VMT Comparison Methodology

County-wide VMT Calculations

Annual VMT data for each community was taken from a VMT study conducted by Fehr and Peers. This study estimated total annual VMT for Aspen, Snowmass Village, Basalt, Unincorporated Pitkin County, and Pitkin County overall for both 2019 and 2020. Fehr and Peers used 2017 trip data collected from AirSage for their analysis and scaled the results for 2019 and 2020. AirSage data tracks cell phone location and GPS data which can be used to estimate distance traveled. Fehr and Peers provided CORE and Pitkin County with a memo detailing the methodology for their calculations; that memo should be referenced for more detail on their approach. [See PDF titled "Pitkin_County_2019_VMT_Analysis_Summary_Memo"]

Home Management VMT Methodology

Per interviews with property managers, most property management companies use sport utility vehicles (SUVs) and light duty trucks for maintenance vehicles. The spread of these vehicles is 30% SUVs and 70% trucks. Lotus assumed this spread for all property management companies across the Valley. All vehicles are gas powered.

It is also assumed that workers make one trip per day to and from the property, 5 days a week for 52 weeks. HOA managed properties utilize an average of two workers per property. These workers make one trip to and from the property 5 days a week, 52 weeks per year. It was assumed they drove separately. There is additionally a snow removal truck that comes by during the winter months to plow most HOA managed properties. It is assumed that there is an average of 83 days of snow per year in Aspen and that each snow removal trip averages 5 miles.[1] These assumptions are based on interviews with property managers in the Roaring Fork Valley.

Per conversations with large home managers in the Valley, there is no public transportation near most of the large, managed homes. Therefore, all employees drive to the homes. Most housekeepers carpool and on average carpool with 4-5 total people in the car. For larger homes, there are two distinct seasons with different management activities. The first season is the 2-3 months per year when the

[1] See: https://www.weather-us.com/en/colorado-usa/aspen-climate.

homeowner is actively living in the home. The second is the 9-10 months where the home is empty. Based on interviews with home managers, for larger homes, it is assumed that there are 25-30 trips made to and from the home on a weekly basis when the homeowner is living in the home. When the homeowner is not in the home, it is assumed that there are 5-10 trips made to and from the home on a weekly basis.

Commuting distance for property management employees is unavailable. **Therefore, Lotus assumed that an average commuting trip for a property management employee was similar to the distance between Glenwood Springs and Aspen. This distance is 41 miles one way (82 miles roundtrip).** This assumption was verified during interviews with the property managers and was found to be the average distance traveled by a construction worker in the construction worker commute survey used in the Construction Management VMT analysis. Vehicle miles traveled were converted into gallons of fuel using average fuel efficiencies from the US EPA's State Inventory Tool. GHG emissions from on-road vehicles were the product of the gallons of fuel consumed and the fuel emission factors.

Home Management Proportion of County VMT

Home Management VMT was scaled for the proportion of the one-way distance that occurs inside the County boundary. **Since half of the distance from Glenwood Springs to Aspen is within Pitkin County**, half of the 36,163,144 miles traveled [18,081,572] can be attributed to Home Management activities within the County.

This was divided by the total County VMT from 2019 [18,081,572 / 128,177,945] to estimate 11% of all VMT in the County can be attributable to home management activities **within Pitkin County boundaries**. The total home management VMT [36,163,144] is ***equivalent to*** 22% of all miles driven in Pitkin County in 2019.

The 18,081,572 miles traveled within Pitkin County for the purposes of home management is equivalent to:

- Driving around the circumference of the earth 727 times (circumference of the earth is 24,855 miles).
- Driving roundtrip to the moon 38 times (the moon is 238,900 miles from the earth).
- Offsetting the emissions from these trips would require planting 133,612 trees, or 9,563 acres of forest.

Pitkin County Task 4 Methodology

Construction Economy Stationary Energy Calculations

Lotus found that data to calculate emissions from stationary equipment on construction sites is nearly non-existent. Therefore, a number of assumptions were used to calculate these emissions:

- In the absence of available data to calculate emissions from equipment used on the construction site, Lotus assumed that the emissions from equipment used to demolish and deconstruct buildings was the same as the emissions from equipment used to construct a home.
- Stage C1 (deconstruction and demolition) uses an emission factor of 3.4 $kgCO_2e/m^2$ gross internal area. This value is based on monitored demolition cases in London and is referenced in: https://www.rics.org/globalassets/rics-website/media/news/whole-life-carbon-assessment-for-the--built-environment-november-2017.pdf. This guidance is the gold standard but is based out of the UK. Conversations with the Carbon Leadership Forum EC3 Tool designer indicated that, although this value is based on cases in the UK, it is the most representative factor available for the US to date.
- Total new square footage was collected from the "Building data by census code" spreadsheet tab 'Sheet5'.

Thus, emissions were calculated using the following equation:

Emissions = Total new build square feet / conversion factor for square foot to square meter * 3.4 kg CO_2e/m^2 / conversion factor for kg to metric tons

Construction Economy Commuting/On-Road Data Calculations

Lotus used the daily contractor survey to calculate emissions from commuting to and from construction sites. The survey provides data on where the job site is located, how many workers were on site, where the workers commute from, and whether the workers commute solo, carpool, or take transit. This survey was conducted between April 2020-June 2021.

It is unknown from the survey how many workers came from specific towns to each worksite on specific days. Thus, Lotus calculated the number of trips between the worksite and each designated worker hometown. For example, a survey response might indicate that on a given day seven workers drove from Basalt, Carbondale, and Glenwood Springs to a worksite in Aspen. Lotus separated out these locations and made a count of three person “trips” between the worksite and worker home locations. Since this is an undercount of worker trips, Lotus calculated the difference between the reported number of workers on worksites and the number of person trips between the worksite and a designated worker hometown.

Additionally, there were many trips where the worker hometown was designated "Other." Since the "Other" location was not always designated in the notes section, Lotus assumed the location was Grand Junction, CO and calculated the distance between Grand Junction and the four site locations. Lotus then calculated the distance between the hometowns and site locations using the center point of the designated location (i.e., Basalt, Parachute, etc.). For Unincorporated Pitkin County, Meredith, CO was used as the proxy location. To calculate the vehicle miles traveled for the remaining trips with undesignated home locations, the average distance between all recorded home and worksite locations was calculated and applied to these trips. The total number of trips between the jobsite and specified home location for the year was calculated and the roundtrip mileage was applied to get the total vehicle miles traveled from the construction economy.

According to the survey, the vast majority of trips (just under 95%) were by individual vehicle or carpool. Thus, Lotus assumed that trips taken on transit or by other methods were de minimis and it was assumed that all emissions from commuting result from individual (66%) or carpool (34%) trips. Lotus assumed that all passenger vehicles used for commuting were gas and assumed that light duty trucks were an even split between gas and diesel. Lotus also assumed that 2/3 of worker's cars were light duty trucks and 1/3 of cars were passenger vehicles. GHG emissions from on-road vehicles were the product of the gallons of fuel consumed and the fuel emission factors.

Construction Economy Waste Calculations

Lotus used the spreadsheet “Building data by census code” which was provided by Pitkin County. This spreadsheet calculates the total amount of square feet of new residential builds, home additions, home remodels, and demolitions annually between 2010 and 2019. Additionally, this spreadsheet calculates the total amount of waste sent to the landfill from new residential builds annually.

The total waste sent to the landfill in 2019 was assumed to be the total amount of construction and demolition waste sent. Per a report from the EPA titled "Estimating 2003 Building-Related Construction and Demolition Materials Amounts", residential construction comprises 39% of all construction and demolition waste. Additionally, of residential construction waste, new construction comprises 15%, demolition comprises 58%, and renovation comprises 28% of the waste stream. Waste from demolition and renovations in Pitkin County in 2019 was unavailable. Thus, Lotus calculated the proportion of new construction waste within the total C&D waste stream (2,855.02/11,718, or 24%). The remaining proportion of the C&D waste stream was divided up between demolition (67%) and renovations (33%) based on the 2003 EPA report.

The 2017 Pitkin County Construction/Demolition Waste Analysis was used as the waste characterization. The 2016 Roaring Fork Waste Diversion Plan was used for recycling characterizations in Pitkin County. Values shown in the report generally aligned with waste emission factor categories. Every attempt was made to combine similar waste types for values that did not directly align with waste emission factor categories. Waste characterization allows emissions to be calculated for the different types of waste produced.

According to data from the EPA's Landfill Methane Outreach Program (LMOP),[1] the Pitkin County Solid Waste Center does not collect landfill gas. Therefore, landfill gas collection efficiency was noted as 0%.

GHG emissions from landfilled waste = (sum (tons of waste * percent of waste type * emission factor)) * (1 – oxidation factor) * (1 – landfill gas collection efficiency) * GWP

Repeat the above formula for each waste type included in the waste characterization.

Property Management Stationary Energy Calculations

Per interviews with property managers in the Valley, the only pieces of equipment that are used in property management are lawnmowers, snowblowers, bucket loaders (for snow removal), and zambonis. Therefore, the only stationary energy emissions from this sector are from these pieces of equipment.

[1] For more information see: https://www.epa.gov/lmop/project-and-landfill-data-state.

Fuel efficiencies for these four pieces of equipment were collected from several websites.[2,3,4] For the bucket loader, a Caterpillar 906M was used as a proxy as it is the smallest loader model available.[5] The midpoint of the Medium Hourly Fuel Consumption estimates was used as the bucket loader's hourly fuel use estimate.[6]

From our interviews with HOA managers, it is assumed that lawns are mowed weekly between the months of May-September, thus 20 weeks. It is assumed that there is an average of 83 days of snow per year in Aspen.[7] Snowblowers are used for ~4 hours on snow days. It is assumed that zambonis are used daily between the months of December-April and are only used at managed HOA properties.

Property managers work with both HOAs and specific large homes in the Roaring Fork Valley. Per interviews and conversations with County staff, we assumed that the average size of a managed home is equal to or greater than 5,750 SF. Zach Hendrix with the County noted that 583 single family homes are equal to or greater than this size, and are thus, managed by property managers. These houses are assumed to be located within Unincorporated Pitkin County. Approximately 50% of the housing units in Pitkin County are managed by an HOA, see Question 44 of "Greater Roaring Fork Regional Housing Study".[8] Per the 2020 Census, Pitkin County had 14,016 housing units. According to the National and State Statistical Review for Community Association Data, in 2016 there were 26.3 million housing units in 342,000 community associations.[9] Additionally, between 51-55% of community associations are homeowners associations. Lotus assumed the midpoint of 53%. Thus, the average number of housing units in an HOA (41) was calculated to help estimate the number of HOAs in Pitkin County (26,300,000 housing units/342,000 community associations*53% as HOAs; 171 total in Unincorporated and Incorporated Pitkin County). We assumed that half of managed single-family homes were managed by

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[2] See: https://zamboni.com/wp-content/uploads/specs/650_specs.pdf.
[3] See: https://www.ehow.com/info_12217386_far-can-lawn-mower-ride-one-tank.html.
[4] See: https://www.snowblowerforum.com/threads/fuel-efficiency.41169/.
[5] See: https://www.cat.com/en_US/products/new/equipment/wheel-loaders.html.
[6] See: https://static1.squarespace.com/static/58877529414fb5283ed14a6b/t/5888f8acbebafbea448f7094/1485371564893/Fuel+Table+-+Loaders.pdf.
[7] See: https://www.weather-us.com/en/colorado-usa/aspen-climate.
[8] See: https://www.apcha.org/DocumentCenter/View/1197/Final-ReportGreater-Roaring-Fork-Regional-Housing-Study20190417.
[9] See: https://www.caionline.org/AboutCommunityAssociations/Statistical%20Information/2016StatsReviewFBWeb.pdf.

an HOA, which results in a total of 7 HOAs in Unincorporated Pitkin County and a remaining 293 single-family homes not managed by an HOA in Unincorporated Pitkin County. The remaining 164 HOAs are assumed to be within the Incorporated parts of Pitkin County.

Gallons of gasoline used and kWh consumed were calculated and emissions found using the corresponding emission factors and global warming potentials.

Property Management On-Road Calculations

Per interviews with property managers, most property management companies use sport utility vehicles (SUVs) and light duty trucks for maintenance vehicles. The spread of these vehicles is 30% SUVs and 70% trucks. Lotus assumed this spread for all property management companies across the Valley. All vehicles are gas powered.

It is also assumed that workers make one trip per day to and from the property, 5 days a week for 52 weeks. HOA managed properties utilize an average of two workers per property. These workers make one trip to and from the property 5 days a week, 52 weeks per year. It was assumed they drive separately. There is additionally a snow removal truck that comes by during the winter months to plow most HOA managed properties. It is assumed that there is an average of 83 days of snow per year in Aspen and that each snow removal trip averages 5 miles.[10] These assumptions are based on interviews with property managers in the Roaring Fork Valley.

Per conversations with large home managers in the Valley, there is no public transportation near most of the large, managed homes. Therefore, all employees drive to the homes. Most housekeepers carpool and on average carpool with 4-5 total people in the car. For larger homes, there are two distinct seasons with different management activities. The first season is the 2-3 months per year when the homeowner is actively living in the home. The second is the 9-10 months where the home is empty. Based on interviews with home managers, for larger homes, it is assumed that there are 25-30 trips made to and from the home on a weekly basis when the homeowner is living in the home. When the homeowner is not in the home, it is assumed that there are 5-10 trips made to and from the home on a weekly basis.

Commuting distance for property management employees is unavailable. Therefore, Lotus assumed that an average commuting trip for a property management employee was similar to the distance between Glenwood Springs and Aspen. This

[10] See: https://www.weather-us.com/en/colorado-usa/aspen-climate.

distance is 41 miles one way (82 miles roundtrip). Vehicle miles traveled were converted into gallons of fuel using average fuel efficiencies from the US EPA's State Inventory Tool. GHG emissions from on-road vehicles were the product of the gallons of fuel consumed and the fuel emission factors.

Property Management Waste Calculations

Per interviews with large home managers in the Roaring Fork Valley, between 20-25 pounds of trash are produced weekly. Thus, Lotus assumed the midpoint (22.5 lbs). Per conversations with property managers in Pitkin County, waste collected from HOA managed properties is primarily lawn waste. The average American lawn generates 30 lbs of waste per trimming.[11] Thus, Lotus assumed that the average amount of waste collected from HOA properties on a weekly basis was 30 lbs. From our interviews with HOA managers, it is assumed that lawns are mowed weekly between the months of May-September, thus 20 weeks. Therefore, weekly waste from HOA properties was multiplied by 20 since all waste collected from HOA-managed properties is assumed to be lawn waste. There is no composting collected at managed properties, all composting happened on site at the homes.

Waste and recycling characterizations were taken from the 2016 Roaring Fork Waste Diversion Plan. Values shown in the report generally aligned with waste emission factor categories. Every attempt was made to combine similar waste types for values that did not directly align with waste emission factor categories. Waste characterization allows emissions to be calculated for the different types of waste produced. It is assumed that all waste and recycling is taken to the Pitkin County Solid Waste Center, which does not have a landfill gas collection system. It was assumed that the amount of weekly diverted waste is the diversion rate multiplied by the total waste collected.[12]

GHG emissions from landfilled waste = (sum (tons of waste * percent of waste type * emission factor)) * (1 – oxidation factor) * (1 – landfill gas collection efficiency) * GWP

Repeat the above formula for each waste type included in the waste characterization.

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[11] See: https://www.stmarysmd.com/dpw/recyclegrass/.

[12] Pitkin County Diversion Rate for 2019 is from: https://copirg.org/sites/pirg/files/reports/State%20of%20Recycling%20and%20Composting%20in%20CO_2020_Eco-Cycle_CoPIRG.pdf.

FEHR PEERS

Memorandum

Date: December 23, 2021

To: Ashley Perl, City of Aspen
Zach Hendrix, Pitkin County

From: Patrick Picard, AICP and Chris Breiland, PE

Subject: Methodology & Findings of 2019 & 2020 Pitkin County VMT Analysis

DN21-0691

Introduction

This memo describes the methodology used to estimate vehicle miles traveled (VMT) in 2019 and 2020 attributable to the following geographies within Pitkin County as well as a brief summary of the findings:

- City of Aspen
- Town of Snowmass Village
- Town of Basalt (encompassing portions in both Eagle and Pitkin Counties)
- Unincorporated Pitkin County

VMT Attributable

The VMT measure is based on guidance provided by the International Council for Local Environmental Initiatives (ICLEI). ICLEI defines VMT attributable to a community as based on the origins and destinations of each trip. Thus, it is not a direct measure of the VMT occurring in a community, but instead attributable to that community. For vehicle trips that both begin and end in a community, 100% of the VMT from that trip would be considered to be attributable to the community. For trips with one trip end in the community and one trip end outside the community, 50% of the VMT from that trip would be attributable to the community where the trip began and 50% would be attributable to community where the trip ended. Trips that pass through a community without stopping are not included in the measure.

An example of each scenario is provided below:

- For a trip that begins and ends in Pitkin County, 100% of the VMT of that trip would be considered attributable to Pitkin County.
- For a trip that begins in Garfield County and ends in Pitkin County, 50% of that trip would be considered attributable to Pitkin County.
- For a trip that begins in Garfield County and ends in Delta County, but passes through Pitkin County without stopping, 0% of that trip would be considered attributable to Pitkin County.

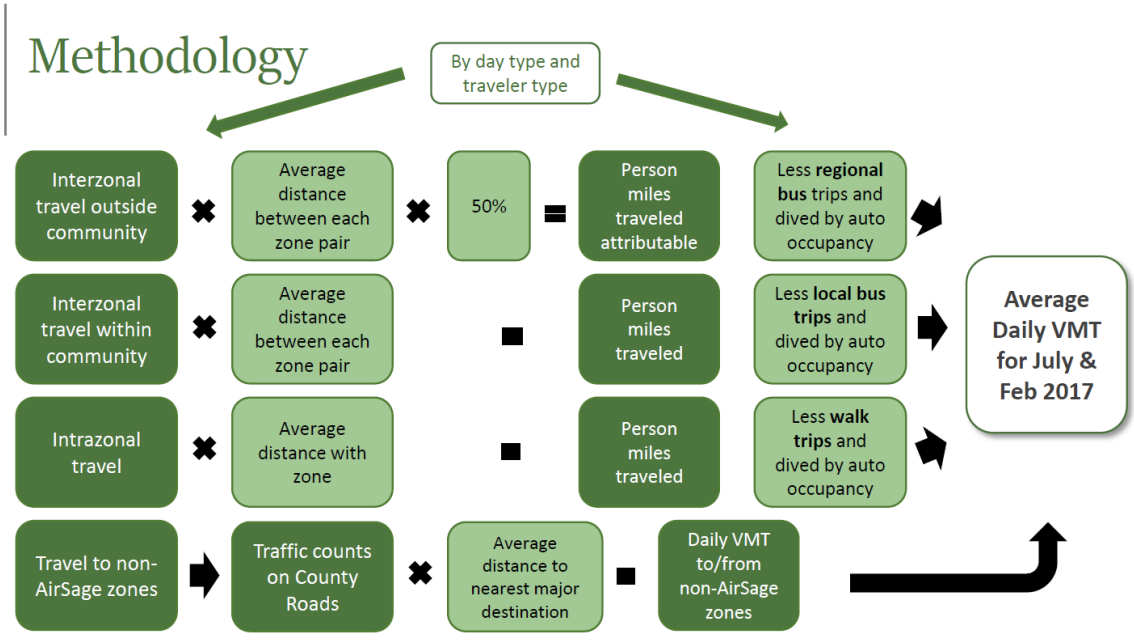
Lastly, a different measure is used to estimate VMT generated by transit, which was not included as part of the estimate summarized in this memo.

Methodology

VMT was estimated using a variety of sources. However, the main source included Big Data from February and July of 2017 provided by AirSage that was collected a part of a regional data collection process initiated by the Roaring Fork Transportation Authority (RFTA) in collaboration with communities between Parachute and Aspen. A map of the AirSage zones is provided in the Appendix. VMT was estimated for four different trip types as illustrated in **Figure 1** pivoting from the data available from AirSage:

- Interzonal trips to/from the community (e.g., trips from an AirSage zone within Pitkin County to an AirSage zone outside Pitkin County)
- Interzonal trips within the community (e.g., trips from an AirSage zone within Pitkin County to another AirSage zone within Pitkin County)
- Intrazonal trips (e.g., trips that begin and end within the same AirSage zone in Pitkin County)
- Travel to non-AirSage zones (e.g., trips that have at least one trip end in Pitkin County and one trip end not in one of the 43 predefined AirSage zones)

Figure 1. Summary of Pitkin County VMT Analysis Methodology



AirSage Data Analysis

For the first three trip types derived from the AirSage data, a multistep process was used to estimate VMT in Pitkin County, including the following general steps:

1. Estimate person miles traveled in February and July of 2017 based on the AirSage Data
2. Subtract transit trips to get person miles traveled by motor vehicle
3. Factor average auto occupancy to get vehicle miles traveled
4. Convert to annual and to 2019 and 2020 based on factors generated by the permanent counters on CO 82 at Old Snowmass and on the Castle Creek Bridge

The first three steps are illustrated in **Figure 1** and each step is described in more detail below.

AirSage Data Background Information

The AirSage data provides origin-destination travel patterns for 43 predefined zones in the Roaring Fork valley and surrounding region, see Appendix. The data comes from February, 2017 and July, 2017 and is differentiated by weekday and weekend day as well as visitor and resident trips.

The data collected by AirSage are person trips from one zone to another. Trips are recorded by mobile device tracking technology in smartphones which is enabled when a user has a location-based services application turned on. A trip is considered to end when the cellphone is stationary for at least five consecutive minutes. AirSage has no way to determine the mode used for a trip, making the data mode agnostic. However, all modes of transportation are recorded, including people driving, riding in a car, walking, bicycling and riding a bus. Other activities would also be recorded in the Aspen area, including people skiing, traveling in a golf cart, etc.

Each smart phone device has a "home" based on its regular location at night, allowing AirSage to distinguish between resident and visitor trips. This allows for the sample to be scaled to represent the movements of 100% of the population of the census block group. As such, the trip count numbers provided by AirSage are an estimate of all the trips that occurred and includes all modes.

The reliability of the data was also confirmed in comparing these numbers to available average daily traffic (ADT) data along SH 82, where similar trends were observed.

AirSage Zones by Community

Since the boundaries of the AirSage zones were not always in direct alignment with the community, a list of the AirSage zones assigned to each community is provided in **Table 1**. In many cases even if the AirSage zone did not match up exactly with the community boundary, it covered the applicable developed portion. In cases where this was not true, a designated

percentage of a particular zone was used based on population data provided by the census or geography depending on the context of the zone.

Table 1. AirSage Zones by Community

Unincorporated Pitkin County	Aspen	Snowmass Village	Basalt
• Zone 24 – Old Snowmass • Zone 25 – Brush Creek Road Intercept Lot • Zone 26 – Woody Creek • Zone 29 – Aspen Airport • Zone 30 – Aspen ABC • Zone 34 – Aspen Red Mountain • Zone 40 – Aspen Mountain • Zone 42 – Buttermilk Mountain • Zone 103 – SH 133 (16% of trips) • Zone 104 – SH 82 Independence Pass (50% of trips)	• Zone 31 – Aspen Golf Course • Zone 32 – Aspen High School • Zone 33 – Aspen Hospital • Zone 35 – Aspen Core Northwest • Zone 36 – Aspen Core Southwest • Zone 37- Aspen Core Downtown • Zone 38 – Aspen Core Northeast • Zone 39 – Aspen Core Southeast • Zone 41 – Aspen Highlands Mountain	• Zone 27 – Snowmass Village Town Core • Zone 28 – Snowmass Village • Zone 43 – Snowmass Mountain	• Zone 21 - El Jebel/Willets (50% of trips) • Zone 22 – Sagewood/ Aspen Junction • Zone 23 - Basalt

Step 1 Estimate Person Miles Traveled

Average weekday and weekend visitor person miles traveled (PMT) and resident PMT was estimated for July and February 2017 using AirSage data by multiplying the number of trips by the average trip length between each zone. This resulted in an estimate of average daily PMT for eight trip types in 2017:

1. Resident weekday in February
2. Visitor weekday in February
3. Resident weekend day in February
4. Visitor weekend day in February
5. Resident weekday in July
6. Visitor weekday in July
7. Resident weekend day in July
8. Visitor weekend day in July

The average trip length was determined by choosing a logical central location in each zone and measuring the distance along the roadway network. A table of the centroid locations for each zone and distance matrix is included in the Appendix.

For interzonal trips outside of the community, only one direction (or 50% of the trips) were included since only half of the VMT from that trip would be considered attributable to the community being analyzed per ICLEI protocol.

For intrazonal trips (trips that begin and end in the same zone) the average trip distance was estimated by measuring the distance from a logical central location with a high trip generator (such as a commercial center, or dense development) to a location on the edge of the zone.

Step 2 Estimate Person Miles Traveled by Motor Vehicle

Person miles traveled for all interzonal trips was converted to person miles traveled using a motor vehicle by subtracting average daily transit trips for each of the eight trip types above. This was estimated by using a combination of weekday and weekend boarding data by route and stop in Pitkin County and Basalt for February and July 2017 as well as RFTA onboard survey data from 2018 to differentiate visitor transit trip and resident transit trip use. It was assumed the average transit trip length for each trip type were the same as the average trip length in a motor vehicle.

For interzonal trips that left the community, only boardings of regional buses in that community were used (thus only 50% of the round trip was captured). For interzonal trips that stayed within the community boardings for local buses in that community were used (thus capturing 100% of those round trips). A list of which routes were considered local and regional by community are listed in **Table 2**.

Table 2. Bus Routes Considered "Local" or "Regional" by Community Analyzed

Trip Type	Pitkin County	Aspen	Snowmass Village	Basalt
Local (Interzonal trips within the community)	• Aspen local buses • Snowmass/ Aspen • Woody Creek • Maroon Creek • COSV Buses	• Aspen local buses	• COSV Buses	• No local transit trips
Regional (Interzonal trips to/from the community)	• VelociRFTA • Local Valley • Express	• VelociRFTA • Local Valley Express • Snowmass/ Aspen • Woody Creek • Maroon Creek	• Snowmass/ Aspen • Express (SV direct)	• VelociRFTA • Local Valley • Express

RFTA provided boarding data by stop, by weekday, Saturday, and Sunday, for July and February 2017. To portion each trip type by visitor, 2018 Onboard Transit Survey Data showed the following percentage breakdowns:

- For Aspen/Snowmass area buses 70% of ridership is by residents and 30% is by visitors.
- For regional (Highway 82) buses, 96% of ridership is by residents and 4% is by visitors.

Person miles traveled for all intrazonal trips (which are much shorter trips) was converted to person miles traveled using a motor vehicle by subtracting average daily trips walking and biking. The percentage of trips made by driving (driving mode split) was based on trip distance and was derived from 2017 National Household Travel Survey data for households in an urban cluster, by distance. Analysis of this data revealed the average percentage of trips driving for different distances as shown in **Table 3**. The drive mode split for each zone was based on the average trip length. For example, using the NHTS data shown in **Table 3**, for intrazonal trips where the average trip length is 0.4 miles, it was assumed that 56% of trips were made by driving. Similarly, for intrazonal trips where the average trip length is 2 miles, it was assumed that 84% of trips were made by driving.

Table 3. Mode Share of Drive Trips by Average Trip Length

Mode	Less than 0.5 miles	Less than 1.5 miles	Less than 2.5 miles	Less than 3.5 miles
% Drive Trips	56%	78%	84%	86%

Source: National Household Travel Survey 2017 (https://nhts.ornl.gov/) in an Urban Cluster; Fehr & Peers

The result of factoring in transit, walk, and bike trips was average PMT by motor vehicle.

Step 3 Convert Person Miles Traveled to Vehicle Miles Traveled

PMT by motor vehicle was converted to vehicle mile traveled (VMT) by factoring in average vehicle occupancy. Average vehicle occupancy was derived from the 2017 NHTS for both weekday and weekend trips by trip purpose as illustrated in **Table 4**. Based on this data the following vehicle occupancies were used for each trip type:

- Resident weekday trips: 1.53 - based on weekday trips for all purposes
- Resident weekend trips: 1.53 - based on weekday trips for all purposes (given the strong service sector economy and that many people commute on the weekends, weekday vehicle occupancy was used)
- Visitor weekday trips: 1.97 – based on weekday vehicle occupancy for social/recreational
- Visitor weekend trips: 2.27 – based on weekend vehicle occupancy for social/recreational

Table 4. Average Vehicle Occupancy

Trip Purpose	Weekday Trip	Weekend Trip
Home	1.45	1.95
Work	1.19	1.33
School/Daycare/Religious activity	1.47	2.21
Medical/Dental services	1.60	1.85
Shopping/Errands	1.74	2.01
Social/Recreational	1.97	2.27
Transport someone	1.91	2.35
Meals	2.03	2.31
Something else	1.79	1.75
All	1.53	2.02

Source: National Household Travel Survey 2017 (https://nhts.ornl.gov/)

The result of this step was VMT for all eight of the trip types defined earlier (weekday/weekend, resident/visitor, February/July) for the following AirSage zonal trips: interzonal trips within the community, half of interzonal trips that leave the community, and for intrazonal trips within the community.

Step 4 Scale Vehicle Miles Traveled to 2019

The final step involved combining the disaggregated trip data from 2017 as described above to 2019 and 2020 data sets, using the following sub-steps:

- First, the visitor and resident average daily VMT were added together.
- Second, the weekday and weekend average daily VMT were combined to average daily VMT.
- Third, the average daily VMT by month for each of the three AirSage zonal trip types (interzonal within community, interzonal trips that leave the community, and intrazonal trips within the community) were added together. For unincorporated Pitkin County VMT from non-AirSage zone trips were also added (the methodology for that estimate is described in the next section)

Application of this subset of steps resulted in average daily VMT for February, 2017 and July, 2017 for the particular community. The next two steps involved using permanent vehicle count data in Pitkin County to first convert the data sets to annual data for 2017 and second to scale the data to 2019 and 2020, both using factors derived from the permanent count data.

There are two locations in Pitkin County with permanent vehicle counters dating at least back to 2017, both on CO 82:

- CO 82 near Old Snowmass (collected by CDOT)
- CO 82 at the Castle Creek Bridge (collected by City of Aspen)

Figure 2. Average Daily Traffic by Month on CO 82 in 2017

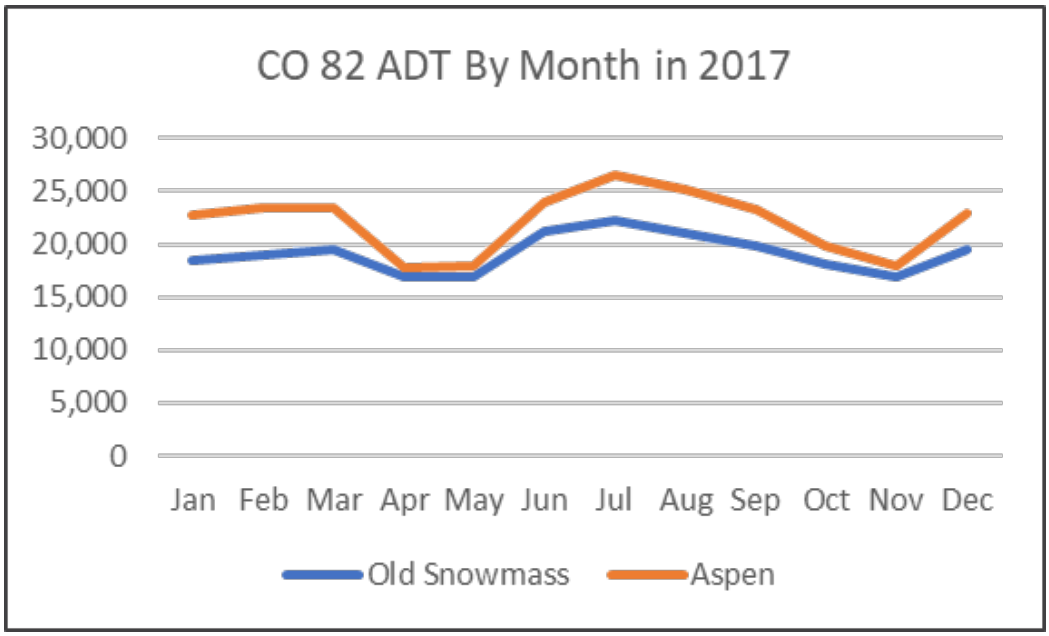
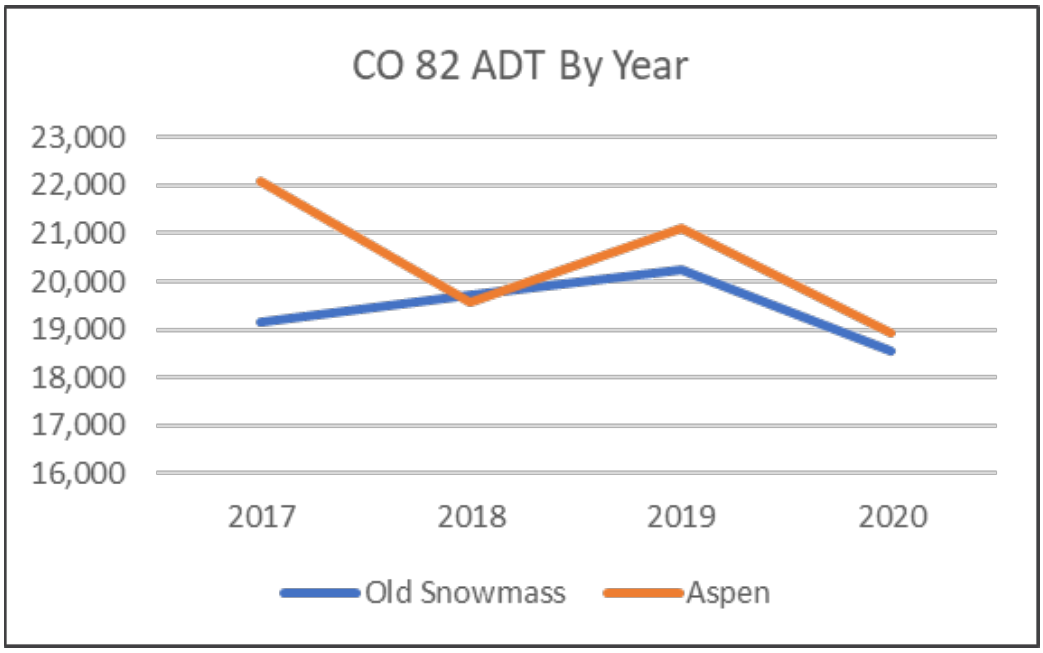


Figure 3. Average Daily Traffic by Year on CO 82



The two data sets were compared as illustrated in **Figure 2**, which shows monthly counts in 2017, and **Figure 3** that shows annual counts from 2017 to 2019. Interestingly there is some discrepancy between the data sets. Both data sets show vehicle counts peaking in February and July, but the data in Aspen show a bigger difference between the peak season and off-season than the data at Old Snowmass. Additionally, the data at Aspen shows a decline in vehicle traffic from 2017 to 2019, while the data at Old Snowmass shows a slight increase. To resolve these differences, the following methodology was used:

- For all communities February count data was used to estimate average daily VMT for the following other "winter" months using a seasonal factor, including November, December, January, March, and April.
- For all communities July count data was used to estimate average daily VMT for the following other "summer" months using a seasonal factor, including: May, June, August, September, and October.
- An average of the two count locations was used to annualize the data, but only the count data at Old Snowmass was used to extract factors to convert from 2017 average daily to 2019 and 2020 average daily VMT. This is because much of the VMT attributable to Pitkin County travels on this segment of CO 82.

This resulted in average daily VMT by community in 2019 and 2020. These values were multiplied by the number of days per year (365) to get annual VMT for each year.

Trips Not Captured in AirSage Data

While the AirSage data included all areas of Aspen, Snowmass Village, and Basalt, it did not include some of the more rural areas of unincorporated Pitkin County. In order to capture these trips the following methodology was used to estimate VMT.

Pitkin County collects a robust set of traffic counts at many locations on the major county roads. This data was combed to pinpoint locations not included in the AirSage data. Seven traffic count locations were identified on major county roads that would include trips not captured in the AirSage data as shown in **Table 5**. These locations cover all the major access points to unincorporated Pitkin County not already included in the AirSage data.

Table 5. Traffic Count Locations for VMT Analysis in Unincorporated Pitkin County

Count Location	July Daily Vol.	Feb Daily Vol.	Year Collected	Avg. Trip Length (miles)	Basis for Avg. Trip Length	% VMT Attributable to Unincorp. Pitkin Co.	% VMT Attributable to Aspen	% VMT Attributable to COSV
Castle Creek Road	675	399	2017	14	Aspen to Castle Creek TH	50%	50%	0%
Woody Creek Road	487	744	2017/ 2016	18	Aspen to end of Woody Creek Rd	50%	37.5%	12.5%
Frying Pan Road	400	112	2016/ 2018	60	Aspen to end of road	50%	0%	0%
Upper Thomspon Creek	130	88	2019 /2012 (Nov)	30	Glenwood Springs to S. Thompson Cr. Rd	50%	0%	0%
W Sopris Creek	750	433	2017	25	Aspen to Sopris Mountain Ranch	50%	25%	25%
Snowmass Creek Road	277	N/A	2017	12	Aspen to Snowmass Lake Trailhead	50%	0%	50%
Upper Maroon Creek Road	966	N/A	2019	11	To Aspen (minus 144 buses per day)	50%	50%	0%

For each location an average trip length was derived by estimating the distance on that road to the nearest major destination, typically downtown Aspen. Counts were pulled as close to July and February 2017 as possible and noted where they deviate. The daily count was multiplied by the average trip length to get VMT. A percent of trip attributable to each community was also assigned. These were summed to get the daily VMT to non-AirSage zones for each community.

Findings

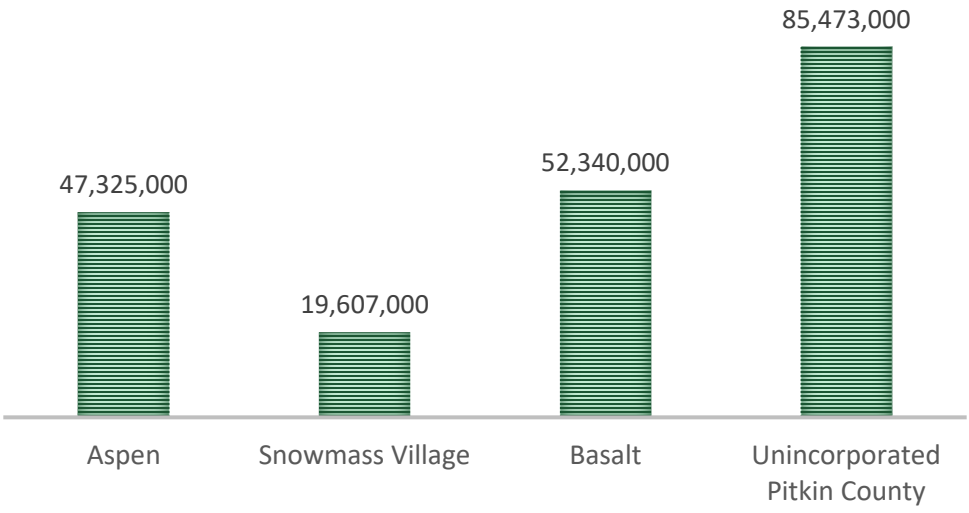
Summary of Findings

A summary of findings is provided in **Table 6** and **Figure 4**. This data shows that VMT is highest in Unincorporated Pitkin County. **Table 6** shows the VMT per household. Using this metric, Aspen has the lowest per capita VMT and unincorporated Pitkin County has a substantially higher VMT per capita. By comparison data provided by the USDOT Bureau of Transportation Statistics shows that average VMT per household is typically 20-30 in urban areas and 30 to 50+ in rural areas. This is generally consistent with the findings of this analysis.

Table 6. Vehicle Miles Traveled Estimates by Community

Denomination	Year	Aspen	Snowmass Village	Basalt	Unincorporated Pitkin County	Pitkin County Total
Average Daily VMT (Month)	July 2017	171,982	62,221	156,375	263,674	533,539
	February 2017	100,798	50,173	135,875	225,755	407,711
Average Daily VMT (Year)	2017	122,767	50,864	135,778	221,730	426,326
	2019	129,656	53,719	143,397	234,173	450,250
	2020	118,995	49,301	131,605	214,917	413,225
Annual VMT	2017	44,810,000	18,566,000	49,559,000	80,932,000	155,609,884
	2019	**47,325,000**	**19,607,000**	**52,340,000**	**85,473,000**	164,341,089
	2020	43,433,000	17,995,000	48,036,000	78,445,000	150,827,565
Households	2019	3,356	1,227	3,185	2,406	7,467
Daily VMT per HH	2019	39	44	45	97	60

Figure 4 2019 Annual Vehicle Miles Traveled by Community



Explanation of Findings

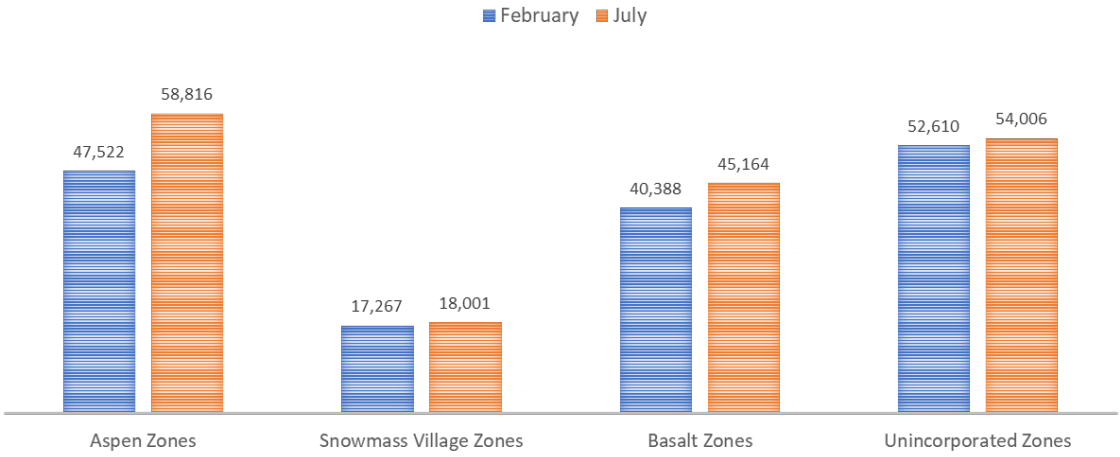
This section provides some explanation for two key questions that emerged following the review of the findings.

Why is VMT so high in Basalt and particularly Unincorporated Pitkin County compared to Aspen & Snowmass Village?

A review of the data reveals four major reasons to explain the answer to this question:

1. **Trip Distances** – **Figure 5** shows that the average number of trips in Aspen is higher than Basalt and unincorporated Pitkin County in the summer, yet has lower VMT. This can be explained in part due to much higher average trip length in the other communities. People in Basalt more frequently travel farther. Similarly, there are a lot of long trips in unincorporated Pitkin County likely because services and jobs are much more dispersed and generally farther away from people's homes.
2. **Less Transit Use** – Another explanation of the discrepancy has to do with transit use, which is much higher in Aspen and Snowmass Village than unincorporated Pitkin County and Basalt.
3. **Aspen Airport and ABC are Major Destinations** – A review of the data shows a lot of VMT generated by these zones around the Aspen Airport which is in Unincorporated Pitkin County. The data shows a higher the prevalence of long trips to down-valley locations as compared to trips in Snowmass Village and Aspen core which tend to have a higher ratio of shorter trips within their respective community.
4. **Brush Creek Road Intercept Lot** – The Brush Creek Road intercept lot is also a high VMT generator. While many of these trips end up in Snowmass or Aspen, the trips to those communities are either by transit or are much shorter as compared to the trip length to down-valley locations. Thus, much of the high VMT assigned to this zone ends up being attributable to unincorporated Pitkin County instead of Aspen or Snowmass Village.

Figure 5. Weekday Trip Origins by Community



Why is Aspen VMT estimate lower than previous estimates?

The 2017 annual VMT for the Aspen Emission Inventory Boundary (EIB) previously conducted was 147,463,536 while the 2019 annual VMT for the City of Aspen from this analysis was found to b 47,325,000, which is much lower than the previous findings. Similarly, the 2019 annual VMT for the Pitkin County from this analysis was found to be 164,341,089, only 11% higher than the previous 2017 estimate for the Aspen EIB. Comparing to the previous estimates one would have expected the VMT attributable to Aspen in the current estimates to be higher and the VMT attributable to all of Pitkin County to be higher as well.

There are few explanations for why Aspen is so much lower than previous estimates and why Pitkin County VMT also seems low compared to what would be extrapolated from previous estimates:

- First, a major reason for the difference in the Aspen VMT estimates as compared to previous estimates has to do with the change in the boundary. The EIB, which was used in the previous analysis, included a much larger area around Aspen, in particular the Aspen Airport and AABC, which were noted as having generated a significant amount of longer trips and disproportionally higher VMT.
- Second, even factoring the change in the boundary, the VMT attributable to Pitkin County for 2017 using this most recent methodology (156 million) is only a little higher than the Aspen total that was estimated in 2017 using the previous methodology (148 million). Most of this discrepancy has to do with the change in methodology. The single source that appears to be affecting this difference the most is the trip length. In the previous methodology, survey data was used to estimate many of the travel patterns as well as other generalities. For example, if 10% of people working in Aspen commute from Glenwood Springs, then that was assumed to be the trip length for that trip. In the most

current methodology, AirSage data was used to inform origins and destinations and that data shows a lot more short trips than previously assumed. The reason behind this has to do with stops. For example, in the previous example of someone commuting from Glenwood to Aspen, if they stopped in Basalt for a cup of coffee or the hardware store, etc. the VMT attributable to Pitkin County would only be for the distance of the trip from Basalt to Aspen. Also, many down-valley trips are stopping at one of three locations in unincorporated Pitkin County: the Brush Creek Road Intercept Lot, the Aspen Airport, and the Aspen Airport Business Center. There are definite tradeoffs with this approach, but it is consistent with ICLEI protocol. In the end, determining trips attributable to a location does not come without some degree of nuance.

- Third, the vehicle occupancy assumptions will impact the VMT estimates quite a bit. For the current estimates data was used from NHTS but they are generalities and more locally accurate data, if available, would improve the accuracy. A review of the previous estimate from 2017, suggests that analysis may have assumed a slightly lower vehicle occupancy than was used in the current methodology, which would result in higher VMT estimates in the previous analysis.
- Lastly, the previous analysis included transit trip VMT, whereas the updated one does not. Transit VMT is not very significant, likely accounting for less than one percent of VMT, but would partially contribute the difference observed from the previous estimate.

Future Analysis Recommendations

We have two recommendations to improve the accuracy and streamline the process of future VMT analysis in Pitkin County:

1. We would recommend in future analysis to collect a new set of "Big Data," which could be more accurately tailored to the time frame desired as well as the zonal boundaries desired. This would result in both a more accurate estimate and could be achieved using a more streamlined approach. Big Data accuracy has also improved substantially over the last several years and collecting new data would reflect a more accurate trip count and travel pattern.
2. We also recommend investigating a methodology to more accurately estimate average vehicle occupancy in the region. It was noted earlier that the assumption of average vehicle occupancy significantly affect the results. Thus, improving the accuracy of those assumptions will help improve the accuracy of the findings.

Appendix

Average Distance Between AirSage Zones

Zone	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	39	40	41	42	43	101	102	103	104
21	65.6	45.7	38.1	30.3	28.2	43.5	13.7	21.3	19.1	19.8	18.7	18.6	18.1	18.8	17.2	14.5	17.7	9.5	8.6	3.8	0.0	1.5	3.8	9.4	16.2	14.8	21.7	20.4	18.7	18.7	20.5	21.4	21.3	23.2	21.6	21.7	22.4	22.8	23.6	22.4	19.5	22.6	22.3	106.6	78.9	23.2	41.7
22	67.1	47.2	39.6	31.8	29.7	45.0	15.2	22.8	20.6	21.3	20.2	20.1	19.6	20.3	18.7	16.0	19.2	11.0	10.1	5.3	1.5	0.0	2.3	7.9	14.7	13.2	20.1	18.8	17.2	17.2	19.0	19.9	19.8	21.6	20.0	20.2	20.9	21.2	22.1	20.9	18.0	21.1	20.8	108.1	80.4	24.8	40.2
23	69.4	49.5	41.9	34.1	32.0	47.3	17.5	25.1	22.9	23.6	22.5	22.4	21.9	22.6	21.0	18.3	21.5	13.3	12.4	7.6	3.8	2.3	0.0	5.6	12.4	11.0	17.9	16.6	14.9	14.9	16.7	17.6	17.5	19.4	17.8	17.9	18.6	19.0	19.8	18.6	15.7	18.8	18.5	111.0	111.3	27.3	38.0
24	75.0	55.1	47.5	39.7	37.6	52.9	23.1	30.7	28.5	29.2	28.1	28.0	27.5	28.2	26.6	23.9	27.1	18.9	18.0	13.2	9.4	7.9	5.6	0.0	10.5	8.9	15.8	14.5	12.8	12.8	14.6	15.8	15.3	17.3	15.7	15.8	16.5	16.9	17.7	16.5	16.3	13.6	17.2	116.0	118.3	34.3	35.8
25	81.8	61.9	54.3	46.4	44.4	59.7	29.9	37.5	35.3	36.0	34.9	34.8	34.3	35.0	34.0	30.7	28.5	25.7	24.8	20.0	16.2	14.7	12.4	10.5	0.0	2.6	5.7	4.4	2.8	2.8	4.5	5.5	5.2	7.2	5.6	5.7	6.5	6.8	7.6	6.3	6.2	3.4	7.1	123.0	125.1	41.1	25.7
26	80.3	60.4	52.8	45.0	43.0	58.3	28.4	36.0	33.9	34.6	33.4	33.3	32.8	33.5	32.0	29.2	27.1	24.2	23.4	18.5	14.8	13.2	11.0	8.9	2.6	0.0	7.9	6.6	4.9	4.9	6.7	7.9	7.5	9.4	7.8	7.9	8.6	8.9	9.8	8.6	8.5	5.7	9.3	121.0	123.7	39.6	28.0
27	87.2	67.3	59.7	51.9	49.9	65.2	35.3	43.0	40.8	41.5	40.3	40.3	39.7	40.4	38.9	36.1	34.0	31.1	30.3	25.4	21.7	20.1	17.9	15.8	5.7	7.9	0.0	1.3	7.9	8.1	7.9	9.1	8.7	10.6	9.0	9.1	9.9	10.2	11.0	9.8	9.7	6.8	2.7	128.0	131.0	46.5	29.1
28	85.9	66.0	58.4	50.6	48.6	63.9	34.0	41.7	38.0	40.2	39.0	39.0	38.4	39.1	37.6	34.8	32.7	29.8	29.0	24.1	20.4	18.8	16.6	14.5	4.4	6.6	1.3	0.0	6.6	6.8	6.6	7.8	7.4	9.3	7.7	7.8	8.6	8.9	9.7	8.5	8.4	5.5	2.7	127.0	129.3	45.2	27.9
29	84.3	64.4	56.8	48.9	46.9	62.2	32.4	40.0	37.8	38.5	37.4	37.3	36.8	37.5	35.9	33.2	31.0	28.2	27.3	22.5	18.7	17.2	14.9	12.8	2.8	4.9	7.9	6.6	0.0	0.4	2.2	3.2	2.8	4.9	3.3	3.4	4.2	4.5	5.3	3.9	3.8	1.0	9.3	125.0	127.6	43.6	23.2
30	84.3	64.4	56.8	48.9	46.9	62.2	32.4	40.0	37.8	38.5	37.4	37.3	36.8	37.5	35.9	33.2	31.0	28.2	27.3	22.5	18.7	17.2	14.9	12.8	2.8	4.9	8.1	6.8	0.4	0.0	2.3	3.6	3.0	4.9	3.3	3.5	4.2	4.5	5.4	4.1	4.0	1.2	9.5	125.0	127.6	43.6	23.5
31	86.0	66.2	58.5	50.7	48.7	64.0	34.1	41.8	39.6	40.3	39.1	39.1	38.5	39.2	37.7	34.9	32.8	29.9	29.1	24.3	20.5	19.0	16.7	14.6	4.5	6.7	7.9	6.6	2.2	2.3	0.0	1.5	1.1	3.0	1.4	1.5	2.2	2.6	3.4	2.2	2.1	1.2	9.3	127.0	129.4	45.3	21.6
32	87.0	67.1	59.5	51.6	49.6	64.9	35.1	42.7	40.5	41.2	40.1	40.0	39.5	40.2	38.6	35.9	33.7	30.9	30.3	25.2	21.4	19.9	17.6	15.8	5.5	7.9	9.1	7.8	3.2	3.6	1.5	0.0	1.1	3.3	1.7	1.9	2.6	2.9	3.8	2.2	0.8	2.2	10.3	128.0	130.0	46.3	21.5
33	86.8	66.9	59.3	51.5	49.5	64.3	34.9	42.6	40.4	41.1	39.9	39.9	39.3	40.0	38.5	35.7	33.6	30.7	29.9	25.0	21.3	19.8	17.5	15.3	5.2	7.5	8.7	7.4	2.8	3.0	1.1	1.1	0.0	2.9	1.3	1.4	2.1	2.5	3.3	5.4	1.6	2.0	10.1	128.0	130.0	46.1	21.4
34	88.7	68.8	61.2	53.4	51.4	66.7	36.8	44.5	42.3	43.0	41.8	41.8	41.2	41.9	40.4	37.6	35.5	32.6	31.8	26.9	23.2	21.6	19.4	17.3	7.2	9.4	10.6	9.3	4.9	4.9	3.0	3.3	2.9	0.0	1.6	1.6	1.4	1.2	2.6	1.6	3.9	3.9	12.0	129.0	132.0	48.0	20.7
35	87.1	67.2	59.6	51.8	49.8	65.1	35.2	42.9	40.7	41.4	40.2	40.2	39.6	40.3	38.8	36.0	33.9	31.0	30.2	25.3	21.6	20.0	17.8	15.7	5.6	7.8	9.0	7.7	3.3	3.3	1.4	1.7	1.3	1.6	0.0	0.2	1.0	1.3	2.1	0.9	2.3	2.3	10.7	128.0	130.0	46.4	20.3
36	87.2	67.4	59.7	51.9	49.9	65.2	35.3	43.0	40.8	41.5	40.3	40.3	39.7	40.4	38.9	36.1	34.0	31.1	30.3	25.4	21.7	20.2	17.9	15.8	5.7	7.9	9.1	7.8	3.4	3.5	1.5	1.9	1.4	1.6	0.2	0.0	0.7	1.2	2.0	0.7	2.4	2.4	10.5	128.0	131.0	46.5	20.2
37	87.9	68.1	60.5	52.6	50.6	65.9	36.0	43.7	41.5	42.2	41.0	41.0	40.4	41.1	39.6	36.8	34.7	31.8	31.0	26.2	22.4	20.9	18.6	16.5	6.5	8.6	9.9	8.6	4.2	4.2	2.2	2.6	2.1	1.4	1.0	0.8	0.0	0.8	1.3	0.1	3.1	3.1	11.1	129.0	131.0	47.3	19.5
38	88.3	68.4	60.8	53.0	51.0	66.3	36.4	44.0	41.9	42.6	41.4	41.3	40.8	41.5	39.9	37.2	35.0	32.2	31.3	26.5	22.8	21.2	19.0	16.9	6.8	8.9	10.2	8.9	4.5	4.5	2.6	2.9	2.5	1.2	1.3	1.2	0.8	0.0	1.7	1.2	3.5	3.5	11.6	129.0	132.0	47.6	19.8
39	89.1	69.3	61.6	53.8	51.8	67.1	37.2	44.9	42.7	43.4	42.2	42.2	41.6	42.3	40.8	38.0	35.0	33.0	32.2	27.4	23.6	22.1	19.8	17.7	7.6	9.8	11.0	9.7	5.3	5.4	3.4	3.8	3.3	2.6	2.1	2.0	1.3	1.5	0.0	1.7	4.3	4.3	12.4	130.0	132.0	48.4	18.7
40	87.9	68.1	60.4	52.5	50.6	65.9	36.0	43.7	41.5	42.2	41.0	41.0	40.4	41.1	39.6	36.8	34.7	31.8	31.0	26.2	22.4	20.9	18.6	16.5	6.3	8.6	9.8	8.5	3.9	4.1	2.2	2.2	5.4	1.6	0.9	0.7	0.1	1.2	1.7	0.0	3.1	3.1	11.2	129.0	131.0	47.2	19.9
41	85.0	65.2	57.6	49.7	47.7	63.0	33.2	40.8	38.6	39.3	38.1	38.1	37.5	32.8	36.7	33.9	31.8	28.9	28.1	23.3	19.5	18.0	15.7	16.3	6.2	8.5	9.7	8.4	3.8	4.0	2.1	0.8	1.6	3.9	2.3	2.4	3.1	3.5	4.3	3.1	0.0	3.0	11.1	126.0	128.4	47.1	22.4
42	88.1	68.3	60.7	52.8	50.8	66.1	36.3	43.9	41.7	42.4	41.2	41.2	40.6	41.3	39.8	37.0	34.9	32.0	31.2	26.4	22.6	21.1	18.8	13.6	3.4	5.7	6.8	5.5	1.0	1.2	1.2	2.2	2.0	3.9	2.3	2.4	3.1	3.5	4.3	3.1	3.0	0.0	8.2	129.0	132.0	44.4	22.5
43	87.8	68.0	60.4	52.5	50.5	65.8	35.9	43.6	41.4	42.1	40.9	40.9	40.3	41.0	39.5	36.7	34.6	31.7	30.9	26.1	22.3	20.8	18.5	17.2	7.1	9.3	2.7	2.7	9.3	9.5	9.3	10.3	10.1	12.0	10.7	10.5	11.1	11.6	12.4	11.2	11.1	8.2	0.0	129.0	131.0	47.9	30.6
103	78.5	55.9	48.3	40.5	38.5	53.8	23.9	31.5	29.4	30.1	28.9	28.8	28.3	29.0	27.4	22.7	22.5	19.7	16.4	19.5	23.2	24.8	27.3	41.3	48.1	46.6	53.5	52.2	50.6	50.6	52.3	53.3	53.1	55.0	53.4	53.5	54.3	54.6	55.4	54.2	54.1	51.4	54.9	117.0	119.2	0.0	73.6
104	107.0	87.4	79.8	72.0	69.9	85.2	55.4	63.0	60.8	61.5	60.4	60.3	59.8	60.5	59.8	56.2	54.0	51.2	50.3	45.5	41.7	40.2	38.0	35.8	25.7	28.0	29.1	27.9	23.2	23.5	21.6	21.5	21.4	20.7	20.3	20.2	19.5	19.8	18.7	19.9	22.4	22.5	30.6	148.0	104.2	66.6	0.0

AirSage Zone Centroid Location

Zone #	Zone Name	Zone Centroid
1	Parachute/Battlement Mesa	I-70 Exit 75
2	Rifle	3rd St/Railroad Ave
3	Silt	I-70 Exit 97
4	New Castle	I-70 Exit 105
5	Glenwood Springs (Sunlight Mountain)	Sunlight Mtn. Resort
6	Dotsero/Gypsum	US 6/Valley Rd
7	Missouri Heights	CMC Spring Valley
8	Glenwood Springs_Northwest	Glenwood Springs Mall
9	Glenwood Springs_Northeast	I-70 Exit 116
10	Glenwood Springs_Meadows	Wulfshohn Rd and Meadows Dr
11	Glenwood Springs_North Midland	13th St and Midland Ave
12	Glenwood Springs_Downtown	SH 82/9th
13	Glenwood Springs_Central	SH 82/15th
14	Cardiff	Midland Ave/4 Mile Rd/Airport Rd
15	Glenwood Springs_South Central	SH 82/27th
16	CMC, West of Roaring Fork	CR 109/Ironbridge
17	CMC, East of Roaring Fork	SH 82/CR 114
18	Aspen Glen	SH 82/Diamond A Ranch Road
19	Carbondale	SH 133/Main St
20	Ranch at Roaring Fork/Catherine Store	SH 82/CR 100
21	El Jebel/Willits	SH 82/El Jebel Rd
22	Sagewood/Aspen Junction	SH 82/Willits Ln/Two Rivers Rd
23	Basalt	SH 82/Basalt Ave
24	Old Snowmass	Snowmass Creek Rd/Capitol Creek Rd
25	Brush Creek Road Intercept Lot	SH 82/Brush Creek Road
26	Woody Creek	Upper River Road/Woody Creek Road
27	Snowmass Village Town Core	Snowmass Mall
28	Snowmass Village	Owl Creek Rd/Brush Creek Rd
29	Aspen/Pitkin County Airport	SH 82/Airport Rd
30	Airport Business Center	Baltic Ave/AABC
31	Aspen Golf Course	SH 82/Truscott Pl
32	Aspen High School	Aspen High School
33	Aspen Hospital	Aspen Hospital
34	Aspen Red Mountain	Red Mountain Rd/Draw Dr
35	Aspen Core_Northwest	N 5th St/W Smuggler St
36	Aspen Core_Southwest	Main St/4th
37	Aspen Core_Downtown	Galena/Hyman
38	Aspen Core_Northeast	South Ave/Gibson Ave
39	Aspen Core_Southeatt	SH 82/Roaring Fork Dr
40	Aspen Mountain	Hunter St/Durant Ave
41	Aspen Highlands Mountain	Maroon Creek Rd/Prospector Rd
42	Buttermilk Mountain	SH 82/Owl Creek Rd
43	Snowmass Mountain	Burlingame Rd/Carriage Way
44	I-70 West External	5th/Ute (Grand Junction)
45	I-70 East External	I-70/Vail Rd (Vail)
46	SH 133 External	SH 133/CR 3 (Redstone)
47	SH 82 (Independence Pass) External	Top of Independence Pass

AirSage Zone Map

RIO BLANCO
GARFIELD
EAGLE
MESA
PITKIN
GUNNISON
DELTA

SH 13
SH 325
I 70
U.S. 6
SH 82
SH 133
SH 65

NEW CASTLE
RIFLE
SILT
GLENWOOD SPRINGS
PARACHUTE
BATTLEMENT MESA
CARBONDALE
EL JEBEL
BASALT
GYPSUM
EAGLE
COLLBRAN
MARBLE
SNOWMASS VILLAGE
ASPEN

Legend

- Highways
- Major Roads
- Local Roads
- Cities
- Counties

AirSage Zones

- 1: Parachute/Battlement Mesa
- 2: Rifle
- 3: Silt
- 4: New Castle
- 5: Glenwood Springs (Sunlight Mtn.)
- 6: Dotsero/Gypsum
- 7: Missouri Heights
- 8: Glenwood Springs (Northwest)
- 9: Glenwood Springs (Northeast)
- 10: Glenwood Springs (Meadows)
- 11: Glenwood Springs (North Midland)
- 12: Glenwood Springs (Downtown)
- 13: Glenwood Springs (Central)
- 14: Cardiff
- 15: Glenwood Springs (South Midland)
- 16: CMC, West of Roaring Fork
- 17: CMC, East of Roaring Fork
- 18: Aspen Glen
- 19: Carbondale
- 20: Ranch at Roaring Fork/Catherine Store
- 21: El Jebel/Willets
- 22: Sagewood/Aspen Junction
- 23: Basalt
- 24: Old Snowmass
- 25: BCR Intercept Lot
- 26: Woody Creek
- 27: Snowmass Town Core
- 28: Snowmass
- 29: Aspen Airport
- 30: Aspen ABC
- 31: Aspen Golf Course
- 32: Aspen High School
- 33: Aspen Hospital
- 34: Aspen Red Mountain
- 35: Aspen Core (Northwest)
- 36: Aspen Core (Southwest)
- 37: Aspen Core (Downtown)
- 38: Aspen Core (Northeast)
- 39: Aspen Core (Southeast)
- 40: Aspen Mountain Ski
- 41: Aspen Highlands Ski
- 42: Aspen Buttermilk Ski
- 43: Snowmass Mountain Ski
- 101: I-70 West External Zone
- 102: I-70 East External Zone
- 103: SH 133 External Zone
- 104: SH 82 External Zone

0 1 2 4 6 8 Miles

ROARING FORK TRANSPORTATION AUTHORITY

PARSONS

CSV 9/23/2016 22" X 34"