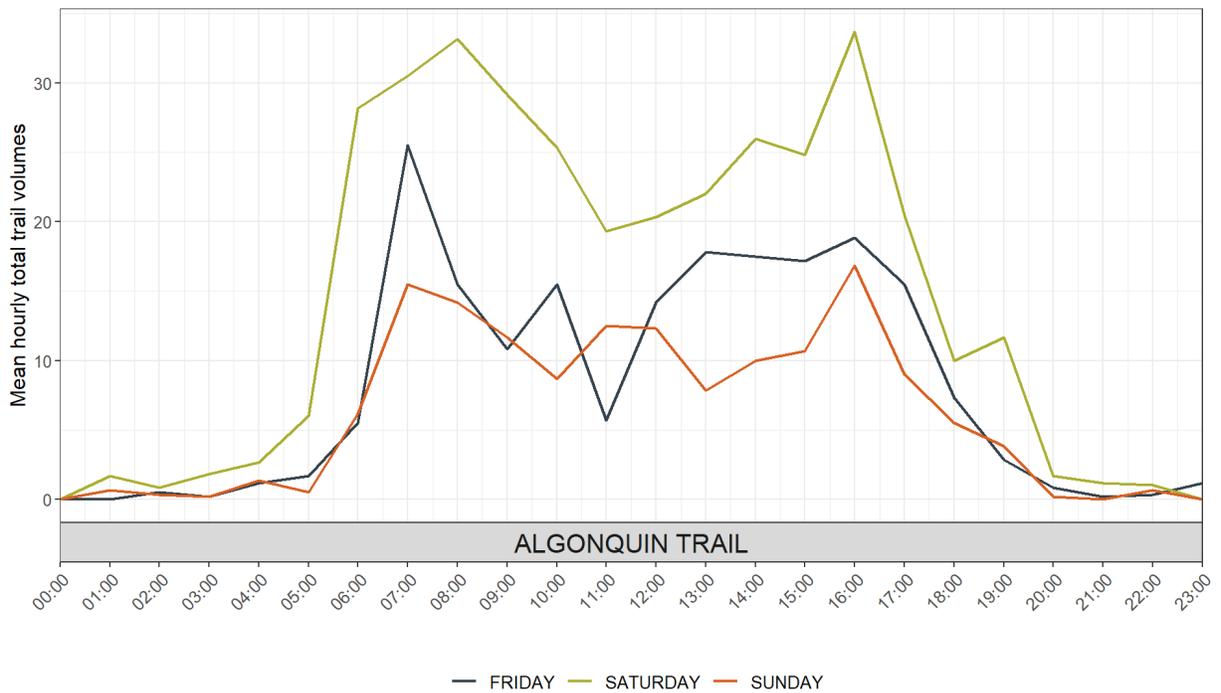
**Figure 40 Daily total trail volume by date: Algonquin Trail (gray shading indicates weekends/holidays)**



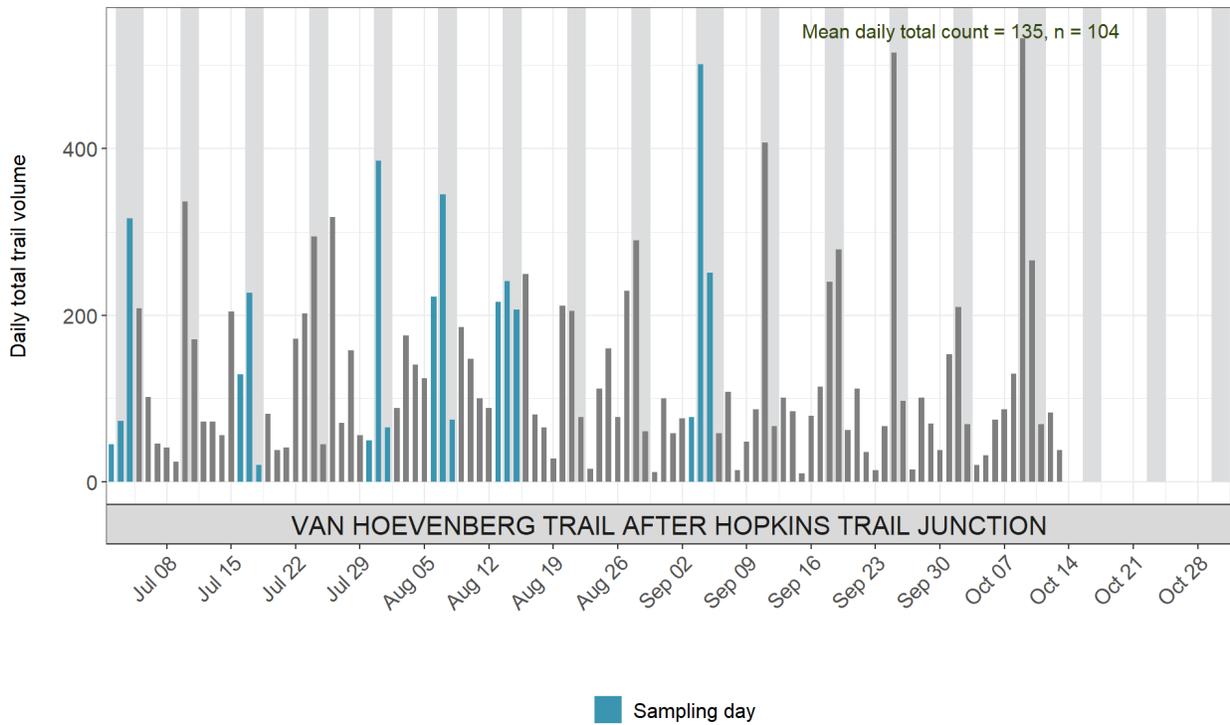
**Figure 41 Hourly total trail volume by date: Algonquin Trail (gray shading indicates weekends/holidays)**



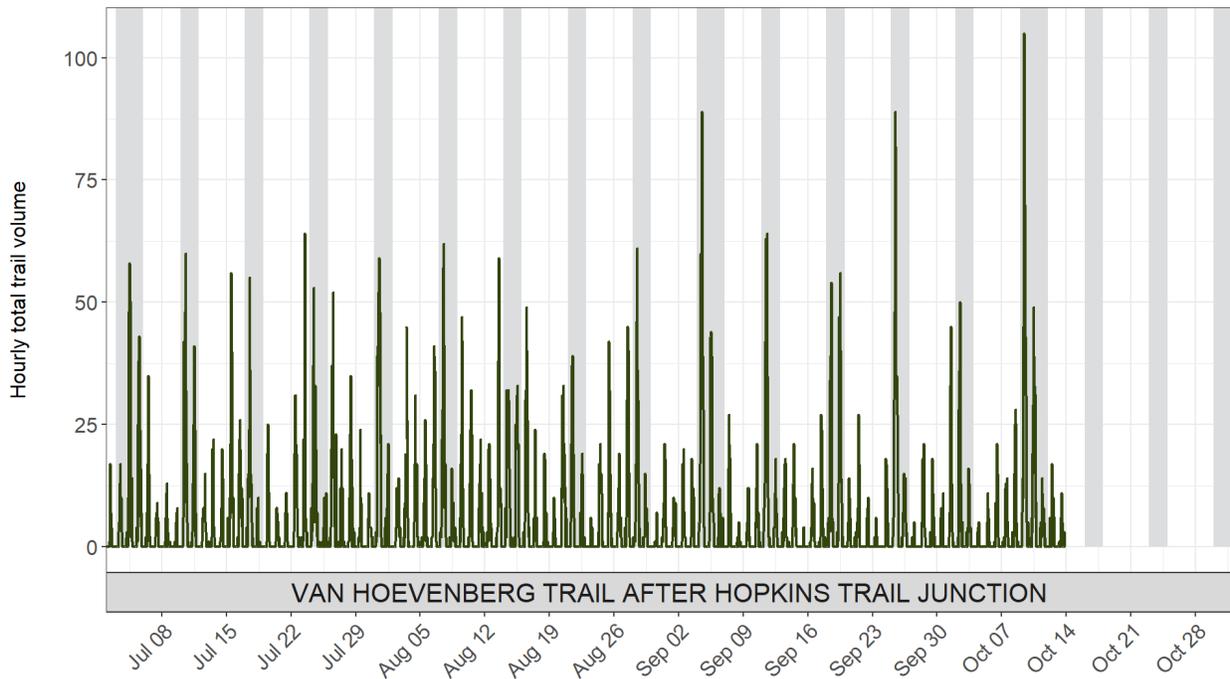
**Figure 42 Hourly total trail volume by date and day of week: Algonquin Trail**



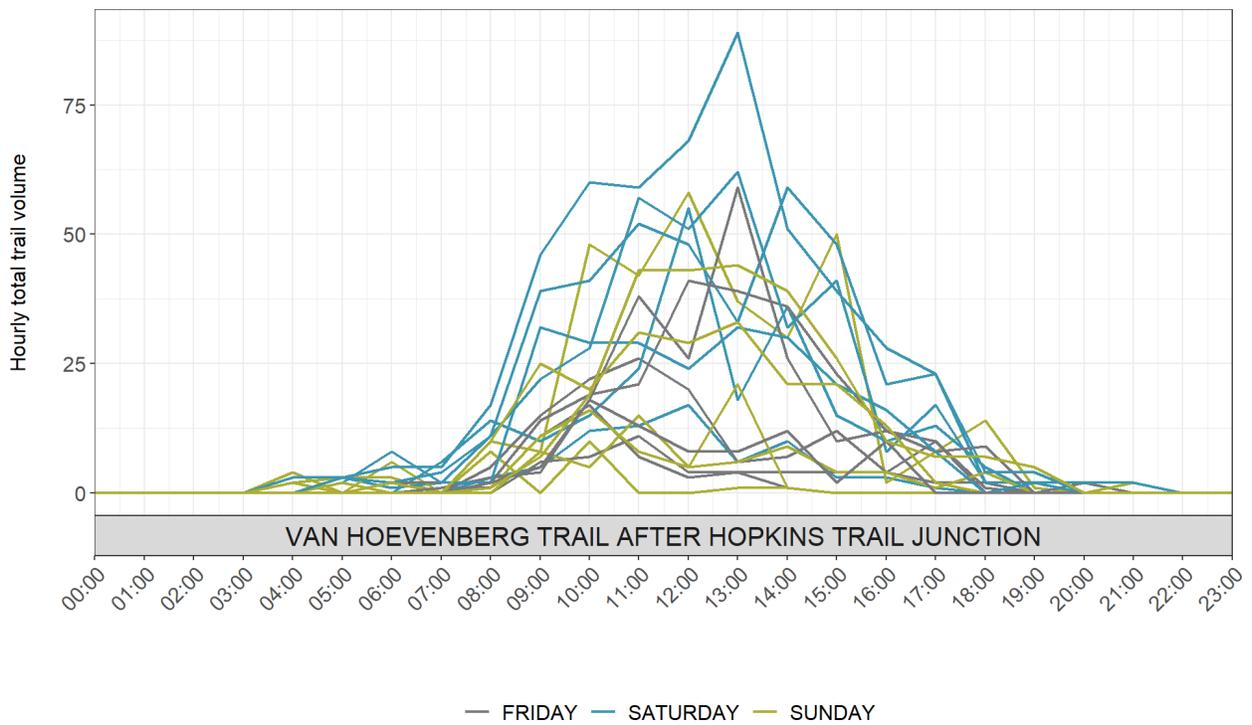
**Figure 43 Mean hourly total trail volume by day of week: Algonquin Trail**



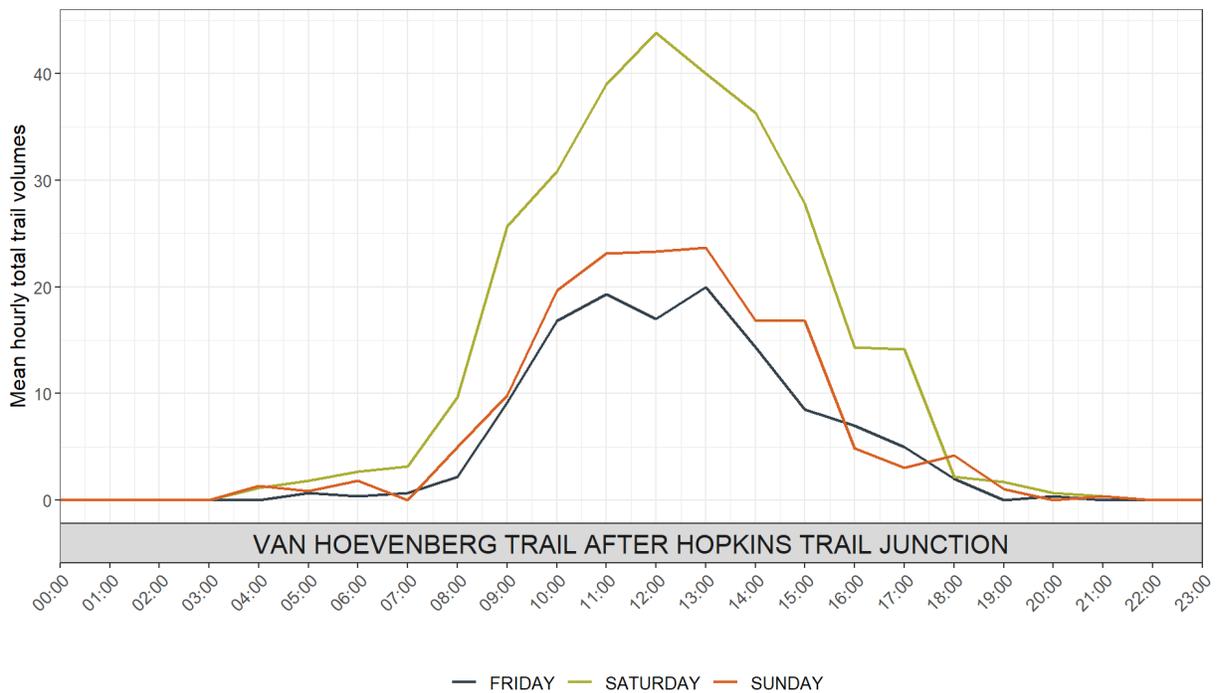
**Figure 44 Daily total trail volume by date: Van Hovenberg Trail after the Hopkins Trail Junction (gray shading indicates weekends/holidays)**



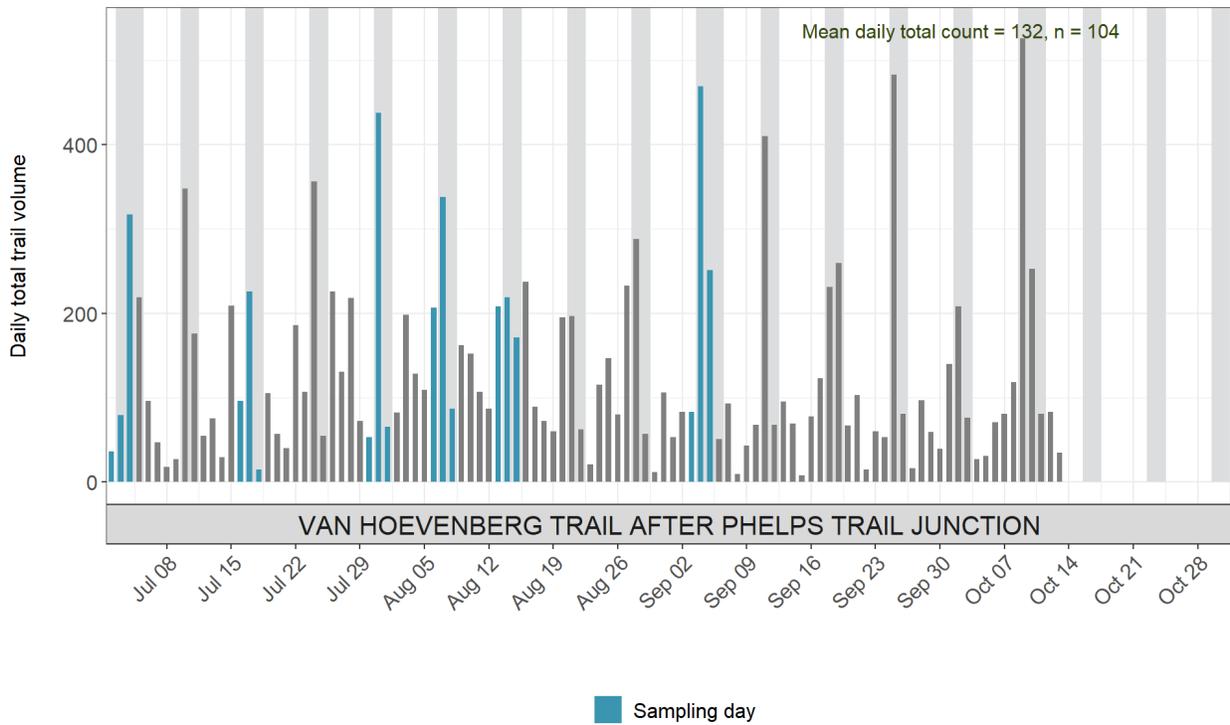
**Figure 45 Hourly total trail volume by date: Van Hovenberg Trail after the Hopkins Trail Junction (gray shading indicates weekends/holidays)**



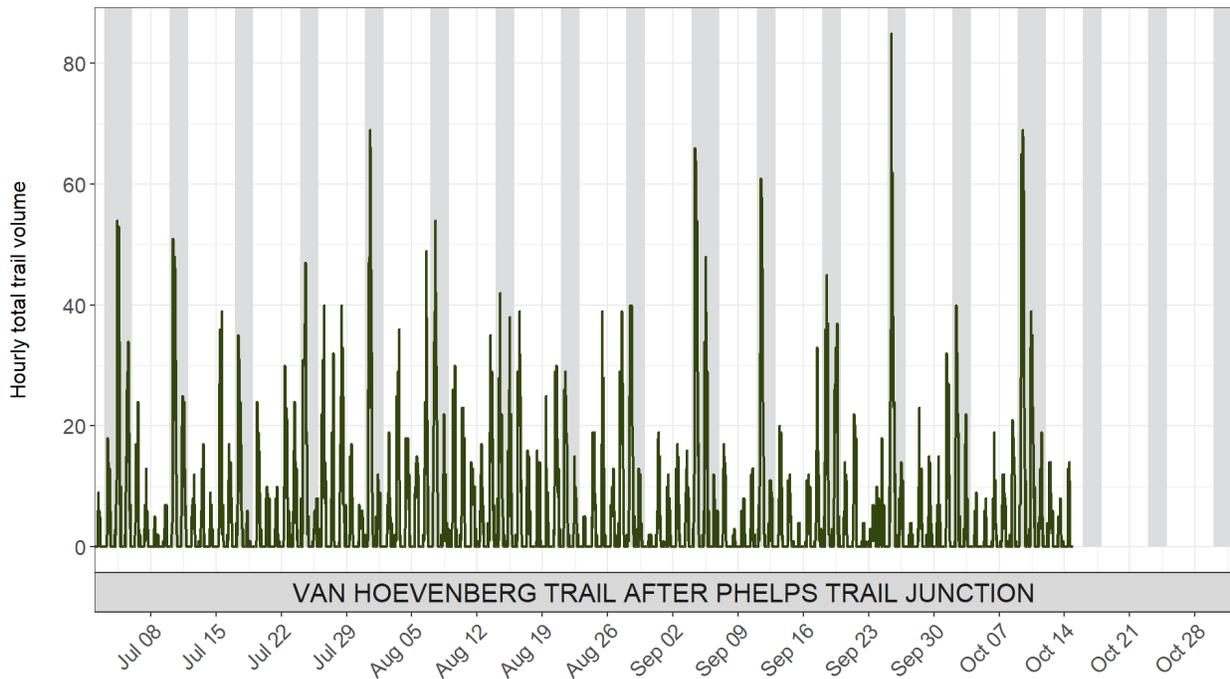
**Figure 46** Hourly total trail volume by date and day of week: Van Hoevenberg Trail after the Hopkins Trail Junction



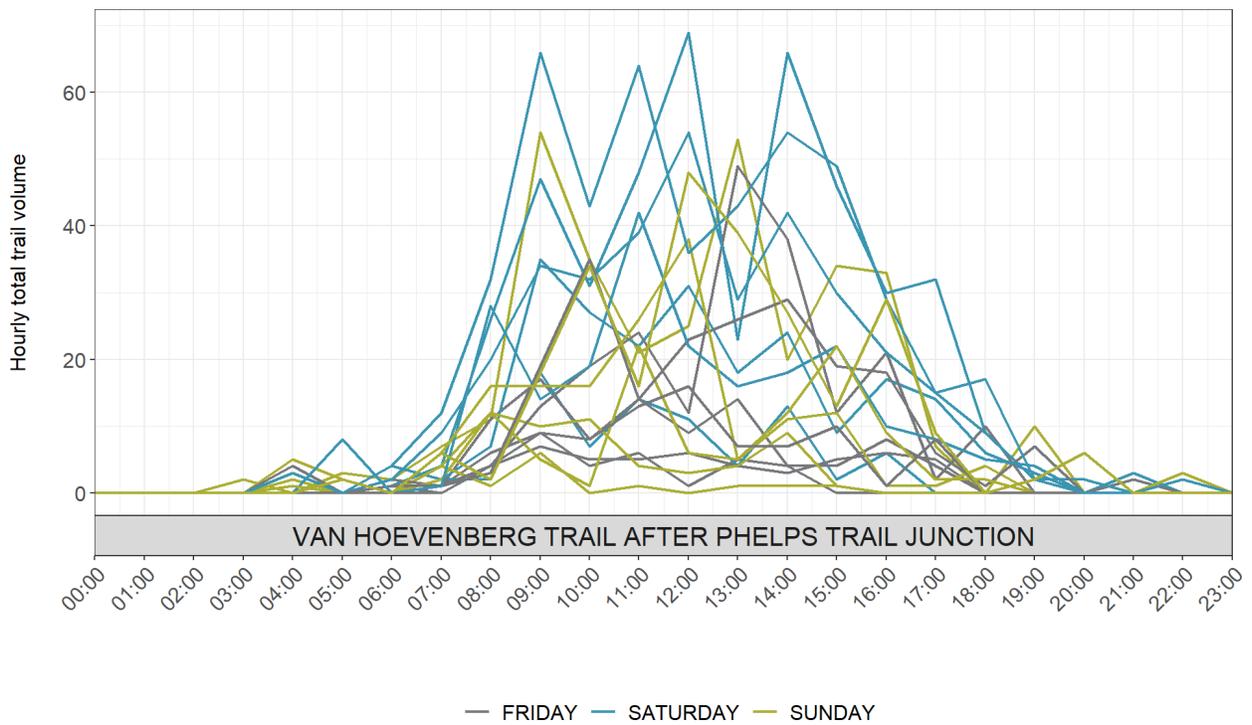
**Figure 47** Mean hourly total trail volume by day of week: Van Hoevenberg Trail after the Hopkins Trail Junction



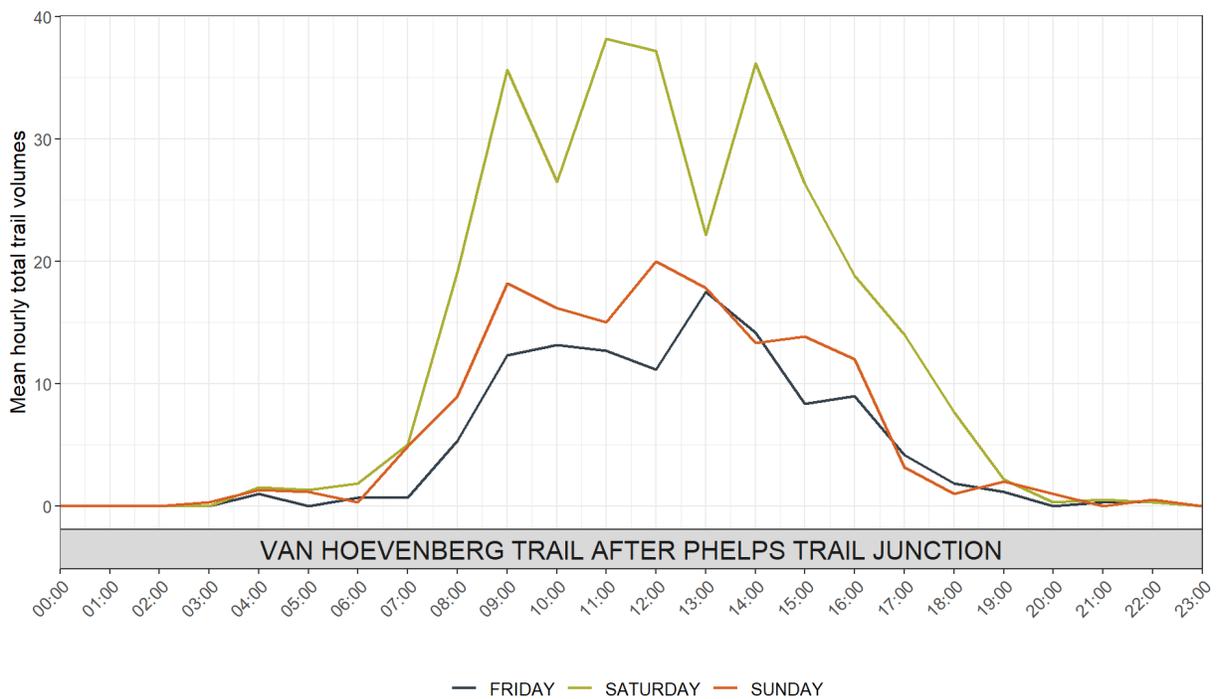
**Figure 48 Daily total trail volume by date: Van Hovenberg Trail after the Phelps Trail Junction (gray shading indicates weekends/holidays)**



**Figure 49 Hourly total trail volume by date: Van Hovenberg Trail after the Phelps Trail Junction (gray shading indicates weekends/holidays)**



**Figure 50 Hourly total trail volume by date and day of week: Van Hoevenberg Trail after the Phelps Trail Junction**



**Figure 51 Mean hourly total trail volume by day of week: Van Hoevenberg Trail after the Phelps Trail Junction**