# 4.0 CHEMICAL COMPONENTS OF LIGHT EXTINCTION

Since the chemical components of the suspended particles can be used to determine the sources and the light extinction properties of particles in the atmosphere, it is important to understand the chemical characteristics of the suspended particles. Different chemical components possess different light extinction properties. These properties are expressed as chemical-specific "efficiencies" for the chemical components that constitute the majority of suspended particle mass. Efficiencies are expressed in square meters per gram ($m^2/g$) of suspended material, and they approximate the number of inverse megameters ($Mm^{-1}$) that correspond to each $\mu g/m^3$ of each chemical component. Watson and Chow (1994) note that elemental carbon absorbs light with efficiencies commonly in the range of 8 to 12 $m^2/g$, whereas suspended dust scatters light with efficiencies commonly in the range of 0.4 to 1.0 $m^2/g$. Other scattering efficiency ranges are 3 to 9 $m^2/g$ for sulfate or nitrate and 3 to 5 $m^2/g$ for organic carbon.

Particle scattering efficiencies are most sensitive to the size distribution of particles, and this distribution changes with relative humidity depending on the hygroscopic nature of each chemical substance. Efficiency estimates are also complicated by the mixture of several chemical species in the same particle, a mixture that is largely unknown for a specific situation. Changes in extinction differ depending on whether particle size or particle number changes for a given change in chemical concentration.

This section estimates scattering and absorption efficiencies for different chemical components, and estimates uncertainties associated with different assumptions about size and composition. It summarizes the particle compositions at each aerosol measurement location to identify the major components of $PM_{2.5}$ that can be associated with scattering and absorption efficiencies. Individual contributions from each chemical component are tabulated, and frequency distributions are examined to determine which chemical components contribute to different levels of total light extinction. Chemical compositions measured by the Buffalo Pass IMPROVE monitor are compared with compositions from other Class I areas.

## 4.1 Light Scattering Efficiencies

The Elastic Light Scattering Interactive Efficiencies (ELSIE) model (Sloane, 1984; 1986; Sloane *et al.*, 1991; Lowenthal *et al.*, 1995) is used to estimate the light extinction caused by hygroscopic aerosols of mixed chemical composition. Appendix B.4 provides details on the use of ELSIE in the MZVS and compares the derived efficiencies with those found by other methods.

### 4.1.1 ELSIE Model

The ELSIE model was applied with the following assumptions and parameter selections:

- A unimodal-lognormal particle size distribution was assumed based on a specified geometric mean diameter ($D_g$) and standard deviation for all chemical components. If the actual size distribution is non-unimodal or non-lognormal, the light extinction coefficients will be overestimated at some sizes and underestimated at other sizes. Appendix B shows that light extinction is very sensitive to $D_g$ for $D_g < 0.3$ μm, and small changes in the geometric mean diameter could result in large errors in the total estimated light extinction.

- Unimodal-lognormal distributions are estimated from the ratios between the TSI nephelometer particle scattering measured at different wavelengths (blue/green and green/red).

- Particles are assumed to be spherical. This is a good assumption if the particles have been nucleated or condensed into droplets. However, at low relative humidities, suspended dust and elemental carbon particles may have irregular shapes that deviate from sphericity and change their light extinction properties.

- Particle light extinction coefficients are assumed to equal the number of particles multiplied by each one's extinction cross section. This implies that no particle blocks light that would hit another particle, and light is not multiply scattered. This assumption is reasonable for the MZVS because particle concentrations are low. Significant multiple scattering would result in an underestimate extinction efficiencies.

- $PM_{2.5}$ mass is assumed to be composed of six chemical components: ammonium sulfate, ammonium nitrate, organics, elemental carbon, suspended dust (using the definitions of Zhang *et al*., 1994), and liquid water. This assumption neglects other components that were not directly measured or have very low extinction coefficients. As shown below, these components are the major constituents of $PM_{2.5}$ found during the MZVS.

- The particle absorption cross section is assumed to be the difference between the particle extinction and scattering cross sections. This is a fairly good assumption since only particles are considered by ELSIE.

- The wavelength of light is assumed to be monochromatic (550 nm), corresponding to the green light scattering of the TSI nephelometer. This wavelength is also in the middle of the visible light range of the OPTEC nephelometer. Particles scatter and absorb light, and their efficiencies vary with wavelength. Sunlight is composed of many wavelengths. Actual extinction in the atmosphere will vary depending on the illumination (which varies by time of day and cloud-cover).

- Particles in a size range are assumed to have the same density. ELSIE calculates the number of particles in each size range from the particle size, volume-averaged density, and the total aerosol volume in the size range.

- Liquid water growth functions are empirically derived, and may differ from actual liquid water uptake by soluble particles. There is no definitive way to determine how particles of differing composition and structure grow as the relative humidity increases. Some particles become droplets within a short time after relative humidity rises, while other particles require a longer reaction time.

- The size of particles is assumed to be constant rather than the number when chemical compositions are changed in ELSIE calculations.

- The aerosol is assumed to be internally and homogeneously mixed. Sensitivity tests in Appendix B.4 show that an externally mixed assumption yields particle scattering coefficients ($b_{sp}$) that are 14% lower than those obtained with the internally mixed assumption. In reality, the aerosol is probably some combination of externally and internally mixed particles.

Appendix B.4 examines the quantitative effects of these assumptions in some detail, enhancing rather than repeating the observations published by Lowenthal et al. (1995). The most critical assumptions for applying ELSIE for the MZVS are those related to the particle size distribution. The estimated $b_{sp}$ is most sensitive to variations in particle size for the particle diameters less than 0.3 μm that apparently occurred in the MZVS. These limitations are further evaluated in the following discussions.

### 4.1.2 Particle Size Distributions and Mean Geometric Diameters

The aerosol size distribution for each six-hour average $PM_{2.5}$ sample at the Buffalo Pass site was inferred from the ratio of the average measured $b_{sp}$ in the blue wavelength (450 nm) to the average measured $b_{sp}$ in the green wavelength (550 nm) (i.e., B/G ratio). A unimodal-lognormal particle size distribution was assumed with geometric mean diameter ($D_g$) and a geometric standard deviation equal to 2.0. Particle scattering ($b_{sp}$) was estimated at the blue and green wavelengths over a range of $D_g$ from 0.05 to 1.0 μm. The inferred $D_g$ was that which produced an estimated B/G that corresponded most closely to the measured B/G. The inferred $D_g$ for a given sample reflects its chemical composition and water content.

Table 4.1.1 shows the relationship between the measured B/G and inferred $D_g$ (Size1) for each sample at Buffalo Pass. The first “ER” column in Table 4.1.1 shows the percent deviation of the calculated from measured particle scattering. These deviations are sometimes very large, exceeding a factor of two or more for some samples. The final three columns in Table 4.1.1 show the geometric mean particle diameters (Size2) that best reproduce the measured particle scattering for each sample, and the B/G ratios that would correspond to this diameter. The deviations between measured and calculated values are much smaller for these cases, as would be expected. For most cases, the difference in B/G

## Table 4.1.1
## Comparison of $b_{sp}$(g) Estimated from Sizes ($D_g$) Inferred from Measured $b_{sp}$(b)/$b_{sp}$(g) Ratios

( sizes ($D_g$) which give best agreement between measured
and estimated $b_{sp}$(g) and $b_{sp}$(b)/$b_{sp}$(g) ratios )

| Date | Start Hour (MST) | Meas. $b_{sp}$[a] | Meas. B/G[b] | Size1[c] | ER[d] | Size2[e] | B/G[f] | ER[g] |
|---|---|---|---|---|---|---|---|---|
| 08/07/95 | 6 | 17.52 | 1.55 | 0.17 | -0.6 | 0.15 | 1.60 | 16.6 |
| 08/07/95 | 12 | 14.84 | 1.49 | 0.20 | -6.6 | 0.20 | 1.49 | -7.2 |
| 08/08/95 | 6 | 17.72 | 1.57 | 0.18 | -1.1 | 0.20 | 1.53 | -17.1 |
| 08/08/95[h] | 12 | 17.39 | 1.46 | 0.24 | -108.7 | 0.15 | 1.62 | -13.8 |
| 08/09/95[h] | 6 | 7.57 | 1.32 | 0.35 | -310.2 | 0.10 | 1.80 | 17.8 |
| 08/09/95[h] | 12 | 8.60 | 1.28 | 0.41 | -341.9 | 0.10 | 1.79 | 14.5 |
| 08/14/95 | 6 | 6.39 | 1.52 | 0.18 | -3.7 | 0.20 | 1.49 | -13.2 |
| 08/14/95 | 12 | 3.92 | 1.50 | 0.20 | -48.6 | 0.15 | 1.60 | -4.9 |
| 08/21/95[h] | 6 | 15.09 | 1.42 | 0.28 | -83.6 | 0.15 | 1.63 | 11.3 |
| 08/21/95[h] | 12 | 16.27 | 1.39 | 0.29 | -65.1 | 0.20 | 1.52 | -17.2 |
| 08/22/95 | 6 | 10.97 | 1.36 | 0.30 | -72.4 | 0.20 | 1.51 | -17.1 |
| 08/22/95[h] | 12 | 12.36 | 1.40 | 0.28 | -123.2 | 0.15 | 1.61 | -11.5 |
| 08/23/95 | 6 | 9.93 | 1.37 | 0.29 | -70.6 | 0.15 | 1.60 | 17.6 |
| 08/23/95[h] | 12 | 14.18 | 1.39 | 0.29 | -100.4 | 0.15 | 1.62 | 5.6 |
| 08/24/95[h] | 6 | 11.48 | 1.44 | 0.26 | -251.4 | 0.10 | 1.79 | 11.1 |
| 08/24/95 | 12 | 11.69 | 1.57 | 0.17 | -17.4 | 0.15 | 1.60 | -1.8 |
| 08/25/95 | 6 | 6.79 | 1.49 | 0.21 | -122.5 | 0.10 | 1.77 | 26.9 |
| 08/25/95 | 12 | 8.06 | 1.57 | 0.17 | -70.7 | 0.10 | 1.78 | 30.2 |
| 08/26/95 | 6 | 7.75 | 1.54 | 0.18 | -57.5 | 0.15 | 1.61 | -19.4 |
| 08/26/95 | 12 | 6.77 | 1.57 | 0.18 | -50.6 | 0.15 | 1.62 | -21.6 |
| 08/27/95 | 6 | 11.05 | 1.52 | 0.20 | -3.1 | 0.20 | 1.52 | -5.6 |
| 08/27/95 | 12 | 9.21 | 1.54 | 0.19 | -33.1 | 0.15 | 1.62 | 4.5 |
| 09/02/95 | 6 | 14.61 | 1.43 | 0.24 | 19.1 | 0.35 | 1.30 | -2.1 |
| 09/02/95 | 12 | 14.99 | 1.44 | 0.22 | 30.3 | 0.45 | 1.17 | 0.5 |
| 09/17/95 | 6 | 7.44 | 1.52 | 0.19 | 22.9 | 0.25 | 1.43 | -0.6 |
| 09/17/95 | 12 | 7.56 | 1.56 | 0.18 | 13.8 | 0.20 | 1.53 | 3.4 |
| 09/18/95 | 6 | 5.40 | 1.62 | 0.15 | 49.7 | 0.25 | 1.45 | 7.1 |
| 09/18/95 | 12 | 10.92 | 1.57 | 0.18 | 59.8 | 0.60 | 1.16 | 13.1 |
| 09/19/95 | 6 | 3.37 | 1.52 | 0.19 | 17.3 | 0.25 | 1.42 | -11.0 |
| 09/19/95 | 12 | 10.74 | 1.56 | 0.17 | 43.1 | 0.30 | 1.36 | 1.3 |
| 09/20/95 | 6 | 6.26 | 1.54 | 0.17 | 18.0 | 0.20 | 1.49 | 3.1 |
| 09/20/95 | 12 | 9.16 | 1.48 | 0.22 | 48.6 | 0.50 | 1.22 | 17.8 |
| 09/21/95 | 6 | 6.43 | 1.58 | 0.16 | 59.7 | 0.50 | 1.21 | 8.0 |
| 09/21/95 | 12 | 7.30 | 1.62 | 0.15 | 73.6 | 0.60 | 1.16 | 28.2 |
| 09/24/95 | 6 | 9.65 | 1.56 | 0.18 | 42.4 | 0.30 | 1.38 | 1.6 |
| 09/24/95 | 12 | 8.13 | 1.53 | 0.18 | 59.5 | 0.40 | 1.26 | 26.2 |
| 09/27/95 | 6 | 8.00 | 1.49 | 0.20 | 40.2 | 0.40 | 1.26 | 5.1 |
| 09/27/95 | 12 | 9.18 | 1.49 | 0.22 | 33.2 | 0.35 | 1.32 | 2.4 |

## Table 4.1.1 (continued)
## Comparison of $b_{sp}(g)$ Estimated from Sizes ($D_g$) Inferred from Measured $b_{sp}(b)/b_{sp}(g)$ Ratios.

( sizes ($D_g$) which give best agreement between measured
and estimated $b_{sp}(g)$ and $b_{sp}(b)/b_{sp}(g)$ ratios )

| Date | Start Hour | Meas. $b_{sp}$[a] | Meas. B/G[b] | Size1[c] | ER[d] | Size2[e] | B/G[f] | ER[g] |
|---|---|---|---|---|---|---|---|---|
| 09/30/95 | 6 | 1.02 | 1.59 | 0.14 | 21.5 | 0.15 | 1.57 | 16.9 |
| 09/30/95 | 12 | 8.00 | 1.59 | 0.15 | 35.0 | 0.20 | 1.47 | 4.5 |
| 10/01/95 | 6 | 10.13 | 1.58 | 0.16 | 57.9 | 0.50 | 1.21 | 3.9 |
| 10/01/95 | 12 | 6.46 | 1.55 | 0.18 | 15.4 | 0.20 | 1.52 | 5.4 |
| 10/02/95 | 6 | 11.13 | 1.55 | 0.19 | 50.2 | 0.60 | 1.17 | 0.7 |
| 10/02/95 | 12 | 3.72 | 1.48 | 0.21 | -19.8 | 0.20 | 1.50 | -11.9 |
| 10/07/95 | 6 | 4.65 | 1.44 | 0.22 | -69.9 | 0.15 | 1.57 | -9.8 |
| 10/07/95 | 12 | 5.46 | 1.44 | 0.26 | 45.5 | 0.50 | 1.23 | 23.1 |
| 10/08/95 | 6 | 16.55 | 1.53 | 0.19 | 60.3 | 0.60 | 1.16 | 25.3 |
| 10/08/95 | 12 | 6.76 | 1.50 | 0.22 | 53.0 | 0.50 | 1.24 | 19.7 |
| 10/09/95 | 6 | 5.56 | 1.43 | 0.24 | 6.9 | 0.25 | 1.42 | 4.6 |
| 10/09/95 | 12 | 6.24 | 1.43 | 0.23 | 17.5 | 0.30 | 1.34 | -0.7 |
| 10/10/95 | 6 | 9.52 | 1.44 | 0.23 | 64.8 | 0.45 | 1.17 | 50.9 |
| 10/10/95 | 12 | 6.70 | 1.44 | 0.22 | 37.0 | 0.40 | 1.25 | 13.5 |
| 10/11/95 | 6 | 3.82 | 1.42 | 0.24 | -35.3 | 0.20 | 1.48 | -15.0 |
| 10/11/95 | 12 | 3.83 | 1.41 | 0.25 | -178.1 | 0.10 | 1.75 | 21.2 |
| 10/12/95 | 6 | 15.92 | 1.49 | 0.20 | -24.3 | 0.15 | 1.59 | 13.2 |
| 10/12/95 | 12 | 12.00 | 1.53 | 0.17 | 26.3 | 0.95 | 1.03 | -2.1 |
| 10/13/95 | 6 | 2.38 | 1.57 | 0.15 | -41.1 | 0.10 | 1.73 | 26.8 |
| 10/13/95 | 12 | 1.78 | 1.52 | 0.19 | -123.0 | 0.10 | 1.76 | 17.5 |
| 10/14/95 | 6 | 2.52 | 1.45 | 0.21 | -67.5 | 0.15 | 1.57 | -11.4 |
| 10/14/95 | 12 | 1.55 | 1.48 | 0.20 | -183.3 | 0.10 | 1.75 | -2.6 |
| 10/16/95 | 6 | 2.81 | 1.42 | 0.24 | -86.0 | 0.15 | 1.59 | -6.4 |
| 10/17/95 | 6 | 8.93 | 1.46 | 0.24 | 40.1 | 0.50 | 1.22 | 12.5 |
| 10/18/95 | 6 | 6.95 | 1.44 | 0.23 | 35.0 | 0.40 | 1.26 | 11.7 |
| 10/19/95 | 6 | 5.39 | 1.46 | 0.22 | 64.6 | 0.40 | 1.26 | 48.7 |
| 10/22/95 | 6 | 2.82 | 1.58 | 0.15 | 61.2 | 0.40 | 1.26 | 12.9 |
| 10/23/95 | 6 | 6.55 | 1.66 | 0.14 | 70.8 | 0.50 | 1.23 | 8.4 |

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[a] Measured $b_{sp}(g)$.
[b] Measured ratio of $b_{sp}(b)/b_{sp}(g)$.
[c] Size1: $D_g$ corresponding to measured $b_{sp}(b)/b_{sp}(g)$ ratios.
[d] Error (Measured $b_{sp}$ - Estimated $b_{sp}$)/Measured $b_{sp}$ based on Size1 and TSI nephelometer RH.
[e] Optimum size ($D_g$) corresponding to best agreement between estimated and measured $b_{sp}$ and $b_{sp}(b)/b_{sp}(g)$.
[f] Estimated $b_{sp}(b)/b_{sp}(g)$ ratio which corresponds to best agreement between measured and estimated $b_{sp}(g)$ over a range of $D_g$.
[g] Error (Measured $b_{sp}$ - Estimated $b_{sp}$)/Measured $b_{sp}$ corresponding to optimum size.
[h] Samples where $b_{sp}$ was overpredicted.

ratios for the two calculation methods is small, and well within measurement precisions. The difference in particle geometric mean diameters is also small for most cases, on the order 0.05 μm for most cases. These results show how sensitive the calculated particle scattering is to particle size in this size range.

### 4.1.3 Liquid Water Content

The volume of liquid water is estimated using a growth function, which is the relationship between particle composition and relative humidity derived empirically for chemically-complex aerosols (Hanel, 1976; Hanel and Lehmann, 1981; Sloane, 1984; Sloane, 1986). This function depends on the volume-averaged density and fractional solubility of the dry aerosol. The changes in the scattering efficiencies for different chemical components as a function of the relative humidity growth function are shown in Figure 4.1.1. As the relative humidity increases, the scattering efficiencies of the various components increase.

Figure 4.1.1. Relationships between relative humidity (1/1-RH/100)) and specific scattering efficiencies of ammonium sulfate, ammonium nitrate, organic carbon, and soil.

### 4.1.4 Comparisons Between Measured and Calculated Light Extinction

Comparisons between the results of the ELSIE model and measured total light extinction at each site are shown in Figure 4.1.2. Each plot contains a solid line indicating the one-to-one line and two dashed lines indicating the slope with a non-zero or zero intercept. Measurement uncertainties as well as model-calculated uncertainties associated with the X- and Y-axes are shown for comparison. As intercepts are low compared to the measured concentrations, the slope closely represents the ratio of Y over X. Points are not plotted for weather obscured situations; a total of 28 points were removed because the relative humidity exceeded 90%.

Comparisons of calculated and measured $b_{ext}$ are within the measured and calculated uncertainties most of the time at all sites except Gilpin Creek. The measurement uncertainty for each 6-hour or 12-hour sampling period was approximated by the standard error of the average derived from hourly measurements. The measurement and modeled uncertainties are often large. More than 70% of the data overlap with the one-to-one line within one standard deviation of each measurement.

Figure 4.1.2 Scatter plots of calculated versus measured particle light scattering between 2/23/95 and 10/23/95 at all six sites during the Mt. Zirkel Visibility Study.

The disagreements for Gilpin Creek data do not have an obvious explanation. Uncertainties associated with these values are large, owing to long averaging times and a large portion of the light extinction being due to organics and elemental carbon, which have large measurement uncertainties. For Gilpin Creek, fewer than 50% of the data points were explained well by the ELSIE modeling.

Scatter plots comparing calculated particle scattering and absorption were also generated and are included in Appendix B. These plots show that the calculated particle light scattering ($b_{sp}$) agreed with the measured $b_{sp}$ within one standard deviation for more than

80% of the samples at the Baggs and Hayden Waste Water sites, with correlation coefficients (r) of 0.78 to 0.81. The particle scattering comparisons were in poorer agreement at the Gilpin Creek and Buffalo Pass sites (r = 0.35 to 0.37).

## 4.2 Chemical Composition of Suspended Particles

Tables 4.2.1a-f summarize average and maximum concentrations of the chemical components measured in the MZVS. The period from which these samples were obtained spanned 02/16/95 to 10/29/95, and the dates correspond to the episodes identified in Section 3.4. Since the sample selection process was intentionally biased toward the sampling periods with elevated light extinction, the averages in Tables 4.2.1a-f are higher than the averages that would be found in a random selection of samples or in a long-term sampling network.

Various plots of the individual measurements are available in Appendix E, and examination of these plots is consistent with the general discussion of averages and maxima presented here. Tables 4.2.1a-f show which chemical components are the largest contributors to $PM_{2.5}$ mass, and therefore those chemicals that are likely to be the major causes of particle scattering and absorption. Organic carbon and sulfate were the major chemical components in most of the samples. Ammonium was a large component in most samples. Nitrate was a minor component all of the time. Suspended dust elements and elemental carbon were minor components in most samples, but they were large components on some samples.

$PM_{2.5}$ mass concentrations were low most of the time, averaging from 3.8 ± 1.6 $\mu g/m^3$ at the Baggs site to 5.7 ± 2.1 $\mu g/m^3$ at the Hayden VOR site. Elevated $PM_{2.5}$ concentrations were found at the Buffalo Pass site (20.5 ± 0.04 $\mu g/m^3$) during the morning (0600-1200 MST) of 08/24/95, and at the Hayden Waste Water site during the afternoon (1200-1800 MST) of 02/24/95 (15.5 ± 2.6 $\mu g/m^3$) as well as during the morning of 02/26/95 (14.3 ± 0.8 $\mu g/m^3$), and at the Gilpin Creek site (14.8 ± 2.7 $\mu g/m^3$) during the daytime (0600-1800 MST) of 07/30/95.

On average, the sum of species to $PM_{2.5}$ mass ratios ranged from 0.57 at the Juniper Mountain site to 1.05 at the Baggs site, which is consistent with the findings of other studies (e.g., Chow *et al.*, 1996). The major species accounted for most of the measured mass, most of the time.

Organic carbon was the largest component of $PM_{2.5}$, followed by sulfate, ammonium, elemental carbon, and nitrate. Average organic carbon concentrations ranged from 0.92 ± 0.77 $\mu g/m^3$ at the Buffalo Pass site to 2.1 ± 1.0 $\mu g/m^3$ at the Baggs site. Maximum organic carbon ranged from 3.0 $\mu g/m^3$ at the Buffalo Pass site to 6.3 $\mu g/m^3$ at the Gilpin Creek site.

Average elemental carbon concentrations ranged from 0.26 ± 0.22 $\mu g/m^3$ at the Buffalo Pass site to 0.96 ± 0.81 $\mu g/m^3$ at the Gilpin Creek site. Maximum elemental carbon ranged from 0.93 $\mu g/m^3$ at the Juniper Mountain site to 3.8 $\mu g/m^3$ at the Gilpin Creek site. The average organic to total carbon ratio (i.e, OC/TC, where TC is the sum of organic plus elemental carbon) of 0.63 at the Gilpin Creek site is 15% to 25% lower than the OC/TC ratios at the other sites.

Average sulfate concentrations were similar among all sites, ranging from 0.81 ± 0.48 μg/$m^3$ at the Buffalo Pass site to 1.1 ± 0.7 μg/$m^3$ at the Hayden VOR and Hayden Waste

## Table 4.2.1a

## Maximum and Average Six- and/or Twelve-Hour Concentrations (μg/m$^3$) for PM$_{2.5}$ Mass and Major Chemical Constituents at the Buffalo Pass Site between 02/16/95 and 10/29/95

| Species | Average | Maximum | Std. Dev. | Total No. in Average |
|---|---:|---:|---:|---:|
| Mass | 4.70156 | 20.40620 | 2.96880 | 64 |
| $b_{abs}$ (Mm$^{-1}$) | 2.46988 | 9.45875 | 2.09006 | 80 |
| $Cl^-$ | 0.00939 | 0.13100 | 0.01963 | 94 |
| $NO_3^-$ | 0.08824 | 0.58320 | 0.08603 | 94 |
| $SO_4^=$ | 0.80650 | 2.08860 | 0.48207 | 94 |
| $K^+$ | 0.01785 | 0.08840 | 0.01707 | 93 |
| $NH_4^+$ | 0.26732 | 0.91110 | 0.19323 | 80 |
| Total Ammonia ($NH_3$+$NH_4^+$) | 0.48132 | 1.08010 | 0.22800 | 61 |
| Denuded $NH_4^+$ | 0.34537 | 0.86240 | 0.20725 | 62 |
| OC | 0.91746 | 3.01890 | 0.76931 | 94 |
| EC | 0.25718 | 1.12240 | 0.21750 | 94 |
| Backup OC | 0.82601 | 3.45320 | 0.63063 | 94 |
| Backup EC | 0.22790 | 1.42330 | 0.25629 | 94 |
| Na | 0.01094 | 0.05420 | 0.01095 | 95 |
| Mg | 0.01003 | 0.06450 | 0.01230 | 95 |
| Al | 0.07503 | 1.09240 | 0.12049 | 95 |
| Si | 0.17366 | 1.29020 | 0.19768 | 95 |
| P | 0.00027 | 0.00280 | 0.00057 | 95 |
| S | 0.28736 | 0.77340 | 0.17124 | 95 |
| Cl | 0.00208 | 0.04260 | 0.00533 | 95 |
| K | 0.03799 | 0.18260 | 0.03382 | 95 |
| Ca | 0.03569 | 0.27520 | 0.03961 | 95 |
| Ti | 0.00476 | 0.04180 | 0.00769 | 95 |
| V | 0.00026 | 0.00300 | 0.00045 | 95 |
| Cr | 0.00032 | 0.00400 | 0.00054 | 95 |
| Mn | 0.00125 | 0.01030 | 0.00156 | 95 |
| Fe | 0.06144 | 0.48340 | 0.07656 | 95 |
| Co | 0.00007 | 0.00180 | 0.00021 | 95 |
| Ni | 0.00021 | 0.00300 | 0.00051 | 95 |
| Cu | 0.00263 | 0.03110 | 0.00457 | 95 |
| Zn | 0.00641 | 0.09950 | 0.01079 | 95 |
| Ga | 0.00005 | 0.00040 | 0.00009 | 95 |
| As | 0.00022 | 0.00260 | 0.00036 | 95 |
| Se | 0.00018 | 0.00100 | 0.00017 | 95 |
| Br | 0.00154 | 0.00500 | 0.00097 | 95 |
| Rb | 0.00016 | 0.00130 | 0.00020 | 95 |
| Sr | 0.00048 | 0.00270 | 0.00050 | 95 |

| | | | | |
|---|---|---|---|---|
| Yt | 0.00005 | 0.00060 | 0.00008 | 95 |
| Zr | 0.00023 | 0.00180 | 0.00032 | 95 |
| Mo | 0.00012 | 0.00330 | 0.00035 | 95 |
| Pd | 0.00054 | 0.00290 | 0.00067 | 95 |
| Ag | 0.00038 | 0.00290 | 0.00067 | 95 |
| Cd | 0.00064 | 0.01950 | 0.00210 | 95 |
| In | 0.00064 | 0.00360 | 0.00089 | 95 |
| Sn | 0.00145 | 0.00690 | 0.00164 | 95 |
| Sb | 0.00134 | 0.00660 | 0.00164 | 95 |
| Ba | 0.00687 | 0.02400 | 0.00667 | 95 |
| La | 0.00292 | 0.01950 | 0.00469 | 95 |
| Au | 0.00009 | 0.00080 | 0.00018 | 95 |
| Hg | 0.00006 | 0.00040 | 0.00011 | 95 |
| Tl | 0.00008 | 0.00200 | 0.00022 | 95 |
| Pb | 0.00089 | 0.00690 | 0.00109 | 95 |
| U | 0.00009 | 0.00100 | 0.00015 | 95 |
| $SO_2$ | 1.21173 | 10.43410 | 1.39658 | 90 |
| Total Nitrate ($HNO_3$+$NO_3^+$) | 0.59743 | 1.65900 | 0.37924 | 57 |
| Denuded $NO_3^-$ | 0.18451 | 1.06870 | 0.17628 | 49 |
| Volatilized $NO_3^-$ | 0.04770 | 0.24310 | 0.03854 | 94 |
| Sum of Species | 2.71472 | 9.11390 | 1.55614 | 95 |

## Table 4.2.1b

## Maximum and Average Six- and/or Twelve-Hour Concentrations ($\mu g/m^3$) for $PM_{2.5}$ Mass and Major Chemical Constituents at the Gilpin Creek Site between 02/16/95 and 10/29/95

| Species | Average | Maximum | Std. Dev. | Total No. in Average |
|---|---|---|---|---|
| Mass | 4.31739 | 14.84160 | 2.66618 | 47 |
| $b_{abs}$ ($Mm^{-1}$) | 4.89930 | 23.84787 | 7.98182 | 41 |
| $Cl^-$ | 0.04914 | 1.56970 | 0.24259 | 42 |
| $NO_3^-$ | 0.21888 | 0.43580 | 0.10010 | 42 |
| $SO_4^=$ | 0.90165 | 1.87740 | 0.44388 | 42 |
| $K^+$ | 0.03639 | 0.34820 | 0.06868 | 40 |
| $NH_4^+$ | 0.25866 | 0.66380 | 0.15840 | 24 |
| Total Ammonia ($NH_3$+$NH_4^+$) | 0.00000 | 0.00000 | 0.00000 | 0 |
| Denuded $NH_4^+$ | 0.00000 | 0.00000 | 0.00000 | 0 |
| OC | 1.19512 | 6.34810 | 1.55933 | 42 |
| EC | 0.96276 | 3.78950 | 0.80705 | 42 |
| Backup OC | 0.40688 | 2.51090 | 0.70146 | 44 |
| Backup EC | 0.39569 | 2.23920 | 0.59977 | 44 |

| | | | | |
|---|---|---|---|---|
| Na | 0.02778 | 0.09950 | 0.02862 | 45 |
| Mg | 0.01607 | 0.08680 | 0.01876 | 45 |
| Al | 0.03122 | 0.20150 | 0.03969 | 45 |
| Si | 0.11197 | 0.68600 | 0.13275 | 45 |
| P | 0.00037 | 0.00450 | 0.00095 | 45 |
| S | 0.32539 | 0.75540 | 0.15496 | 45 |
| Cl | 0.00123 | 0.01800 | 0.00324 | 45 |
| K | 0.03349 | 0.11030 | 0.02838 | 45 |
| Ca | 0.03049 | 0.18540 | 0.03405 | 45 |
| Ti | 0.00195 | 0.02410 | 0.00483 | 45 |
| V | 0.00048 | 0.00330 | 0.00092 | 45 |
| Cr | 0.00090 | 0.01000 | 0.00212 | 45 |
| Mn | 0.00089 | 0.00700 | 0.00133 | 45 |
| Fe | 0.03040 | 0.18780 | 0.03622 | 45 |
| Co | 0.00023 | 0.00120 | 0.00034 | 45 |
| Ni | 0.00026 | 0.00240 | 0.00050 | 45 |
| Cu | 0.00065 | 0.00280 | 0.00070 | 45 |
| Zn | 0.00165 | 0.01070 | 0.00200 | 45 |
| Ga | 0.00027 | 0.00570 | 0.00087 | 45 |
| As | 0.00033 | 0.00210 | 0.00054 | 45 |
| Se | 0.00024 | 0.00100 | 0.00024 | 45 |
| Br | 0.00132 | 0.00560 | 0.00103 | 45 |
| Rb | 0.00013 | 0.00070 | 0.00017 | 45 |
| Sr | 0.00046 | 0.00270 | 0.00049 | 45 |
| Yt | 0.00015 | 0.00080 | 0.00021 | 45 |
| Zr | 0.00112 | 0.03550 | 0.00526 | 45 |
| Mo | 0.00036 | 0.00150 | 0.00049 | 45 |
| Pd | 0.00301 | 0.01110 | 0.00308 | 45 |
| Ag | 0.00170 | 0.00840 | 0.00238 | 45 |
| Cd | 0.00182 | 0.00930 | 0.00276 | 45 |
| In | 0.00316 | 0.01060 | 0.00341 | 45 |
| Sn | 0.00591 | 0.02270 | 0.00665 | 45 |
| Sb | 0.00566 | 0.01740 | 0.00565 | 45 |
| Ba | 0.02692 | 0.07410 | 0.02366 | 45 |
| La | 0.02039 | 0.08060 | 0.02535 | 45 |
| Au | 0.00040 | 0.00190 | 0.00063 | 45 |
| Hg | 0.00037 | 0.00170 | 0.00051 | 45 |
| Tl | 0.00025 | 0.00130 | 0.00036 | 45 |
| Pb | 0.00125 | 0.01050 | 0.00191 | 45 |
| U | 0.00024 | 0.00130 | 0.00035 | 45 |
| $SO_2$ | 0.62695 | 2.32200 | 0.53375 | 46 |
| Total Nitrate ($HNO_3$+$NO_3^+$) | 0.00000 | 0.00000 | 0.00000 | 0 |
| Denuded $NO_3^-$ | 0.00000 | 0.00000 | 0.00000 | 0 |
| Volatilized $NO_3^-$ | 0.00000 | 0.00000 | 0.00000 | 0 |
| Sum of Species | 3.36565 | 9.08700 | 2.59966 | 50 |

## Table 4.2.1c

## Maximum and Average Six- and/or Twelve-Hour Concentrations (μg/m$^3$) for $PM_{2.5}$ Mass and Major Chemical Constituents at the Juniper Mountain Site between 02/16/95 and 10/29/95

| Species | Average | Maximum | Std. Dev. | Total No. in Average |
|---|---|---|---|---|
| Mass | 4.49806 | 12.80610 | 2.53299 | 47 |
| $b_{abs}$ ($Mm^{-1}$) | 2.88798 | 8.79618 | 2.18607 | 47 |
| $Cl^-$ | 0.00565 | 0.11750 | 0.01868 | 45 |
| $NO_3^-$ | 0.06508 | 0.16290 | 0.03589 | 45 |
| $SO_4^=$ | 0.88045 | 1.75590 | 0.43821 | 45 |
| $K^+$ | 0.02307 | 0.13010 | 0.02330 | 45 |
| $NH_4^+$ | 0.29379 | 0.62480 | 0.17690 | 31 |
| Total Ammonia ($NH_3$+$NH_4^+$) | 0.48705 | 1.50460 | 0.26834 | 33 |
| Denuded $NH_4^+$ | 0.29423 | 1.24800 | 0.23662 | 32 |
| OC | 1.27004 | 3.13630 | 0.77866 | 45 |
| EC | 0.42322 | 0.92750 | 0.21945 | 45 |
| Backup OC | 0.84690 | 3.79930 | 0.77763 | 45 |
| Backup EC | 0.24870 | 0.62900 | 0.18410 | 45 |
| Na | 0.01090 | 0.03590 | 0.00997 | 47 |
| Mg | 0.00850 | 0.03780 | 0.00880 | 47 |
| Al | 0.12730 | 1.61140 | 0.26300 | 47 |
| Si | 0.13471 | 0.83480 | 0.12482 | 47 |
| P | 0.00007 | 0.00120 | 0.00023 | 47 |
| S | 0.33671 | 0.66280 | 0.16151 | 47 |
| Cl | 0.00237 | 0.02430 | 0.00493 | 47 |
| K | 0.03493 | 0.12300 | 0.02621 | 47 |
| Ca | 0.03727 | 0.13320 | 0.02948 | 47 |
| Ti | 0.00199 | 0.01960 | 0.00311 | 47 |
| V | 0.00024 | 0.00110 | 0.00032 | 47 |
| Cr | 0.00046 | 0.00600 | 0.00099 | 47 |
| Mn | 0.00083 | 0.00430 | 0.00082 | 47 |
| Fe | 0.03602 | 0.20770 | 0.03340 | 47 |
| Co | 0.00006 | 0.00040 | 0.00009 | 47 |
| Ni | 0.00021 | 0.00190 | 0.00038 | 47 |
| Cu | 0.00205 | 0.01240 | 0.00242 | 47 |
| Zn | 0.02476 | 0.34120 | 0.05470 | 47 |
| Ga | 0.00003 | 0.00030 | 0.00007 | 47 |
| As | 0.00030 | 0.00210 | 0.00041 | 47 |
| Se | 0.00015 | 0.00050 | 0.00011 | 47 |
| Br | 0.00179 | 0.00410 | 0.00109 | 47 |
| Rb | 0.00011 | 0.00060 | 0.00011 | 47 |
| Sr | 0.00048 | 0.00290 | 0.00052 | 47 |

| | | | | |
|---|---|---|---|---|
| Yt | 0.00006 | 0.00040 | 0.00008 | 47 |
| Zr | 0.00016 | 0.00070 | 0.00014 | 47 |
| Mo | 0.00010 | 0.00050 | 0.00013 | 47 |
| Pd | 0.00055 | 0.00240 | 0.00066 | 47 |
| Ag | 0.00016 | 0.00130 | 0.00031 | 47 |
| Cd | 0.00040 | 0.00220 | 0.00064 | 47 |
| In | 0.00070 | 0.00370 | 0.00092 | 47 |
| Sn | 0.00181 | 0.00900 | 0.00201 | 47 |
| Sb | 0.00207 | 0.00730 | 0.00189 | 47 |
| Ba | 0.00593 | 0.02140 | 0.00641 | 47 |
| La | 0.00540 | 0.04090 | 0.00857 | 47 |
| Au | 0.00009 | 0.00120 | 0.00022 | 47 |
| Hg | 0.00010 | 0.00040 | 0.00013 | 47 |
| Tl | 0.00004 | 0.00030 | 0.00007 | 47 |
| Pb | 0.00098 | 0.00500 | 0.00096 | 47 |
| U | 0.00007 | 0.00030 | 0.00009 | 47 |
| $SO_2$ | 0.43146 | 3.14260 | 0.49617 | 47 |
| Total Nitrate ($HNO_3$+$NO_3^+$) | 0.86043 | 2.56740 | 0.52146 | 26 |
| Denuded $NO_3^-$ | 0.16202 | 1.01810 | 0.19528 | 29 |
| Volatilized $NO_3^-$ | 0.04914 | 0.22310 | 0.03698 | 46 |
| Sum of Species | 2.56426 | 6.24400 | 1.84731 | 58 |

## Table 4.2.1f

## Maximum and Average Six- and/or Twelve-Hour Concentrations (µg/m$^3$) for $PM_{2.5}$ Mass and Major Chemical Constituents at the Hayden Waste Water Site between 02/16/95 and 10/29/95

| Species | Average | Maximum | Std. Dev. | Total No. in Average |
|---|---|---|---|---|
| Mass | 5.39501 | 15.46500 | 2.57460 | 66 |
| $b_{abs}$ (Mm$^{-1}$) | 4.26912 | 14.73817 | 3.31286 | 55 |
| $Cl^-$ | 0.01792 | 0.41550 | 0.05207 | 66 |
| $NO_3^-$ | 0.24583 | 2.28100 | 0.45127 | 66 |
| $SO_4^=$ | 1.07634 | 4.53790 | 0.60427 | 66 |
| $K^+$ | 0.01970 | 0.07580 | 0.01705 | 66 |
| $NH_4^+$ | 0.35115 | 1.37480 | 0.23870 | 43 |
| Total Ammonia ($NH_3$+$NH_4^+$) | 0.00000 | 0.00000 | 0.00000 | 0 |
| Denuded $NH_4^+$ | 0.00000 | 0.00000 | 0.00000 | 0 |
| OC | 1.68601 | 4.16320 | 0.97143 | 66 |
| EC | 0.47893 | 1.49410 | 0.26897 | 66 |
| Backup OC | 1.12226 | 7.43730 | 1.27564 | 67 |
| Backup EC | 0.22898 | 4.41880 | 0.65717 | 67 |

| | | | | |
|---|---|---|---|---|
| Na | 0.04215 | 0.18240 | 0.04321 | 66 |
| Mg | 0.01342 | 0.05310 | 0.01301 | 66 |
| Al | 0.10145 | 0.57180 | 0.09108 | 66 |
| Si | 0.15827 | 0.71770 | 0.12327 | 66 |
| P | 0.00043 | 0.00300 | 0.00076 | 66 |
| S | 0.40579 | 1.32470 | 0.19650 | 66 |
| Cl | 0.00129 | 0.03070 | 0.00444 | 66 |
| K | 0.03549 | 0.13550 | 0.02697 | 66 |
| Ca | 0.03690 | 0.14820 | 0.02853 | 66 |
| Ti | 0.00382 | 0.02260 | 0.00392 | 66 |
| V | 0.00065 | 0.00250 | 0.00059 | 66 |
| Cr | 0.00032 | 0.00240 | 0.00047 | 66 |
| Mn | 0.00099 | 0.00390 | 0.00067 | 66 |
| Fe | 0.05455 | 0.26350 | 0.04514 | 66 |
| Co | 0.00007 | 0.00040 | 0.00012 | 66 |
| Ni | 0.00048 | 0.00650 | 0.00092 | 66 |
| Cu | 0.00267 | 0.01960 | 0.00297 | 66 |
| Zn | 0.01005 | 0.08360 | 0.01522 | 66 |
| Ga | 0.00021 | 0.00120 | 0.00032 | 66 |
| As | 0.00034 | 0.00250 | 0.00045 | 66 |
| Se | 0.00080 | 0.00500 | 0.00086 | 66 |
| Br | 0.00846 | 0.44030 | 0.05357 | 66 |
| Rb | 0.00014 | 0.00060 | 0.00016 | 66 |
| Sr | 0.00096 | 0.01720 | 0.00214 | 66 |
| Yt | 0.00010 | 0.00070 | 0.00014 | 66 |
| Zr | 0.00042 | 0.00450 | 0.00072 | 66 |
| Mo | 0.00010 | 0.00070 | 0.00017 | 66 |
| Pd | 0.00089 | 0.00590 | 0.00143 | 66 |
| Ag | 0.00109 | 0.00630 | 0.00154 | 66 |
| Cd | 0.00057 | 0.00700 | 0.00106 | 66 |
| In | 0.00151 | 0.01210 | 0.00229 | 66 |
| Sn | 0.00233 | 0.01950 | 0.00348 | 66 |
| Sb | 0.00103 | 0.00810 | 0.00180 | 66 |
| Ba | 0.00565 | 0.03370 | 0.00885 | 66 |
| La | 0.00595 | 0.03720 | 0.01022 | 66 |
| Au | 0.00026 | 0.00180 | 0.00041 | 66 |
| Hg | 0.00009 | 0.00080 | 0.00017 | 66 |
| Tl | 0.00008 | 0.00070 | 0.00017 | 66 |
| Pb | 0.00152 | 0.04910 | 0.00596 | 66 |
| U | 0.00018 | 0.00110 | 0.00027 | 66 |
| $SO_2$ | 9.27529 | 71.79830 | 14.50151 | 71 |
| Total Nitrate ($HNO_3$+$NO_3^+$) | 0.00000 | 0.00000 | 0.00000 | 0 |
| Denuded $NO_3^-$ | 0.00000 | 0.00000 | 0.00000 | 0 |
| Volatilized $NO_3^-$ | 0.12214 | 0.69390 | 0.14093 | 66 |
| Sum of Species | 3.86058 | 8.92120 | 2.04227 | 72 |

Water sites. Maximum sulfate concentrations were two to four times higher than their averages, ranging from 1.9 $\mu g/m^3$ at the Gilpin Creek and Baggs sites to 4.3 $\mu g/m^3$ at the Hayden VOR site or 4.5 $\mu g/m^3$ at the Hayden Waste Water site.

Nitrate concentrations were 10% to 25% of the corresponding sulfate abundance at each site. Average nitrate concentrations were 0.25 ± 0.45 $\mu g/m^3$ at the Hayden Waste Water site, 0.22 ± 0.10 $\mu g/m^3$ at the Gilpin Creek site, and between 0.07 to 0.10 $\mu g/m^3$ at the remaining sites. A maximum nitrate concentration of 2.3 $\mu g/m^3$ was found at the Hayden Waste Water site during the morning of 02/26/95, which is 4 to 14 higher than the maximum nitrate concentrations measured at the other sites.

Average ammonium concentrations were also similar among all sites, ranging from 0.24 ± 0.12 $\mu g/m^3$ at the Baggs site to 0.49 ± 0.38 $\mu g/m^3$ at the Hayden VOR site. Major crustal components such as aluminum (Al), silicon (Si), potassium (K), calcium (Ca), and iron (Fe) were low most of the time, on the order of one-tenth to one-hundredth of 1 $\mu g/m^3$.

Observations drawn from examination of the individual chemical compositions and time series plots in Appendix E are as follows:

- Total carbon aerosol constituted over 50% of the $PM_{2.5}$ mass during the warmer months (May through August) and constituted only 20% to 30% of $PM_{2.5}$ during the cooler months (February, March, September, October). Organic carbon (OC) was the major component of total carbon (TC) in all samples, with OC/TC ratios in the range of 0.6 to 0.8. Organic carbon concentrations varied by threefold from the colder to warmer seasons, being highest during August and lowest during February and October.

- $PM_{2.5}$ ammonium nitrate concentrations were a small fraction of $PM_{2.5}$ for nearly all samples, in the range of 1% to 5% of $PM_{2.5}$.

- The abundance of crustal components varied significantly and accounted for 5% to 30% of the $PM_{2.5}$ mass depending on location and sampling period.

- High carbon concentrations were measured sporadically at different sites. The maximum organic carbon concentration for the entire study period was found at the Gilpin Creek site on 06/29/95 (6.3 ± 1.6 $\mu g/m^3$), while concurrent measurements at the other sites were below 1.5 $\mu g/m^3$. The maximum elemental carbon of 3.8 ± 2.1 $\mu g/m^3$ was found at the Gilpin Creek site on 09/02/95, which was three times the maxima observed at the other sites. Juniper Mountain also reported its maximum elemental carbon (0.93 ± 0.15 $\mu g/m^3$) during the morning of 09/02/95, with less than 1 $\mu g/m^3$ of elemental carbon at the other sites. The maximum organic carbon concentration of 3.0 ± 0.65 $\mu g/m^3$ at the Buffalo Pass site (reported on the morning of 10/12/95) was twice that of corresponding measurements at the other sites. Concurrent elemental carbon concentrations were also elevated (> 1 $\mu g/m^3$) at Buffalo Pass and Gilpin Creek.

- Elemental carbon was higher at the Gilpin Creek site than at the other sites, with concentrations exceeding 1 $\mu g/m^3$ on over 40% of the samples. Since elemental carbon has a high extinction efficiency, these high concentrations would have a significant impact on light extinction.

## 4.3 Light Extinction by Chemical Components

Tables 4.3.1–4.3.6 present all six- and/or twelve-hour averaged measured and calculated values for the various components of light extinction during episodes. Table 4.3.7 summarizes the frequency with which each chemical component contributed extinction, while Table 4.3.8 presents the maximum and average contributions to extinction. As with the $PM_{2.5}$ mass and chemical data, averages are biased towards sampling periods with elevated light extinction and will not be representative of averages found in a random selection of samples or in a long-term sampling network.

Table 4.3.7 shows that organics are the largest chemical contributor to light extinction at five out of the six sites most of the time. At Gilpin Creek, elemental carbon was often a the major contributor to extinction, with organics being the second highest contributor. Elemental carbon was the second largest chemical contributor to light extinction at four of the remaining five sites. At Buffalo Pass, however, ammonium sulfate was the second largest contributor to extinction instead of the third as occurred at the other five sites. Soils and ammonium nitrates were the least important chemical contributors to light extinction.

Even though the major chemical components were elevated during certain periods, the total light extinction was not necessarily elevated. For example, the concentrations of major chemical components were elevated at all sites during the period between 08/07/95 and 08/09/95, but the light extinction was not elevated.

Since ammonium sulfate concentrations were similar throughout the network during a given period, the light extinction due to ammonium sulfate might be expected to be fairly constant across the network during a measurement period. However, Tables 4.3.1 through 4.3.8 show that the contribution of ammonium sulfate to total light extinction was more pronounced at the Buffalo Pass site. Of the 27 cases where ammonium sulfate accounted for more than 25% of the total light extinction, 55.6% were at the Buffalo Pass site, 3.7% were at the Juniper Mountain site, 14.8% were at the Hayden VOR site, 11.1% were at the Hayden Waste Water site, 11.1% were at the Gilpin Creek site, and 3.7% were at the Baggs site.

These situations were found during the four episode periods of 03/26/95 to 03/31/95, 08/21/95 to 08/27/95, 09/17/95 to 09/21/95, and 09/30/95 to 10/02/95. This demonstrates that the relative proportion of light extinction due to a chemical component to the total light extinction is more important than the absolute concentration of the component. Therefore, an increment of a light scattering or absorbing component added to the overall aerosol loading

# Table 4.3.1

# Measured and Calculated Component Contributions to Total Light Extinction at Buffalo Pass

| Site | Date | Hr | RH | Cln Air | bsp | Ebsp | babs | Ebabs | bext | Ebext | Esul | Enit | Eoc | Eec | Esoil | Unid. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B. Pass | 2/23 | 6 | 69 | 8.4 | 3.2 ± 1.0 | 2.8 ± 1.4 | 1.4 ± 1.2 | 3.3 ± 0.9 | 13.1 ± 1.7 | 14.4 ± 1.6 | 1.5 ± 0.1 | 1.1 ± 0.1 | 0.0 ± 1.4 | 3.3 ± 0.9 | 0.2 ± 0.0 | -1.3 ± 2.4 |
| B. Pass | 2/23 | 12 | 61 | 8.4 | 2.7 ± 0.3 | 2.6 ± 1.3 | 2.9 ± 1.3 | 2.5 ± 0.8 | 14.1 ± 1.6 | 13.6 ± 1.5 | 1.7 ± 0.1 | 0.5 ± 0.1 | 0.3 ± 1.3 | 2.5 ± 0.8 | 0.2 ± 0.0 | 0.5 ± 2.2 |
| B. Pass | 3/26 | 6 | 87 | 8.4 | 61.8 ± 27.1 | 9.1 ± 1.1 | 2.4 ± 0.7 | 1.1 ± 0.5 | 72.6 ± 11.9 | 18.7 ± 1.2 | 6.4 ± 0.3 | 0.7 ± 0.1 | 1.7 ± 1.1 | 1.1 ± 0.5 | 0.3 ± 0.0 | 53.9 ± 11.9 |
| B. Pass | 3/27 | 6 | 86 | 8.4 | 34.7 ± 7.1 | 15.5 ± 1.2 | 3.2 ± 0.7 | 2.1 ± 0.8 | 46.2 ± 4.8 | 26.0 ± 1.4 | 12.1 ± 0.6 | 1.1 ± 0.1 | 2.0 ± 1.0 | 2.1 ± 0.8 | 0.3 ± 0.0 | 20.2 ± 5.0 |
| B. Pass | 3/28 | 6 | 86 | 8.4 | 16.9 ± 2.0 | 18.1 ± 1.3 | 2.4 ± 0.7 | 1.9 ± 0.8 | 27.8 ± 2.9 | 28.4 ± 1.5 | 12.1 ± 0.6 | 1.9 ± 0.2 | 3.8 ± 1.1 | 1.9 ± 0.8 | 0.3 ± 0.0 | -0.7 ± 3.2 |
| B. Pass | 3/29 | 6 | 88 | 8.4 | 38.2 ± 4.3 | 21.8 ± 1.4 | --- ± --- | 1.0 ± 0.5 | --- ± --- | 31.1 ± 1.5 | 14.8 ± 0.8 | 6.6 ± 0.4 | 0.0 ± 1.2 | 1.0 ± 0.5 | 0.3 ± 0.0 | --- ± --- |
| B. Pass | 3/30 | 6 | 85 | 8.4 | 33.0 ± 4.7 | 17.7 ± 1.3 | 4.7 ± 0.7 | 0.8 ± 0.5 | 46.1 ± 4.5 | 27.0 ± 1.4 | 16.0 ± 0.9 | 0.8 ± 0.1 | 0.4 ± 0.9 | 0.8 ± 0.5 | 0.5 ± 0.0 | 19.2 ± 4.7 |
| B. Pass | 3/31 | 6 | 82 | 8.4 | 19.8 ± 1.0 | 15.4 ± 1.1 | 4.9 ± 0.7 | 0.7 ± 0.4 | 33.1 ± 2.9 | 24.5 ± 1.2 | 11.1 ± 0.6 | 1.5 ± 0.1 | 1.8 ± 0.9 | 0.7 ± 0.4 | 1.0 ± 0.0 | 8.6 ± 3.1 |
| B. Pass | 5/6 | 6 | 72 | 8.4 | 28.7 ± 11.4 | 9.9 ± 0.8 | 4.7 ± 0.7 | 1.2 ± 0.5 | 41.8 ± 10.4 | 19.5 ± 1.0 | 3.4 ± 0.2 | 0.6 ± 0.1 | 3.1 ± 0.8 | 1.2 ± 0.5 | 2.8 ± 0.1 | 22.3 ± 10.5 |
| B. Pass | 5/7 | 6 | 85 | 8.4 | 196.9 ± 97.4 | 14.2 ± 1.1 | 4.0 ± 0.7 | 1.3 ± 0.6 | 209.4 ± 75.0 | 23.9 ± 1.2 | 7.3 ± 0.4 | 1.5 ± 0.1 | 2.3 ± 1.0 | 1.3 ± 0.6 | 3.0 ± 0.1 | 185.4 ± 75.0 |
| B. Pass | 6/14 | 6 | 28 | 8.4 | 18.2 ± 0.5 | 13.9 ± 1.2 | 9.5 ± 0.8 | 0.6 ± 0.4 | 36.1 ± 5.3 | 22.9 ± 1.3 | 2.5 ± 0.1 | 0.5 ± 0.0 | 9.8 ± 1.2 | 0.6 ± 0.4 | 1.1 ± 0.0 | 13.2 ± 5.5 |
| B. Pass | 6/15 | 6 | 54 | 8.4 | 14.8 ± 1.0 | 11.6 ± 0.9 | 8.0 ± 0.8 | 1.3 ± 0.6 | 31.2 ± 4.6 | 21.4 ± 1.0 | 6.4 ± 0.3 | 0.3 ± 0.1 | 4.3 ± 0.8 | 1.3 ± 0.6 | 0.7 ± 0.0 | 9.8 ± 4.7 |
| B. Pass | 6/16 | 6 | 38 | 8.4 | 12.0 ± 0.6 | 7.3 ± 0.7 | 7.3 ± 0.9 | 5.4 ± 1.9 | 27.7 ± 3.9 | 21.1 ± 2.0 | 3.2 ± 0.2 | 0.4 ± 0.0 | 2.6 ± 0.6 | 5.4 ± 1.9 | 0.9 ± 0.0 | 6.6 ± 4.4 |
| B. Pass | 6/29 | 6 | 99 | 8.4 | 1227.0 ± 422.4 | 86.4 ± 10.8 | 3.8 ± 0.7 | 0.0 ± 0.3 | 1239.3 ± 364.0 | 94.8 ± 10.8 | 38.1 ± 2.3 | 5.1 ± 1.4 | 42.2 ± 10.4 | 0.0 ± 0.3 | 0.9 ± 0.1 | 1144.5 ± 364.1 |
| B. Pass | 6/30 | 6 | 75 | 8.4 | 14.5 ± 1.1 | 12.6 ± 1.2 | 6.3 ± 0.8 | 1.4 ± 0.6 | 29.3 ± 4.6 | 22.4 ± 1.4 | 4.2 ± 0.2 | 0.4 ± 0.1 | 7.6 ± 1.2 | 1.4 ± 0.6 | 0.3 ± 0.0 | 6.9 ± 4.8 |
| B. Pass | 7/1 | 6 | 76 | 8.4 | 14.0 ± 1.2 | 9.0 ± 1.1 | 3.9 ± 0.7 | 1.7 ± 0.5 | 26.3 ± 4.5 | 19.1 ± 1.2 | 3.0 ± 0.2 | 0.5 ± 0.1 | 5.2 ± 1.1 | 1.7 ± 0.5 | 0.3 ± 0.0 | 7.2 ± 4.6 |
| B. Pass | 7/29 | 6 | 24 | 8.4 | 11.4 ± 1.6 | 9.7 ± 0.9 | 3.1 ± 0.7 | 3.6 ± 0.7 | 23.0 ± 4.0 | 21.7 ± 1.2 | 1.8 ± 0.1 | 0.2 ± 0.0 | 6.8 ± 0.9 | 3.6 ± 0.7 | 0.8 ± 0.0 | 1.3 ± 4.2 |
| B. Pass | 7/30 | 6 | 38 | 8.4 | 13.7 ± 0.7 | 8.8 ± 0.8 | 3.8 ± 0.7 | 2.6 ± 0.6 | 26.0 ± 4.3 | 19.8 ± 1.0 | 2.8 ± 0.1 | 0.2 ± 0.0 | 4.9 ± 0.8 | 2.6 ± 0.6 | 0.8 ± 0.0 | 6.2 ± 4.4 |
| B. Pass | 7/31 | 6 | --- | 8.4 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| B. Pass | 8/7 | 6 | 36 | 8.4 | --- ± --- | 14.2 ± 1.6 | 6.6 ± 1.5 | 6.3 ± 2.3 | 51.6 ± 9.1 | 28.9 ± 2.8 | 3.0 ± 0.2 | 0.4 ± 0.1 | 9.5 ± 1.6 | 6.3 ± 2.3 | 1.3 ± 0.0 | 22.7 ± 9.6 |
| B. Pass | 8/7 | 12 | 35 | 8.4 | 16.4 ± 1.8 | 9.2 ± 1.2 | 4.7 ± 1.4 | 5.5 ± 2.1 | 29.6 ± 5.1 | 23.2 ± 2.4 | 2.9 ± 0.2 | 0.2 ± 0.1 | 4.9 ± 1.2 | 5.5 ± 2.1 | 1.2 ± 0.0 | 6.4 ± 5.6 |
| B. Pass | 8/8 | 6 | 48 | 8.4 | 17.4 ± 2.4 | 15.5 ± 1.6 | 6.3 ± 1.4 | 0.0 ± 0.7 | 32.1 ± 4.9 | 23.9 ± 1.7 | 4.4 ± 0.2 | 0.2 ± 0.1 | 9.0 ± 1.6 | 0.0 ± 0.7 | 1.9 ± 0.1 | 8.2 ± 5.2 |
| B. Pass | 8/8 | 12 | 46 | 8.4 | 21.9 ± 2.2 | 12.9 ± 1.3 | 6.2 ± 1.4 | 6.7 ± 2.4 | 36.5 ± 5.9 | 28.0 ± 2.7 | 4.4 ± 0.2 | 0.5 ± 0.1 | 5.6 ± 1.3 | 6.7 ± 2.4 | 2.3 ± 0.1 | 8.5 ± 6.5 |
| B. Pass | 8/9 | 6 | 31 | 8.4 | 9.1 ± 0.8 | 12.7 ± 1.4 | 3.1 ± 1.4 | 0.1 ± 0.7 | 20.6 ± 3.6 | 21.2 ± 1.5 | 1.1 ± 0.1 | 0.6 ± 0.1 | 7.3 ± 1.4 | 0.1 ± 0.7 | 3.8 ± 0.1 | -0.6 ± 3.9 |
| B. Pass | 8/9 | 12 | 28 | 8.4 | 7.9 ± 0.9 | 15.1 ± 1.6 | 5.1 ± 1.5 | 1.3 ± 0.9 | 21.4 ± 3.4 | 24.9 ± 1.8 | 2.2 ± 0.1 | 0.5 ± 0.1 | 9.4 ± 1.6 | 1.3 ± 0.9 | 3.0 ± 0.1 | -3.4 ± 3.9 |
| B. Pass | 8/14 | 6 | 56 | 8.4 | 7.2 ± 0.9 | 8.4 ± 1.5 | 1.6 ± 1.4 | 2.9 ± 0.9 | 17.2 ± 3.3 | 19.7 ± 1.7 | 1.7 ± 0.1 | 0.5 ± 0.1 | 5.2 ± 1.5 | 2.9 ± 0.9 | 1.1 ± 0.0 | -2.5 ± 3.8 |
| B. Pass | 8/14 | 12 | 62 | 8.4 | 3.9 ± 0.9 | 7.4 ± 1.6 | 0.0 ± 1.4 | 2.1 ± 0.8 | 12.3 ± 2.6 | 17.9 ± 1.8 | 1.4 ± 0.1 | 0.4 ± 0.1 | 5.1 ± 1.6 | 2.1 ± 0.8 | 0.5 ± 0.0 | -5.6 ± 3.1 |
| B. Pass | 8/21 | 6 | 85 | 8.4 | 18.1 ± 0.8 | 28.3 ± 2.8 | 1.4 ± 1.3 | 0.0 ± 0.7 | 27.9 ± 5.2 | 36.7 ± 2.9 | 12.3 ± 0.7 | 1.0 ± 0.3 | 13.6 ± 2.7 | 0.0 ± 0.7 | 1.4 ± 0.0 | -8.8 ± 5.9 |
| B. Pass | 8/21 | 12 | 68 | 8.4 | 18.1 ± 2.2 | 17.2 ± 1.7 | 2.8 ± 1.2 | 1.5 ± 0.9 | 29.3 ± 5.4 | 27.2 ± 1.9 | 7.9 ± 0.4 | 0.4 ± 0.1 | 7.7 ± 1.6 | 1.5 ± 0.9 | 1.2 ± 0.0 | 2.2 ± 5.7 |
| B. Pass | 8/22 | 6 | 86 | 8.4 | 11.2 ± 1.3 | 14.7 ± 2.1 | 1.4 ± 1.2 | 2.5 ± 1.1 | 21.0 ± 4.1 | 25.6 ± 2.4 | 7.9 ± 0.4 | 1.0 ± 0.2 | 5.6 ± 2.1 | 2.5 ± 1.1 | 0.2 ± 0.0 | -4.5 ± 4.7 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B. Pass | 8/22 | 12 | 71 | 8.4 | 11.6 ± 0.7 | 19.0 ± 2.1 | 2.5 ± 1.1 | 2.9 ± 1.3 | 22.5 ± 4.0 | 30.3 ± 2.5 | 4.7 ± 0.3 | 0.4 ± 0.1 | 13.1 ± 2.1 | 2.9 ± 1.3 | 0.8 ± 0.0 | -7.8 ± 4.7 |
| B. Pass | 8/23 | 6 | 83 | 8.4 | 9.9 ± 1.4 | 10.6 ± 1.8 | 1.4 ± 1.2 | 3.1 ± 1.3 | 19.7 ± 3.8 | 22.2 ± 2.3 | 6.5 ± 0.4 | 0.6 ± 0.2 | 2.7 ± 1.8 | 3.1 ± 1.3 | 0.8 ± 0.0 | -2.5 ± 4.4 |
| B. Pass | 8/23 | 12 | 86 | 8.4 | 25.2 ± 7.9 | 27.5 ± 2.7 | 3.1 ± 1.4 | 1.6 ± 1.0 | 36.7 ± 7.5 | 37.5 ± 2.9 | 12.2 ± 0.7 | 0.8 ± 0.3 | 10.0 ± 2.6 | 1.6 ± 1.0 | 4.5 ± 0.1 | -0.8 ± 8.0 |
| B. Pass | 8/24 | 6 | 94 | 8.4 | 19.7 ± 1.6 | 93.6 ± 6.3 | 4.7 ± 1.4 | 3.3 ± 1.4 | 32.8 ± 5.6 | 105.4 ± 6.4 | 27.4 ± 1.4 | 3.5 ± 0.5 | 39.5 ± 6.0 | 3.3 ± 1.4 | 23.3 ± 0.7 | -72.6 ± 8.5 |
| B. Pass | 8/24 | 12 | 76 | 8.4 | 16.9 ± 1.4 | 18.2 ± 1.7 | 3.1 ± 1.3 | 4.9 ± 1.9 | 28.4 ± 5.2 | 31.4 ± 2.5 | 11.1 ± 0.6 | 0.4 ± 0.2 | 5.7 ± 1.6 | 4.9 ± 1.9 | 1.0 ± 0.0 | -3.1 ± 5.8 |
| B. Pass | 8/25 | 6 | 72 | 8.4 | 6.4 ± 0.4 | 10.7 ± 1.6 | 0.0 ± 1.4 | 3.9 ± 1.6 | 14.8 ± 3.3 | 23.0 ± 2.3 | 3.0 ± 0.2 | 0.6 ± 0.1 | 6.5 ± 1.6 | 3.9 ± 1.6 | 0.6 ± 0.0 | -8.2 ± 4.0 |
| B. Pass | 8/25 | 12 | 50 | 8.4 | 6.7 ± 0.3 | 11.5 ± 1.4 | 1.5 ± 1.3 | 2.5 ± 1.2 | 16.7 ± 3.3 | 22.4 ± 1.8 | 2.9 ± 0.2 | 0.8 ± 0.1 | 6.9 ± 1.4 | 2.5 ± 1.2 | 1.0 ± 0.0 | -5.7 ± 3.8 |
| B. Pass | 8/26 | 6 | 46 | 8.4 | 5.7 ± 0.6 | 14.9 ± 1.7 | 1.6 ± 1.4 | 2.9 ± 0.9 | 15.7 ± 3.0 | 26.2 ± 1.9 | 3.1 ± 0.2 | 0.6 ± 0.1 | 10.0 ± 1.7 | 2.9 ± 0.9 | 1.2 ± 0.0 | -10.4 ± 3.6 |
| B. Pass | 8/26 | 12 | 37 | 8.4 | 6.6 ± 0.5 | 12.9 ± 1.5 | 3.2 ± 1.4 | 1.4 ± 0.7 | 18.2 ± 3.3 | 22.7 ± 1.7 | 2.3 ± 0.1 | 0.4 ± 0.1 | 6.6 ± 1.5 | 1.4 ± 0.7 | 3.5 ± 0.1 | -4.5 ± 3.7 |
| B. Pass | 8/27 | 6 | 55 | 8.4 | 9.4 ± 0.6 | 13.8 ± 1.6 | 4.7 ± 1.4 | 2.0 ± 0.8 | 22.5 ± 3.8 | 24.3 ± 1.8 | 3.5 ± 0.2 | 0.9 ± 0.1 | 7.0 ± 1.6 | 2.0 ± 0.8 | 2.4 ± 0.1 | -1.8 ± 4.2 |
| B. Pass | 8/27 | 12 | 55 | 8.4 | 9.4 ± 1.0 | 15.3 ± 1.8 | 1.6 ± 1.4 | 1.1 ± 0.7 | 19.5 ± 3.7 | 24.8 ± 1.9 | 2.8 ± 0.2 | 0.7 ± 0.1 | 9.7 ± 1.8 | 1.1 ± 0.7 | 2.1 ± 0.1 | -5.4 ± 4.1 |
| B. Pass | 9/2 | 6 | 53 | 8.4 | 13.7 ± 0.4 | 11.1 ± 1.4 | 3.1 ± 1.4 | 4.3 ± 1.0 | 25.3 ± 4.2 | 23.8 ± 1.7 | 5.2 ± 0.3 | 0.4 ± 0.1 | 4.4 ± 1.4 | 4.3 ± 1.0 | 1.1 ± 0.0 | 1.5 ± 4.6 |
| B. Pass | 9/2 | 12 | 43 | 8.4 | 15.2 ± 1.1 | 9.7 ± 1.3 | 3.2 ± 1.4 | 5.5 ± 1.2 | 26.9 ± 4.7 | 23.7 ± 1.8 | 5.4 ± 0.3 | 0.3 ± 0.1 | 2.1 ± 1.3 | 5.5 ± 1.2 | 1.9 ± 0.1 | 3.3 ± 5.1 |
| B. Pass | 9/17 | 6 | 40 | 8.4 | 6.2 ± 0.3 | 6.4 ± 1.5 | 1.6 ± 1.4 | 1.6 ± 0.9 | 16.3 ± 3.3 | 16.4 ± 1.8 | 2.3 ± 0.1 | 0.4 ± 0.1 | 3.1 ± 1.5 | 1.6 ± 0.9 | 0.7 ± 0.0 | -0.2 ± 3.8 |
| B. Pass | 9/17 | 12 | 41 | 8.4 | 7.2 ± 0.7 | 7.9 ± 1.3 | 0.0 ± 1.4 | 0.4 ± 0.6 | 15.7 ± 3.5 | 16.8 ± 1.5 | 3.0 ± 0.2 | 0.3 ± 0.1 | 4.1 ± 1.3 | 0.4 ± 0.6 | 0.5 ± 0.0 | -1.1 ± 3.8 |
| B. Pass | 9/18 | 6 | 99 | 8.4 | 789.1 ± 500.1 | 102.2 ± 21.4 | 0.0 ± 1.4 | 0.6 ± 0.7 | 797.5 ± 277.9 | 111.2 ± 21.4 | 57.5 ± 3.8 | 6.6 ± 2.8 | 36.4 ± 20.9 | 0.6 ± 0.7 | 1.6 ± 0.1 | 686.3 ± 278.7 |
| B. Pass | 9/18 | 12 | 96 | 8.4 | 851.2 ± 491.6 | 40.0 ± 5.7 | 1.6 ± 1.4 | 0.9 ± 0.7 | 861.3 ± 281.2 | 49.3 ± 5.8 | 28.4 ± 1.6 | 3.9 ± 0.7 | 7.0 ± 5.5 | 0.9 ± 0.7 | 0.6 ± 0.0 | 812.0 ± 281.2 |
| B. Pass | 9/19 | 6 | 92 | 8.4 | 98.2 ± 86.8 | 11.0 ± 3.7 | 0.0 ± 1.5 | 1.1 ± 0.7 | 106.6 ± 38.4 | 20.6 ± 3.7 | 4.4 ± 0.4 | 1.0 ± 0.4 | 5.2 ± 3.6 | 1.1 ± 0.7 | 0.5 ± 0.0 | 86.0 ± 38.6 |
| B. Pass | 9/19 | 12 | 75 | 8.4 | 12.4 ± 1.5 | 11.8 ± 1.9 | 1.6 ± 1.4 | 2.2 ± 0.8 | 22.4 ± 4.4 | 22.4 ± 2.0 | 4.4 ± 0.3 | 0.6 ± 0.2 | 6.4 ± 1.8 | 2.2 ± 0.8 | 0.4 ± 0.0 | 0.0 ± 4.9 |
| B. Pass | 9/20 | 6 | 100 | 8.4 | 1960.7 ± 608.2 | 242.8 ± 45.6 | 0.0 ± 1.4 | 3.1 ± 0.9 | 1969.2 ± 469.2 | 254.4 ± 45.6 | 53.0 ± 5.6 | 26.0 ± 5.7 | 161.4 ± 44.9 | 3.1 ± 0.9 | 2.4 ± 0.3 | 1714.8 ± 471.4 |
| B. Pass | 9/20 | 12 | 99 | 8.4 | 740.2 ± 354.8 | 156.8 ± 29.6 | 3.2 ± 1.4 | 0.8 ± 0.7 | 751.8 ± 217.8 | 166.0 ± 29.6 | 90.1 ± 5.7 | 16.3 ± 4.0 | 48.8 ± 28.7 | 0.8 ± 0.7 | 1.5 ± 0.1 | 585.8 ± 219.8 |
| B. Pass | 9/21 | 6 | 90 | 8.4 | 31.6 ± 9.0 | 13.3 ± 2.7 | 0.0 ± 1.4 | 1.2 ± 0.7 | 40.0 ± 8.7 | 22.9 ± 2.8 | 12.2 ± 0.7 | 0.5 ± 0.3 | 0.3 ± 2.6 | 1.2 ± 0.7 | 0.4 ± 0.0 | 17.1 ± 9.2 |
| B. Pass | 9/21 | 12 | 82 | 8.4 | 7.7 ± 1.1 | 6.5 ± 1.0 | 0.0 ± 0.7 | 0.4 ± 0.3 | 16.1 ± 3.2 | 15.3 ± 1.1 | 4.3 ± 0.2 | 0.3 ± 0.1 | 1.5 ± 1.0 | 0.4 ± 0.3 | 0.3 ± 0.0 | 0.7 ± 3.4 |
| B. Pass | 9/24 | 6 | 94 | 8.4 | 669.9 ± 194.9 | 29.0 ± 5.7 | 1.6 ± 1.4 | 0.6 ± 0.8 | 679.9 ± 157.5 | 37.9 ± 5.8 | 14.4 ± 0.8 | 0.8 ± 0.5 | 13.3 ± 5.6 | 0.6 ± 0.8 | 0.4 ± 0.0 | 642.0 ± 157.6 |
| B. Pass | 9/24 | 12 | 57 | 8.4 | 7.2 ± 0.8 | 4.6 ± 1.6 | 0.0 ± 1.4 | 1.8 ± 1.1 | 15.7 ± 3.5 | 14.9 ± 2.0 | 2.7 ± 0.2 | 0.3 ± 0.1 | 1.4 ± 1.6 | 1.8 ± 1.1 | 0.2 ± 0.0 | 0.8 ± 4.0 |
| B. Pass | 9/27 | 6 | 62 | 8.4 | 8.4 ± 0.7 | 6.2 ± 1.5 | 3.3 ± 1.4 | 3.0 ± 0.9 | 20.1 ± 3.5 | 17.5 ± 1.7 | 3.5 ± 0.2 | 0.4 ± 0.1 | 1.6 ± 1.4 | 3.0 ± 0.9 | 0.6 ± 0.0 | 2.6 ± 3.9 |
| B. Pass | 9/27 | 12 | 42 | 8.4 | 8.7 ± 0.5 | 6.1 ± 1.3 | 3.2 ± 1.4 | 0.5 ± 0.7 | 20.4 ± 3.5 | 15.0 ± 1.5 | 3.2 ± 0.2 | 0.3 ± 0.1 | 2.1 ± 1.3 | 0.5 ± 0.7 | 0.5 ± 0.0 | 5.4 ± 3.8 |
| B. Pass | 9/30 | 6 | 95 | 8.4 | 812.2 ± 184.5 | 7.4 ± 6.2 | 0.0 ± 1.3 | 1.0 ± 0.9 | 820.7 ± 178.1 | 16.8 ± 6.3 | 3.2 ± 0.6 | 2.5 ± 0.7 | 0.8 ± 6.1 | 1.0 ± 0.9 | 0.9 ± 0.0 | 803.8 ± 178.2 |
| B. Pass | 9/30 | 12 | 96 | 8.4 | 1608.9 ± 265.6 | 49.5 ± 7.4 | 1.5 ± 1.3 | 5.9 ± 2.5 | 1618.9 ± 331.1 | 63.8 ± 7.8 | 32.9 ± 1.8 | 4.9 ± 0.7 | 10.5 ± 7.1 | 5.9 ± 2.5 | 1.1 ± 0.0 | 1555.1 ± 331.2 |
| B. Pass | 10/1 | 6 | 95 | 8.4 | 758.4 ± 329.9 | 33.7 ± 6.8 | 3.4 ± 1.5 | 2.5 ± 1.4 | 770.2 ± 211.7 | 44.6 ± 7.0 | 18.8 ± 1.1 | 4.3 ± 0.7 | 8.2 ± 6.7 | 2.5 ± 1.4 | 2.4 ± 0.1 | 725.7 ± 211.9 |
| B. Pass | 10/1 | 12 | 87 | 8.4 | 6.9 ± 1.3 | 15.7 ± 3.2 | 1.6 ± 1.4 | 0.7 ± 0.8 | 16.9 ± 3.2 | 24.8 ± 3.3 | 5.6 ± 0.4 | 3.1 ± 0.3 | 5.4 ± 3.1 | 0.7 ± 0.8 | 1.5 ± 0.0 | -7.9 ± 4.6 |
| B. Pass | 10/2 | 6 | 91 | 8.4 | 49.2 ± 14.5 | 21.2 ± 3.1 | 1.6 ± 1.4 | 0.5 ± 0.7 | 59.2 ± 12.8 | 30.2 ± 3.2 | 7.6 ± 0.5 | 7.3 ± 0.5 | 5.1 ± 3.1 | 0.5 ± 0.7 | 1.2 ± 0.0 | 29.1 ± 13.2 |
| B. Pass | 10/2 | 12 | 65 | 8.4 | 2.7 ± 0.6 | 5.6 ± 1.5 | 0.0 ± 1.4 | 1.4 ± 0.8 | 11.2 ± 2.6 | 15.5 ± 1.7 | 1.8 ± 0.1 | 0.8 ± 0.1 | 2.1 ± 1.5 | 1.4 ± 0.8 | 0.9 ± 0.0 | -4.3 ± 3.1 |
| B. Pass | 10/7 | 6 | 42 | 8.4 | 3.1 ± 0.2 | 7.1 ± 1.6 | 1.7 ± 1.5 | 5.2 ± 2.2 | 13.2 ± 2.5 | 20.8 ± 2.8 | 1.5 ± 0.1 | 0.3 ± 0.1 | 3.1 ± 1.6 | 5.2 ± 2.2 | 2.3 ± 0.1 | -7.6 ± 3.7 |
| B. Pass | 10/7 | 12 | 43 | 8.4 | 3.9 ± 0.2 | 2.5 ± 1.3 | 1.6 ± 1.4 | 0.1 ± 0.7 | 13.9 ± 2.4 | 11.1 ± 1.4 | 1.6 ± 0.1 | 0.2 ± 0.1 | 0.0 ± 1.3 | 0.1 ± 0.7 | 0.7 ± 0.0 | 2.8 ± 2.8 |
| B. Pass | 10/8 | 6 | 88 | 8.4 | 42.9 ± 10.4 | 19.4 ± 3.5 | 0.0 ± 1.4 | 1.5 ± 1.0 | 51.3 ± 10.8 | 29.3 ± 3.7 | 6.3 ± 0.4 | 2.7 ± 0.3 | 9.5 ± 3.5 | 1.5 ± 1.0 | 0.9 ± 0.0 | 22.0 ± 11.4 |
| B. Pass | 10/8 | 12 | 39 | 8.4 | 4.9 ± 0.9 | 3.2 ± 1.4 | 0.0 ± 1.4 | 0.1 ± 0.7 | 13.3 ± 2.7 | 11.7 ± 1.6 | 1.7 ± 0.1 | 0.2 ± 0.1 | 0.8 ± 1.4 | 0.1 ± 0.7 | 0.5 ± 0.0 | 1.6 ± 3.2 |
| B. Pass | 10/9 | 6 | 50 | 8.4 | 4.7 ± 0.4 | 4.8 ± 1.6 | 0.0 ± 1.4 | 1.6 ± 1.0 | 13.2 ± 2.9 | 14.8 ± 1.9 | 1.3 ± 0.1 | 0.2 ± 0.1 | 2.7 ± 1.6 | 1.6 ± 1.0 | 0.5 ± 0.0 | -1.6 ± 3.5 |
| B. Pass | 10/9 | 12 | 41 | 8.4 | 5.4 ± 0.4 | 4.8 ± 1.6 | 0.0 ± 1.5 | 2.8 ± 1.4 | 13.8 ± 3.1 | 16.0 ± 2.2 | 1.2 ± 0.1 | 0.4 ± 0.1 | 2.3 ± 1.6 | 2.8 ± 1.4 | 0.8 ± 0.0 | -2.1 ± 3.8 |
| B. Pass | 10/10 | 6 | 50 | 8.4 | 8.1 ± 0.7 | 3.4 ± 1.2 | 1.6 ± 1.4 | 1.4 ± 0.7 | 18.1 ± 3.5 | 13.3 ± 1.4 | 1.5 ± 0.1 | 0.5 ± 0.1 | 0.8 ± 1.2 | 1.4 ± 0.7 | 0.7 ± 0.0 | 4.9 ± 3.8 |
| B. Pass | 10/10 | 12 | 40 | 8.4 | 4.6 ± 0.3 | 3.9 ± 1.2 | 1.6 ± 1.4 | 2.6 ± 0.8 | 14.6 ± 2.8 | 14.9 ± 1.4 | 1.5 ± 0.1 | 0.4 ± 0.1 | 1.5 ± 1.2 | 2.6 ± 0.8 | 0.5 ± 0.0 | -0.3 ± 3.1 |
| B. Pass | 10/11 | 6 | 35 | 8.4 | 2.7 ± 0.4 | 4.3 ± 1.5 | 0.0 ± 1.4 | 2.6 ± 1.3 | 11.2 ± 2.4 | 15.4 ± 2.0 | 0.7 ± 0.1 | 0.2 ± 0.1 | 3.1 ± 1.5 | 2.6 ± 1.3 | 0.5 ± 0.0 | -4.2 ± 3.1 |
| B. Pass | 10/11 | 12 | 30 | 8.4 | 2.9 ± 0.3 | 8.4 ± 1.6 | 3.5 ± 1.6 | 3.7 ± 1.7 | 14.9 ± 2.5 | 20.6 ± 2.3 | 1.0 ± 0.1 | 0.3 ± 0.1 | 5.0 ± 1.6 | 3.7 ± 1.7 | 2.1 ± 0.1 | -5.7 ± 3.4 |

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| B. Pass | 10/12 | 6 | 57 | 8.4 | 56.2 ± 37.3 | 22.9 ± 2.8 | --- ± --- | 9.3 ± 3.7 | --- ± --- | 40.5 ± 4.6 | 5.9 ± 0.3 | 0.7 ± 0.1 | 12.8 ± 2.7 | 9.3 ± 3.7 | 3.5 ± 0.1 | --- ± --- |
| B. Pass | 10/12 | 12 | 92 | 8.4 | 260.1 ± 167.7 | 35.2 ± 4.8 | 3.3 ± 1.5 | 8.7 ± 3.4 | 271.8 ± 93.2 | 52.3 ± 5.8 | 16.2 ± 0.9 | 0.9 ± 0.3 | 17.5 ± 4.7 | 8.7 ± 3.4 | 0.6 ± 0.0 | 219.6 ± 93.4 |
| B. Pass | 10/13 | 6 | 77 | 8.4 | 2.2 ± 0.5 | 7.2 ± 2.5 | 0.0 ± 1.4 | 3.3 ± 1.6 | 10.7 ± 2.5 | 19.0 ± 3.0 | 1.5 ± 0.2 | 0.7 ± 0.2 | 4.4 ± 2.5 | 3.3 ± 1.6 | 0.6 ± 0.0 | -8.3 ± 3.9 |
| B. Pass | 10/13 | 12 | 47 | 8.4 | 0.4 ± 0.3 | 4.6 ± 1.5 | 0.0 ± 1.4 | 1.4 ± 0.9 | 8.8 ± 2.4 | 14.4 ± 1.8 | 0.7 ± 0.1 | 0.2 ± 0.1 | 3.3 ± 1.5 | 1.4 ± 0.9 | 0.3 ± 0.0 | -5.6 ± 3.0 |
| B. Pass | 10/14 | 6 | 38 | 8.4 | 1.9 ± 0.5 | 4.0 ± 1.5 | 3.1 ± 1.3 | 2.7 ± 1.4 | 13.4 ± 2.4 | 15.0 ± 2.0 | 0.6 ± 0.1 | 0.3 ± 0.1 | 2.0 ± 1.5 | 2.7 ± 1.4 | 1.1 ± 0.0 | -1.7 ± 3.1 |
| B. Pass | 10/14 | 12 | 42 | 8.4 | -0.1 ± 0.2 | 4.5 ± 1.6 | 0.0 ± 1.3 | 2.3 ± 1.3 | 8.3 ± 2.4 | 15.3 ± 2.0 | 0.7 ± 0.1 | 0.2 ± 0.1 | 3.0 ± 1.6 | 2.3 ± 1.3 | 0.7 ± 0.0 | -7.0 ± 3.1 |
| B. Pass | 10/15 | 6 | 38 | 8.4 | 0.4 ± 0.2 | 2.0 ± 1.5 | 7.3 ± 1.3 | 2.6 ± 2.7 | 16.2 ± 2.4 | 13.1 ± 3.1 | 0.5 ± 0.1 | 0.5 ± 0.1 | 0.0 ± 1.5 | 2.6 ± 2.7 | 1.0 ± 0.0 | 3.1 ± 3.9 |
| B. Pass | 10/15 | 12 | 32 | 8.4 | -0.2 ± 0.2 | 6.9 ± 2.1 | 0.0 ± 1.3 | 1.5 ± 1.8 | 8.2 ± 2.3 | 16.8 ± 2.8 | 0.5 ± 0.1 | 0.4 ± 0.1 | 4.9 ± 2.1 | 1.5 ± 1.8 | 1.1 ± 0.0 | -8.6 ± 3.6 |
| B. Pass | 10/16 | 6 | 32 | 8.4 | 3.1 ± 0.6 | 4.4 ± 0.6 | 2.3 ± 0.7 | 1.9 ± 0.5 | 13.8 ± 2.4 | 14.7 ± 0.8 | 1.6 ± 0.1 | 0.3 ± 0.0 | 1.3 ± 0.6 | 1.9 ± 0.5 | 1.1 ± 0.0 | -0.8 ± 2.5 |
| B. Pass | 10/17 | 6 | 46 | 8.4 | 7.3 ± 0.4 | 5.0 ± 0.7 | 2.8 ± 0.8 | 0.9 ± 0.4 | 18.5 ± 3.1 | 14.3 ± 0.8 | 1.8 ± 0.1 | 0.3 ± 0.0 | 2.1 ± 0.7 | 0.9 ± 0.4 | 0.8 ± 0.0 | 4.2 ± 3.2 |
| B. Pass | 10/18 | 6 | 41 | 8.4 | 5.8 ± 0.2 | 4.1 ± 0.7 | 1.4 ± 0.6 | 1.7 ± 0.5 | 15.7 ± 3.0 | 14.2 ± 0.8 | 1.7 ± 0.1 | 0.3 ± 0.0 | 1.5 ± 0.6 | 1.7 ± 0.5 | 0.6 ± 0.0 | 1.5 ± 3.1 |
| B. Pass | 10/19 | 6 | 43 | 8.4 | 4.3 ± 1.0 | 1.9 ± 0.6 | 1.4 ± 0.6 | 0.9 ± 0.4 | 14.2 ± 2.7 | 11.2 ± 0.7 | 0.6 ± 0.0 | 0.3 ± 0.0 | 0.6 ± 0.6 | 0.9 ± 0.4 | 0.4 ± 0.0 | 2.9 ± 2.8 |
| B. Pass | 10/20 | 6 | 22 | 8.4 | 5.7 ± 1.0 | 4.1 ± 1.0 | 0.8 ± 0.7 | 2.5 ± 2.3 | 14.9 ± 2.9 | 15.0 ± 2.5 | 0.6 ± 0.0 | 0.2 ± 0.0 | 2.3 ± 1.0 | 2.5 ± 2.3 | 1.0 ± 0.0 | -0.1 ± 3.8 |
| B. Pass | 10/21 | 6 | 35 | 8.4 | 7.0 ± 1.0 | 3.8 ± 0.9 | 2.3 ± 0.7 | 1.9 ± 1.8 | 17.7 ± 3.1 | 14.1 ± 2.0 | 1.2 ± 0.1 | 0.3 ± 0.0 | 1.3 ± 0.9 | 1.9 ± 1.8 | 1.0 ± 0.0 | 3.6 ± 3.7 |
| B. Pass | 10/22 | 6 | 89 | 8.4 | 53.6 ± 16.6 | 5.4 ± 1.3 | 0.8 ± 0.7 | 0.9 ± 0.4 | 62.8 ± 16.2 | 14.7 ± 1.4 | 4.6 ± 0.3 | 0.5 ± 0.2 | 0.0 ± 1.3 | 0.9 ± 0.4 | 0.3 ± 0.0 | 48.0 ± 16.3 |
| B. Pass | 10/23 | 6 | 86 | 8.4 | 220.9 ± 111.0 | 9.9 ± 1.2 | 1.5 ± 0.7 | 0.5 ± 0.4 | 230.9 ± 85.1 | 18.8 ± 1.2 | 9.4 ± 0.5 | 0.4 ± 0.1 | 0.0 ± 1.1 | 0.5 ± 0.4 | 0.2 ± 0.0 | 212.1 ± 85.1 |
| B. Pass | 10/24 | 6 | 61 | 8.4 | 2.8 ± 0.2 | 2.1 ± 0.9 | 0.8 ± 0.7 | 3.1 ± 2.8 | 12.0 ± 2.1 | 13.6 ± 2.9 | 1.5 ± 0.1 | 0.2 ± 0.1 | 0.1 ± 0.9 | 3.1 ± 2.8 | 0.2 ± 0.0 | -1.5 ± 3.6 |
| B. Pass | 10/25 | 6 | 56 | 8.4 | 2.9 ± 0.2 | 4.2 ± 1.1 | 2.3 ± 0.7 | 5.1 ± 4.3 | 13.7 ± 2.1 | 17.7 ± 4.5 | 1.4 ± 0.1 | 0.3 ± 0.1 | 2.2 ± 1.1 | 5.1 ± 4.3 | 0.3 ± 0.0 | -4.0 ± 4.9 |
| B. Pass | 10/26 | 6 | 66 | 8.4 | 12.6 ± 2.3 | 12.7 ± 2.5 | 0.9 ± 0.8 | 10.2 ± 8.5 | 21.9 ± 4.2 | 31.3 ± 8.9 | 1.3 ± 0.1 | 0.4 ± 0.1 | 10.4 ± 2.5 | 10.2 ± 8.5 | 0.6 ± 0.0 | -9.4 ± 9.8 |
| B. Pass | 10/27 | 6 | 66 | 8.4 | 30.9 ± 17.4 | 3.5 ± 1.1 | 0.0 ± 0.7 | 2.5 ± 2.3 | 39.3 ± 13.6 | 14.4 ± 2.6 | 1.1 ± 0.1 | 0.5 ± 0.1 | 1.2 ± 1.1 | 2.5 ± 2.3 | 0.8 ± 0.0 | 24.9 ± 13.9 |
| B. Pass | 10/28 | 6 | 51 | 8.4 | 1.4 ± 0.2 | 2.1 ± 0.8 | 0.8 ± 0.7 | 0.5 ± 0.8 | 10.6 ± 2.1 | 11.1 ± 1.1 | 0.6 ± 0.1 | 0.4 ± 0.1 | 0.1 ± 0.8 | 0.5 ± 0.8 | 1.1 ± 0.0 | -0.5 ± 2.4 |
| B. Pass | 10/29 | 6 | 61 | 8.4 | 0.7 ± 0.4 | 3.6 ± 1.0 | 0.0 ± 0.7 | 3.2 ± 2.8 | 9.2 ± 2.1 | 15.2 ± 3.0 | 0.8 ± 0.1 | 0.4 ± 0.1 | 1.5 ± 1.0 | 3.2 ± 2.8 | 0.8 ± 0.0 | -6.0 ± 3.7 |

# Table 4.3.2
# Measured and Calculated Component Contributions to Total Light Extinction at Gilpin Creek

| Site | Date | Hr | RH | Cln Air | bsp | Ebsp | babs | Ebabs | bext | Ebext | Esul | Enit | Eoc | Eec | Esoil | Unid. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gilpin Cr. | 2/23 | 6 | 54 | 8.8 | 4.2 ± 0.2 | --- ± --- | 0.0 ± 5.2 | --- ± --- | 13.0 ± 5.3 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Gilpin Cr. | 3/26 | 6 | 66 | 8.8 | 9.8 ± 1.8 | 3.2 ± 6.4 | 5.8 ± 5.1 | 2.8 ± 2.5 | 24.4 ± 5.2 | 14.8 ± 6.9 | 2.4 ± 0.4 | 0.7 ± 0.4 | 0.0 ± 6.4 | 2.8 ± 2.5 | 0.2 ± 0.0 | 9.6 ± 8.6 |
| Gilpin Cr. | 3/27 | 6 | 67 | 8.8 | 13.3 ± 1.8 | 5.7 ± 6.6 | 6.0 ± 5.2 | 6.8 ± 3.1 | 28.0 ± 5.3 | 21.2 ± 7.3 | 2.1 ± 0.4 | 0.4 ± 0.4 | 2.6 ± 6.6 | 6.8 ± 3.1 | 0.5 ± 0.0 | 6.8 ± 9.0 |
| Gilpin Cr. | 3/28 | 6 | 55 | 8.8 | 10.5 ± 0.7 | 5.8 ± 5.9 | 5.8 ± 5.1 | 2.0 ± 2.6 | 25.1 ± 5.2 | 16.6 ± 6.5 | 4.0 ± 0.4 | 1.5 ± 0.3 | 0.0 ± 5.9 | 2.0 ± 2.6 | 0.3 ± 0.0 | 8.5 ± 8.3 |
| Gilpin Cr. | 3/29 | 6 | --- | 8.8 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Gilpin Cr. | 3/30 | 6 | 73 | 8.8 | 28.5 ± 4.4 | 11.8 ± 7.1 | 11.7 ± 5.1 | 1.8 ± 2.5 | 48.9 ± 5.4 | 22.4 ± 7.5 | 9.1 ± 0.6 | 1.4 ± 0.4 | 0.0 ± 7.0 | 1.8 ± 2.5 | 1.2 ± 0.0 | 26.6 ± 9.2 |
| Gilpin Cr. | 3/31 | 6 | 67 | 8.8 | 17.2 ± 0.9 | 10.6 ± 6.7 | 11.8 ± 5.2 | 4.1 ± 2.6 | 37.8 ± 5.3 | 23.5 ± 7.1 | 7.7 ± 0.6 | 1.8 ± 0.4 | 0.0 ± 6.6 | 4.1 ± 2.6 | 1.1 ± 0.0 | 14.3 ± 8.9 |
| Gilpin Cr. | 5/6 | 6 | 60 | 8.8 | 21.2 ± 4.5 | 14.8 ± 5.9 | 18.3 ± 5.4 | 8.2 ± 3.3 | 48.2 ± 5.5 | 31.7 ± 6.8 | 4.9 ± 0.4 | 1.1 ± 0.3 | 5.2 ± 5.9 | 8.2 ± 3.3 | 3.6 ± 0.1 | 16.5 ± 8.8 |
| Gilpin Cr. | 5/7 | 6 | 71 | 8.8 | 79.5 ± 58.3 | 9.4 ± 6.6 | 18.2 ± 5.3 | 6.9 ± 3.0 | 106.4 ± 10.2 | 25.1 ± 7.3 | 4.3 ± 0.5 | 1.2 ± 0.4 | 0.0 ± 6.6 | 6.9 ± 3.0 | 3.9 ± 0.1 | 81.3 ± 12.5 |
| Gilpin Cr. | 6/14 | 6 | 26 | 8.8 | 20.8 ± 0.8 | 22.0 ± 5.6 | 22.5 ± 5.0 | 12.8 ± 4.6 | 52.1 ± 5.1 | 43.5 ± 7.3 | 3.1 ± 0.3 | 1.1 ± 0.3 | 16.9 ± 5.6 | 12.8 ± 4.6 | 0.8 ± 0.0 | 8.6 ± 8.9 |
| Gilpin Cr. | 6/15 | 6 | 41 | 8.8 | 17.9 ± 0.9 | 18.2 ± 5.5 | 23.0 ± 5.1 | 11.0 ± 4.1 | 49.7 ± 5.2 | 38.0 ± 6.8 | 5.4 ± 0.4 | 1.0 ± 0.3 | 10.9 ± 5.5 | 11.0 ± 4.1 | 0.9 ± 0.0 | 11.7 ± 8.6 |
| Gilpin Cr. | 6/16 | 6 | 26 | 8.8 | 13.7 ± 0.5 | 10.8 ± 5.1 | 23.8 ± 5.3 | 10.8 ± 4.1 | 46.3 ± 5.4 | 30.4 ± 6.6 | 3.1 ± 0.3 | 0.7 ± 0.2 | 6.4 ± 5.1 | 10.8 ± 4.1 | 0.7 ± 0.0 | 16.0 ± 8.5 |
| Gilpin Cr. | 6/29 | 6 | 67 | 8.8 | 10.2 ± 0.4 | 33.8 ± 7.4 | 17.4 ± 5.1 | 12.2 ± 4.4 | 36.4 ± 5.2 | 54.7 ± 8.6 | 3.0 ± 0.4 | 0.8 ± 0.4 | 29.7 ± 7.4 | 12.2 ± 4.4 | 0.2 ± 0.1 | -18.3 ± 10.1 |
| Gilpin Cr. | 6/30 | 6 | 54 | 8.8 | 13.9 ± 0.6 | 13.3 ± 5.9 | 17.9 ± 5.3 | 6.3 ± 2.9 | 40.6 ± 5.4 | 28.3 ± 6.6 | 3.1 ± 0.3 | 1.2 ± 0.3 | 8.6 ± 5.8 | 6.3 ± 2.9 | 0.4 ± 0.0 | 12.2 ± 8.5 |
| Gilpin Cr. | 7/1 | 6 | 52 | 8.8 | 17.4 ± 0.8 | 4.5 ± 5.9 | 17.8 ± 5.2 | 10.4 ± 6.3 | 43.9 ± 5.3 | 23.7 ± 8.6 | 2.5 ± 0.3 | 0.7 ± 0.3 | 1.0 ± 5.8 | 10.4 ± 6.3 | 0.4 ± 0.1 | 20.2 ± 10.1 |
| Gilpin Cr. | 7/29 | 6 | 25 | 8.8 | 12.0 ± 1.2 | 17.4 ± 5.4 | 0.0 ± 5.1 | 30.6 ± 17.3 | 20.8 ± 5.2 | 56.8 ± 18.1 | 2.2 ± 0.3 | 0.7 ± 0.2 | 14.2 ± 5.4 | 30.6 ± 17.3 | 0.4 ± 0.0 | -36.1 ± 18.9 |
| Gilpin Cr. | 7/30 | 6 | 33 | 8.8 | 16.2 ± 1.0 | 13.2 ± 5.3 | 0.0 ± 5.0 | 24.8 ± 14.1 | 24.9 ± 5.1 | 46.7 ± 15.0 | 3.0 ± 0.3 | 0.5 ± 0.2 | 9.1 ± 5.3 | 24.8 ± 14.1 | 0.6 ± 0.0 | -21.8 ± 15.9 |
| Gilpin Cr. | 7/30 | 6 | 33 | 8.8 | 16.2 ± 1.0 | --- ± --- | 0.0 ± 5.0 | --- ± --- | 24.9 ± 5.1 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Gilpin Cr. | 7/31 | 6 | 37 | 8.8 | 9.7 ± 1.4 | 5.5 ± 5.3 | 0.0 ± 5.2 | 16.6 ± 9.5 | 18.4 ± 5.3 | 30.8 ± 10.9 | 1.7 ± 0.3 | 0.5 ± 0.3 | 2.8 ± 5.3 | 16.6 ± 9.5 | 0.5 ± 0.0 | -12.4 ± 12.1 |
| Gilpin Cr. | 8/7 | 6 | 29 | 8.8 | 14.8 ± 0.4 | 18.5 ± 5.4 | 0.0 ± 5.2 | 15.9 ± 5.7 | 23.6 ± 5.3 | 43.2 ± 7.9 | 3.3 ± 0.3 | 0.8 ± 0.2 | 13.9 ± 5.4 | 15.9 ± 5.7 | 0.5 ± 0.0 | -19.6 ± 9.5 |
| Gilpin Cr. | 8/8 | 6 | --- | 8.8 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Gilpin Cr. | 8/9 | 6 | 29 | 8.8 | 9.1 ± 0.5 | --- ± --- | 0.0 ± 4.9 | --- ± --- | 17.8 ± 5.0 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Gilpin Cr. | 8/14 | 6 | 49 | 8.8 | 6.2 ± 0.4 | 10.6 ± 5.3 | 0.0 ± 5.2 | 7.6 ± 4.8 | 15.0 ± 5.3 | 27.0 ± 7.1 | 1.5 ± 0.3 | 0.7 ± 0.3 | 8.2 ± 5.2 | 7.6 ± 4.8 | 0.3 ± 0.0 | -12.0 ± 8.9 |
| Gilpin Cr. | 8/21 | 6 | 54 | 8.8 | 13.9 ± 0.5 | 20.9 ± 5.9 | 0.0 ± 5.2 | 9.1 ± 3.6 | 22.7 ± 5.3 | 38.8 ± 6.9 | 5.0 ± 0.4 | 0.5 ± 0.3 | 15.2 ± 5.9 | 9.1 ± 3.6 | 0.2 ± 0.1 | -16.1 ± 8.7 |
| Gilpin Cr. | 8/22 | 6 | 57 | 8.8 | 12.4 ± 0.5 | 9.4 ± 5.5 | 0.0 ± 5.2 | 2.7 ± 2.2 | 21.2 ± 5.3 | 20.8 ± 5.9 | 4.0 ± 0.4 | 0.4 ± 0.3 | 4.6 ± 5.5 | 2.7 ± 2.2 | 0.3 ± 0.0 | 0.3 ± 7.9 |
| Gilpin Cr. | 8/23 | 6 | 62 | 8.8 | 12.6 ± 0.8 | 21.0 ± 6.6 | 0.0 ± 4.9 | 12.2 ± 4.5 | 21.3 ± 5.0 | 42.0 ± 8.0 | 5.3 ± 0.4 | 0.7 ± 0.4 | 14.8 ± 6.6 | 12.2 ± 4.5 | 0.2 ± 0.0 | -20.7 ± 9.5 |
| Gilpin Cr. | 8/24 | 6 | 73 | 8.8 | 13.6 ± 1.1 | 3.2 ± 6.5 | 0.0 ± 5.3 | 6.3 ± 2.9 | 22.3 ± 5.3 | 18.3 ± 7.2 | 1.8 ± 0.4 | 0.5 ± 0.4 | 0.5 ± 6.5 | 6.3 ± 2.9 | 0.3 ± 0.0 | 4.0 ± 8.9 |
| Gilpin Cr. | 8/25 | 6 | 57 | 8.8 | 9.7 ± 1.4 | 6.4 ± 5.6 | 0.0 ± 5.1 | 10.0 ± 3.9 | 18.4 ± 5.2 | 25.2 ± 6.8 | 2.6 ± 0.3 | 0.5 ± 0.3 | 3.0 ± 5.5 | 10.0 ± 3.9 | 0.2 ± 0.0 | -6.7 ± 8.5 |
| Gilpin Cr. | 8/26 | 6 | 39 | 8.8 | 8.2 ± 0.6 | 6.9 ± 5.3 | 0.0 ± 5.0 | 9.3 ± 5.7 | 17.0 ± 5.1 | 25.0 ± 7.8 | 2.7 ± 0.3 | 0.6 ± 0.3 | 3.4 ± 5.3 | 9.3 ± 5.7 | 0.2 ± 0.0 | -8.0 ± 9.3 |
| Gilpin Cr. | 8/27 | 6 | 49 | 8.8 | 12.4 ± 0.7 | 4.3 ± 5.5 | 0.0 ± 4.9 | 6.8 ± 4.4 | 21.2 ± 5.0 | 19.9 ± 7.0 | 3.5 ± 0.3 | 0.5 ± 0.3 | 0.1 ± 5.5 | 6.8 ± 4.4 | 0.2 ± 0.0 | 1.2 ± 8.7 |
| Gilpin Cr. | 9/2 | 6 | 43 | 8.8 | 15.2 ± 0.7 | 14.3 ± 5.6 | 0.0 ± 5.1 | 34.5 ± 19.5 | 24.0 ± 5.2 | 57.5 ± 20.3 | 5.0 ± 0.4 | 0.4 ± 0.3 | 8.5 ± 5.6 | 34.5 ± 19.5 | 0.3 ± 0.1 | -33.5 ± 20.9 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gilpin Cr. | 9/17 | 6 | 35 | 8.8 | 8.3 ± 0.2 | 4.3 ± 5.1 | 0.0 ± 5.1 | 4.4 ± 3.5 | 17.1 ± 5.2 | 17.5 ± 6.2 | 3.0 ± 0.3 | 0.8 ± 0.2 | 0.0 ± 5.1 | 4.4 ± 3.5 | 0.4 ± 0.0 | -0.4 ± 8.1 |
| Gilpin Cr. | 9/18 | 6 | 90 | 8.8 | 114.6 ± 80.0 | 12.4 ± 12.4 | 0.0 ± 5.2 | 4.6 ± 3.5 | 123.3 ± 13.3 | 25.8 ± 12.9 | 10.3 ± 1.1 | 1.8 ± 0.9 | 0.0 ± 12.3 | 4.6 ± 3.5 | 0.4 ± 0.1 | 97.5 ± 18.5 |
| Gilpin Cr. | 9/19 | 6 | 72 | 8.8 | 10.9 ± 1.9 | 3.9 ± 6.8 | 0.0 ± 5.2 | 4.6 ± 3.5 | 19.7 ± 5.3 | 17.3 ± 7.7 | 2.6 ± 0.4 | 1.1 ± 0.4 | 0.0 ± 6.8 | 4.6 ± 3.5 | 0.3 ± 0.1 | 2.3 ± 9.3 |
| Gilpin Cr. | 9/20 | 6 | 88 | 8.8 | 143.3 ± 79.5 | 7.5 ± 11.5 | 0.0 ± 5.0 | 3.1 ± 3.1 | 152.1 ± 13.5 | 19.3 ± 11.9 | 5.6 ± 0.9 | 1.5 ± 0.9 | 0.0 ± 11.4 | 3.1 ± 3.1 | 0.4 ± 0.1 | 132.7 ± 18.0 |
| Gilpin Cr. | 9/21 | 6 | 68 | 8.8 | 6.3 ± 0.7 | 3.3 ± 6.7 | 0.0 ± 5.0 | 4.1 ± 3.3 | 15.1 ± 5.1 | 16.2 ± 7.5 | 2.4 ± 0.4 | 0.6 ± 0.4 | 0.2 ± 6.7 | 4.1 ± 3.3 | 0.1 ± 0.1 | -1.1 ± 9.0 |
| Gilpin Cr. | 9/24 | 6 | 69 | 8.8 | 10.8 ± 1.1 | --- ± --- | 0.0 ± 5.3 | --- ± --- | 19.6 ± 5.4 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Gilpin Cr. | 9/27 | 6 | 43 | 8.8 | 10.5 ± 0.5 | 5.1 ± 5.6 | 0.0 ± 5.0 | 5.3 ± 3.9 | 19.3 ± 5.1 | 19.2 ± 6.8 | 3.6 ± 0.3 | 1.1 ± 0.3 | 0.0 ± 5.6 | 5.3 ± 3.9 | 0.5 ± 0.0 | 0.1 ± 8.5 |
| Gilpin Cr. | 9/30 | 6 | 96 | 8.8 | 1637.7 ± 431.2 | 8.6 ± 28.4 | 0.0 ± 5.2 | 0.0 ± 2.5 | 1646.5 ± 89.1 | 17.4 ± 28.5 | 8.2 ± 2.6 | 0.0 ± 2.4 | 0.0 ± 28.2 | 0.0 ± 2.5 | 0.5 ± 0.1 | 1629.1 ± 93.6 |
| Gilpin Cr. | 10/1 | 6 | 66 | 8.8 | 12.7 ± 2.2 | 4.4 ± 7.2 | 0.0 ± 5.2 | 15.3 ± 6.2 | 21.4 ± 5.3 | 28.5 ± 9.5 | 3.0 ± 0.4 | 0.9 ± 0.4 | 0.3 ± 7.2 | 15.3 ± 6.2 | 0.2 ± 0.0 | -7.1 ± 10.8 |
| Gilpin Cr. | 10/2 | 6 | 57 | 8.8 | 9.3 ± 2.1 | 8.0 ± 6.1 | 0.0 ± 5.2 | 9.9 ± 6.0 | 18.1 ± 5.3 | 26.7 ± 8.6 | 2.3 ± 0.3 | 1.3 ± 0.3 | 4.2 ± 6.1 | 9.9 ± 6.0 | 0.3 ± 0.0 | -8.6 ± 10.1 |
| Gilpin Cr. | 10/7 | 6 | --- | 8.8 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Gilpin Cr. | 10/8 | 6 | 51 | 8.8 | 18.0 ± 3.7 | 9.0 ± 6.7 | 0.0 ± 5.2 | 5.3 ± 3.2 | 26.8 ± 5.4 | 23.0 ± 7.5 | 2.5 ± 0.3 | 0.8 ± 0.3 | 4.8 ± 6.7 | 5.3 ± 3.2 | 0.8 ± 0.0 | 3.7 ± 9.2 |
| Gilpin Cr. | 10/9 | 6 | 39 | 8.8 | 6.7 ± 0.1 | 2.8 ± 5.7 | 0.0 ± 5.2 | 2.1 ± 2.6 | 15.4 ± 5.3 | 13.7 ± 6.3 | 1.7 ± 0.3 | 0.5 ± 0.3 | 0.0 ± 5.7 | 2.1 ± 2.6 | 0.6 ± 0.0 | 1.7 ± 8.2 |
| Gilpin Cr. | 10/10 | 6 | 37 | 8.8 | 8.5 ± 0.5 | 12.7 ± 5.5 | 0.0 ± 5.2 | 12.7 ± 7.5 | 17.3 ± 5.3 | 34.2 ± 9.3 | 1.4 ± 0.3 | 0.6 ± 0.3 | 9.9 ± 5.5 | 12.7 ± 7.5 | 0.9 ± 0.0 | -17.0 ± 10.7 |
| Gilpin Cr. | 10/11 | 6 | 31 | 8.8 | 4.4 ± 0.2 | 3.4 ± 6.1 | 0.0 ± 5.0 | 10.0 ± 4.4 | 13.2 ± 5.1 | 22.2 ± 7.5 | 0.9 ± 0.2 | 0.4 ± 0.3 | 1.8 ± 6.1 | 10.0 ± 4.4 | 0.3 ± 0.0 | -9.0 ± 9.1 |
| Gilpin Cr. | 10/12 | 6 | 62 | 8.8 | 21.3 ± 2.0 | 1.5 ± 6.8 | 5.8 ± 5.0 | 3.6 ± 4.0 | 35.9 ± 5.2 | 13.9 ± 7.9 | 0.7 ± 0.3 | 0.0 ± 0.3 | 0.0 ± 6.8 | 3.6 ± 4.0 | 0.8 ± 0.0 | 22.0 ± 9.4 |
| Gilpin Cr. | 10/13 | 6 | 50 | 8.8 | 2.5 ± 0.2 | 2.1 ± 6.0 | 0.0 ± 5.1 | 0.2 ± 2.6 | 11.3 ± 5.1 | 11.0 ± 6.6 | 0.8 ± 0.3 | 0.5 ± 0.3 | 0.0 ± 6.0 | 0.2 ± 2.6 | 0.8 ± 0.0 | 0.2 ± 8.3 |
| Gilpin Cr. | 10/14 | 6 | 34 | 8.8 | 3.2 ± 0.2 | 2.4 ± 5.6 | 0.0 ± 5.1 | 0.0 ± 2.6 | 12.0 ± 5.2 | 11.1 ± 6.1 | 1.3 ± 0.3 | 0.6 ± 0.3 | 0.0 ± 5.5 | 0.0 ± 2.6 | 0.5 ± 0.0 | 0.9 ± 8.0 |
| Gilpin Cr. | 10/16 | 6 | 27 | 8.8 | 6.0 ± 0.8 | --- ± --- | 0.0 ± 5.2 | --- ± --- | 14.7 ± 5.3 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Gilpin Cr. | 10/17 | 6 | 36 | 8.8 | 10.1 ± 0.4 | --- ± --- | 0.0 ± 5.2 | --- ± --- | 18.8 ± 5.3 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Gilpin Cr. | 10/18 | 6 | 33 | 8.8 | 8.1 ± 0.2 | --- ± --- | 0.0 ± 5.1 | --- ± --- | 16.8 ± 5.2 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Gilpin Cr. | 10/19 | 6 | --- | 8.8 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Gilpin Cr. | 10/22 | 6 | --- | 8.8 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Gilpin Cr. | 10/23 | 6 | --- | 8.8 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |

# Table 4.3.3

## Measured and Calculated Component Contributions to Total Light Extinction at Juniper Mt.

| Site | Date | Hr | RH | Cln Air | bsp | Ebsp | babs | Ebabs | bext | Ebext | Esul | Enit | Eoc | Eec | Esoil | Unid. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Junpr.Mt. | 2/23 | 6 | 62 | 9.2 | 8.318 + 0.51 | --- + --- | --- + --- | --- + --- | --- + --- | --- + --- | --- + --- | --- + --- | --- + --- | --- + --- | --- + --- | --- + --- |
| Junpr.Mt. | 2/23 | 12 | 53 | 9.2 | 5.2 ± 0.5 | 10.5 ± 1.2 | 0.0 ± 1.4 | 6.1 ± 1.0 | 14.3 ± 1.7 | 25.8 ± 1.5 | 1.8 ± 0.1 | 1.1 ± 0.1 | 6.9 ± 1.2 | 6.1 ± 1.0 | 0.6 ± 0.1 | -11.5 ± 2.3 |
| Junpr.Mt. | 3/26 | 6 | 69 | 9.2 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 3/27 | 6 | 59 | 9.2 | --- ± --- | 7.6 ± 0.6 | 4.0 ± 0.7 | 1.4 ± 0.5 | --- ± --- | 18.1 ± 0.7 | 4.9 ± 0.2 | 0.1 ± 0.1 | 2.3 ± 0.5 | 1.4 ± 0.5 | 0.2 ± 0.0 | --- ± --- |
| Junpr.Mt. | 3/28 | 6 | 64 | 9.2 | --- ± --- | 6.7 ± 0.5 | 3.6 ± 0.7 | 1.1 ± 0.4 | --- ± --- | 17.0 ± 0.6 | 5.2 ± 0.3 | 0.3 ± 0.1 | 1.0 ± 0.5 | 1.1 ± 0.4 | 0.3 ± 0.0 | --- ± --- |
| Junpr.Mt. | 3/29 | 6 | 82 | 9.2 | --- ± --- | 10.6 ± 0.7 | 2.9 ± 0.7 | 0.7 ± 0.2 | --- ± --- | 20.5 ± 0.8 | 7.5 ± 0.4 | 0.6 ± 0.1 | 1.7 ± 0.6 | 0.7 ± 0.2 | 0.7 ± 0.1 | --- ± --- |
| Junpr.Mt. | 3/30 | 6 | --- | 9.2 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 3/31 | 6 | 59 | 9.2 | --- ± --- | --- ± --- | 6.3 ± 1.8 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 5/6 | 6 | --- | 9.2 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 5/7 | 6 | 74 | 9.2 | --- ± --- | 14.4 ± 0.7 | 5.8 ± 0.8 | 3.1 ± 1.0 | --- ± --- | 26.6 ± 1.2 | 5.6 ± 0.3 | 0.9 ± 0.1 | 3.2 ± 0.6 | 3.1 ± 1.0 | 4.7 ± 0.1 | --- ± --- |
| Junpr.Mt. | 6/14 | 6 | 19 | 9.2 | 22.5 ± 1.8 | 10.2 ± 0.7 | 8.8 ± 0.8 | 2.8 ± 0.9 | 40.5 ± 0.8 | 22.2 ± 1.2 | 4.1 ± 0.2 | 0.2 ± 0.0 | 5.1 ± 0.7 | 2.8 ± 0.9 | 0.8 ± 0.0 | 18.2 ± 1.4 |
| Junpr.Mt. | 6/15 | 6 | 38 | 9.2 | 20.6 ± 0.3 | 13.4 ± 0.9 | 8.6 ± 0.8 | 4.9 ± 1.6 | 38.3 ± 0.8 | 27.4 ± 1.8 | 3.8 ± 0.2 | 0.4 ± 0.0 | 7.1 ± 0.9 | 4.9 ± 1.6 | 2.0 ± 0.1 | 10.9 ± 2.0 |
| Junpr.Mt. | 6/16 | 6 | 30 | 9.2 | 16.8 ± 1.4 | 3.9 ± 0.6 | 2.3 ± 0.7 | 1.2 ± 0.4 | 28.3 ± 0.7 | 14.2 ± 0.7 | 0.3 ± 0.0 | 0.0 ± 0.0 | 3.4 ± 0.6 | 1.2 ± 0.4 | 0.1 ± 0.0 | 14.1 ± 1.0 |
| Junpr.Mt. | 6/29 | 6 | 69 | 9.2 | 8.3 ± 0.3 | 10.7 ± 1.1 | 6.4 ± 1.0 | 4.7 ± 1.6 | 23.9 ± 1.0 | 24.6 ± 1.9 | 1.8 ± 0.1 | 0.3 ± 0.1 | 7.1 ± 1.1 | 4.7 ± 1.6 | 1.5 ± 0.1 | -0.8 ± 2.2 |
| Junpr.Mt. | 6/30 | 6 | --- | 9.2 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 7/1 | 6 | 71 | 9.2 | 16.4 ± 6.5 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 7/29 | 6 | --- | 9.2 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 7/30 | 6 | 29 | 9.2 | 31.0 ± 3.4 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 7/31 | 6 | --- | 9.2 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 8/7 | 6 | 24 | 9.2 | 16.3 ± 1.1 | 13.9 ± 1.4 | 4.9 ± 1.4 | 5.4 ± 1.8 | 30.4 ± 1.4 | 28.5 ± 2.2 | 2.9 ± 0.2 | 0.3 ± 0.1 | 9.7 ± 1.4 | 5.4 ± 1.8 | 1.0 ± 0.1 | 1.9 ± 2.7 |
| Junpr.Mt. | 8/7 | 12 | 20 | 9.2 | 13.0 ± 0.2 | 11.8 ± 1.2 | 3.2 ± 1.4 | 6.3 ± 2.1 | 25.3 ± 1.4 | 27.3 ± 2.4 | 2.4 ± 0.1 | 0.3 ± 0.1 | 8.5 ± 1.2 | 6.3 ± 2.1 | 0.5 ± 0.1 | -1.9 ± 2.8 |
| Junpr.Mt. | 8/8 | 6 | 33 | 9.2 | 19.7 ± 0.5 | 17.7 ± 1.6 | 4.8 ± 1.4 | 6.1 ± 2.0 | 33.6 ± 1.4 | 33.0 ± 2.6 | 4.2 ± 0.2 | 0.4 ± 0.1 | 11.6 ± 1.5 | 6.1 ± 2.0 | 1.5 ± 0.1 | 0.6 ± 2.9 |
| Junpr.Mt. | 8/8 | 12 | 26 | 9.2 | 16.5 ± 0.5 | 12.9 ± 1.2 | 3.2 ± 1.4 | 7.4 ± 2.4 | 28.9 ± 1.4 | 29.6 ± 2.7 | 2.8 ± 0.2 | 0.4 ± 0.1 | 8.0 ± 1.2 | 7.4 ± 2.4 | 1.7 ± 0.1 | -0.7 ± 3.1 |
| Junpr.Mt. | 8/9 | 6 | 22 | 9.2 | 9.5 ± 0.3 | 11.5 ± 1.3 | 1.6 ± 1.4 | 6.1 ± 2.0 | 20.3 ± 1.4 | 26.8 ± 2.4 | 0.8 ± 0.1 | 0.4 ± 0.1 | 9.2 ± 1.3 | 6.1 ± 2.0 | 1.0 ± 0.1 | -6.5 ± 2.8 |
| Junpr.Mt. | 8/9 | 12 | 22 | 9.2 | 12.0 ± 0.2 | 11.6 ± 1.2 | 1.6 ± 1.4 | 6.9 ± 2.3 | 22.8 ± 1.4 | 27.7 ± 2.6 | 1.7 ± 0.1 | 0.4 ± 0.1 | 8.4 ± 1.2 | 6.9 ± 2.3 | 1.2 ± 0.1 | -4.9 ± 2.9 |
| Junpr.Mt. | 8/14 | 6 | 49 | 9.2 | 6.4 ± 0.4 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 8/14 | 12 | 56 | 9.2 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 8/21 | 6 | 62 | 9.2 | 15.6 ± 0.7 | 14.0 ± 1.6 | 0.0 ± 1.7 | 5.0 ± 1.6 | 24.8 ± 1.7 | 28.2 ± 2.3 | 4.4 ± 0.3 | 0.4 ± 0.2 | 8.7 ± 1.6 | 5.0 ± 1.6 | 0.4 ± 0.1 | -3.4 ± 2.9 |
| Junpr.Mt. | 8/21 | 12 | 48 | 9.2 | 19.2 ± 1.0 | 12.7 ± 1.0 | 2.1 ± 0.9 | 4.1 ± 1.3 | 30.4 ± 0.9 | 25.9 ± 1.7 | 4.1 ± 0.2 | 0.4 ± 0.1 | 6.8 ± 1.0 | 4.1 ± 1.3 | 1.4 ± 0.1 | 4.5 ± 1.9 |
| Junpr.Mt. | 8/22 | 6 | 64 | 9.2 | 16.0 ± 1.5 | 11.3 ± 1.2 | 1.6 ± 1.4 | 4.2 ± 1.4 | 26.7 ± 1.4 | 24.6 ± 1.8 | 4.4 ± 0.2 | 0.4 ± 0.1 | 6.2 ± 1.2 | 4.2 ± 1.4 | 0.2 ± 0.1 | 2.1 ± 2.3 |
| Junpr.Mt. | 8/22 | 12 | --- | 9.2 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 8/23 | 6 | 70 | 9.2 | 19.2 ± 0.6 | 14.8 ± 1.4 | 3.2 ± 1.4 | 4.6 ± 1.5 | 31.5 ± 1.4 | 28.6 ± 2.1 | 5.4 ± 0.3 | 0.4 ± 0.1 | 8.1 ± 1.4 | 4.6 ± 1.5 | 0.8 ± 0.1 | 2.9 ± 2.5 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Junpr.Mt. | 8/23 | 12 | 57 | 9.2 | 14.7 ± 0.3 | --- ± --- | 3.2 ± 1.4 | --- ± --- | 27.1 ± 1.4 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 8/24 | 6 | 67 | 9.2 | 12.7 ± 1.0 | 11.3 ± 1.2 | 3.1 ± 1.4 | 3.4 ± 1.1 | 25.0 ± 1.4 | 23.9 ± 1.7 | 4.4 ± 0.2 | 0.1 ± 0.1 | 6.5 ± 1.2 | 3.4 ± 1.1 | 0.2 ± 0.1 | 1.0 ± 2.2 |
| Junpr.Mt. | 8/24 | 12 | 54 | 9.2 | 9.3 ± 0.5 | 10.9 ± 1.3 | 0.0 ± 1.4 | 4.1 ± 1.3 | 18.5 ± 1.4 | 24.2 ± 1.9 | 2.5 ± 0.2 | 0.1 ± 0.1 | 8.1 ± 1.3 | 4.1 ± 1.3 | 0.2 ± 0.1 | -5.7 ± 2.3 |
| Junpr.Mt. | 8/25 | 6 | 56 | 9.2 | 10.9 ± 1.5 | 9.3 ± 0.9 | 2.1 ± 0.9 | 6.8 ± 2.2 | 22.2 ± 0.9 | 25.3 ± 2.4 | 2.7 ± 0.1 | 0.2 ± 0.1 | 6.0 ± 0.9 | 6.8 ± 2.2 | 0.3 ± 0.1 | -3.1 ± 2.6 |
| Junpr.Mt. | 8/25 | 12 | --- | 9.2 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 8/26 | 6 | 45 | 9.2 | 10.2 ± 0.4 | 9.8 ± 1.3 | 1.6 ± 1.4 | 3.5 ± 0.7 | 21.0 ± 1.4 | 22.5 ± 1.4 | 2.9 ± 0.2 | 0.3 ± 0.1 | 6.3 ± 1.2 | 3.5 ± 0.7 | 0.3 ± 0.1 | -1.5 ± 2.0 |
| Junpr.Mt. | 8/26 | 12 | 33 | 9.2 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 8/27 | 6 | 40 | 9.2 | 8.6 ± 0.2 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 8/27 | 12 | 38 | 9.2 | 10.2 ± 0.2 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 9/2 | 6 | 42 | 9.2 | 15.0 ± 0.4 | 15.2 ± 1.4 | 4.8 ± 1.4 | 8.4 ± 1.4 | 29.0 ± 1.4 | 32.8 ± 2.0 | 5.1 ± 0.3 | 0.6 ± 0.1 | 8.0 ± 1.3 | 8.4 ± 1.4 | 1.5 ± 0.1 | -3.9 ± 2.4 |
| Junpr.Mt. | 9/2 | 12 | 29 | 9.2 | 11.3 ± 0.4 | 9.1 ± 1.1 | 3.2 ± 1.4 | 5.4 ± 0.9 | 23.7 ± 1.4 | 23.7 ± 1.4 | 3.9 ± 0.2 | 0.3 ± 0.1 | 4.4 ± 1.1 | 5.4 ± 0.9 | 0.4 ± 0.1 | -0.1 ± 2.0 |
| Junpr.Mt. | 9/17 | 6 | 31 | 9.2 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 9/17 | 12 | --- | 9.2 | --- ± --- | --- ± --- | 0.0 ± 0.0 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 9/18 | 6 | 77 | 9.2 | 104.8 ± 56.3 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 9/18 | 12 | 69 | 9.2 | 16.3 ± 2.6 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 9/19 | 6 | 94 | 9.2 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 9/19 | 12 | --- | 9.2 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 9/20 | 6 | 76 | 9.2 | 21.2 ± 2.4 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 9/20 | 12 | 70 | 9.2 | 13.7 ± 1.1 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 9/21 | 6 | 73 | 9.2 | 30.3 ± 14.6 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 9/21 | 12 | 50 | 9.2 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 9/24 | 6 | 72 | 9.2 | 17.0 ± 0.9 | 9.0 ± 1.7 | 1.6 ± 1.4 | 3.7 ± 1.4 | 27.8 ± 1.4 | 22.0 ± 2.3 | 4.7 ± 0.3 | 0.5 ± 0.1 | 3.5 ± 1.7 | 3.7 ± 1.4 | 0.3 ± 0.1 | 5.8 ± 2.6 |
| Junpr.Mt. | 9/24 | 12 | 35 | 9.2 | 10.2 ± 0.5 | 6.6 ± 1.4 | 0.0 ± 1.4 | 4.9 ± 1.8 | 19.3 ± 1.4 | 20.7 ± 2.3 | 2.6 ± 0.1 | 0.2 ± 0.1 | 3.7 ± 1.4 | 4.9 ± 1.8 | 0.2 ± 0.1 | -1.4 ± 2.7 |
| Junpr.Mt. | 9/27 | 6 | 42 | 9.2 | 11.7 ± 0.3 | 7.2 ± 1.1 | 1.6 ± 1.4 | 4.2 ± 0.8 | 22.4 ± 1.4 | 20.6 ± 1.3 | 3.1 ± 0.2 | 0.3 ± 0.1 | 3.1 ± 1.0 | 4.2 ± 0.8 | 0.7 ± 0.1 | 1.8 ± 1.9 |
| Junpr.Mt. | 9/27 | 12 | 28 | 9.2 | 13.2 ± 0.4 | 13.3 ± 1.2 | 4.9 ± 1.4 | 6.6 ± 1.1 | 27.2 ± 1.4 | 29.1 ± 1.7 | 3.0 ± 0.2 | 0.6 ± 0.1 | 6.4 ± 1.2 | 6.6 ± 1.1 | 3.3 ± 0.1 | -1.9 ± 2.2 |
| Junpr.Mt. | 9/30 | 6 | 79 | 9.2 | 763.8 ± 373.2 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 9/30 | 12 | --- | 9.2 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 10/1 | 6 | 82 | 9.2 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 10/1 | 12 | --- | 9.2 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 10/2 | 6 | 50 | 9.2 | 4.4 ± 0.1 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 10/2 | 12 | 42 | 9.2 | 4.2 ± 0.2 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 10/7 | 6 | 37 | 9.2 | 4.5 ± 0.2 | 5.0 ± 1.3 | 0.0 ± 1.4 | 2.3 ± 0.9 | 13.7 ± 1.4 | 16.4 ± 1.6 | 1.5 ± 0.1 | 0.2 ± 0.1 | 2.5 ± 1.3 | 2.3 ± 0.9 | 0.8 ± 0.1 | -2.8 ± 2.2 |
| Junpr.Mt. | 10/7 | 12 | --- | 9.2 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 10/8 | 6 | 63 | 9.2 | 20.5 ± 1.9 | 6.4 ± 1.5 | 3.3 ± 1.4 | 3.8 ± 1.4 | 33.0 ± 1.4 | 19.4 ± 2.1 | 2.3 ± 0.2 | 0.7 ± 0.1 | 2.9 ± 1.5 | 3.8 ± 1.4 | 0.5 ± 0.1 | 13.6 ± 2.5 |
| Junpr.Mt. | 10/8 | 12 | 33 | 9.2 | 6.8 ± 0.8 | 4.8 ± 1.3 | 5.1 ± 1.5 | 2.5 ± 1.0 | 21.1 ± 1.5 | 16.5 ± 1.7 | 1.3 ± 0.1 | 0.2 ± 0.1 | 2.9 ± 1.3 | 2.5 ± 1.0 | 0.4 ± 0.1 | 4.6 ± 2.2 |
| Junpr.Mt. | 10/9 | 6 | 34 | 9.2 | 8.7 ± 0.4 | 3.8 ± 1.2 | 1.7 ± 1.5 | 2.1 ± 0.9 | 19.5 ± 1.5 | 15.1 ± 1.5 | 1.1 ± 0.1 | 0.3 ± 0.1 | 1.6 ± 1.2 | 2.1 ± 0.9 | 0.8 ± 0.1 | 4.4 ± 2.1 |
| Junpr.Mt. | 10/9 | 12 | 28 | 9.2 | 9.7 ± 0.2 | 3.0 ± 1.1 | 3.3 ± 1.5 | 1.6 ± 0.7 | 22.2 ± 1.5 | 13.8 ± 1.3 | 1.2 ± 0.1 | 0.3 ± 0.1 | 0.8 ± 1.1 | 1.6 ± 0.7 | 0.6 ± 0.1 | 8.4 ± 2.0 |
| Junpr.Mt. | 10/10 | 6 | 35 | 9.2 | 12.3 ± 0.4 | 6.9 ± 1.1 | 3.3 ± 1.4 | 4.0 ± 0.8 | 24.8 ± 1.4 | 20.0 ± 1.3 | 1.2 ± 0.1 | 0.3 ± 0.1 | 4.7 ± 1.1 | 4.0 ± 0.8 | 0.7 ± 0.1 | 4.7 ± 2.0 |
| Junpr.Mt. | 10/10 | 12 | --- | 9.2 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 10/11 | 6 | 25 | 9.2 | 6.9 ± 0.3 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 10/11 | 12 | 20 | 9.2 | 7.0 ± 0.4 | 10.0 ± 1.5 | 5.0 ± 1.5 | 3.6 ± 1.4 | 21.2 ± 1.5 | 22.8 ± 2.0 | 3.6 ± 0.2 | 0.3 ± 0.1 | 4.7 ± 1.5 | 3.6 ± 1.4 | 1.5 ± 0.1 | -1.6 ± 2.5 |
| Junpr.Mt. | 10/12 | 6 | 38 | 9.2 | 17.7 ± 0.6 | 14.6 ± 1.7 | 5.0 ± 1.5 | 3.4 ± 1.3 | 31.8 ± 1.5 | 27.2 ± 2.1 | 2.5 ± 0.1 | 0.4 ± 0.1 | 6.0 ± 1.7 | 3.4 ± 1.3 | 5.7 ± 0.3 | 4.6 ± 2.6 |
| Junpr.Mt. | 10/12 | 12 | 44 | 9.2 | 19.8 ± 1.6 | 11.1 ± 2.7 | 2.7 ± 2.4 | 4.9 ± 1.9 | 31.7 ± 2.4 | 25.2 ± 3.3 | 0.7 ± 0.1 | 0.5 ± 0.2 | 9.2 ± 2.7 | 4.9 ± 1.9 | 0.7 ± 0.1 | 6.5 ± 4.1 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Junpr.Mt. | 10/13 | 6 | 68 | 9.2 | --- ± --- | --- ± --- | 0.0 ± 3.6 | --- ± --- | 18.5 ± 3.6 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 10/13 | 12 | --- | 9.2 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 10/14 | 6 | 33 | 9.2 | 3.3 ± 0.3 | 3.5 ± 1.3 | 0.0 ± 1.4 | 1.6 ± 0.7 | 12.5 ± 1.4 | 14.3 ± 1.4 | 0.6 ± 0.1 | 0.3 ± 0.1 | 2.3 ± 1.3 | 1.6 ± 0.7 | 0.3 ± 0.1 | -1.8 ± 2.0 |
| Junpr.Mt. | 10/14 | 12 | 30 | 9.2 | 1.7 ± 0.2 | 1.6 ± 1.1 | 0.0 ± 0.0 | 0.0 ± 0.4 | 10.8 ± 0.0 | 10.8 ± 1.2 | 0.4 ± 0.1 | 0.2 ± 0.1 | 0.8 ± 1.1 | 0.0 ± 0.4 | 0.2 ± 0.1 | 0.0 ± 1.2 |
| Junpr.Mt. | 10/16 | 6 | 25 | 9.2 | 4.3 ± 0.3 | 5.0 ± 1.4 | 0.0 ± 2.2 | 3.5 ± 0.8 | 13.5 ± 2.2 | 17.7 ± 1.6 | 2.4 ± 0.2 | 0.5 ± 0.1 | 0.9 ± 1.4 | 3.5 ± 0.8 | 1.2 ± 0.1 | -4.2 ± 2.7 |
| Junpr.Mt. | 10/17 | 6 | 34 | 9.2 | 12.0 ± 0.6 | 5.1 ± 0.6 | 2.5 ± 0.7 | 2.8 ± 0.5 | 23.6 ± 0.7 | 17.1 ± 0.8 | 1.7 ± 0.1 | 0.3 ± 0.0 | 2.5 ± 0.6 | 2.8 ± 0.5 | 0.6 ± 0.0 | 6.6 ± 1.1 |
| Junpr.Mt. | 10/18 | 6 | 28 | 9.2 | 9.9 ± 0.6 | 4.6 ± 0.5 | 2.5 ± 0.7 | 2.1 ± 0.4 | 21.5 ± 0.7 | 15.9 ± 0.7 | 1.6 ± 0.1 | 0.4 ± 0.0 | 1.8 ± 0.5 | 2.1 ± 0.4 | 0.8 ± 0.0 | 5.7 ± 1.0 |
| Junpr.Mt. | 10/19 | 6 | --- | 9.2 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Junpr.Mt. | 10/22 | 6 | 91 | 9.2 | 603.9 ± 109.7 | 4.1 ± 1.2 | 0.8 ± 0.7 | 0.4 ± 0.2 | 613.9 ± 0.7 | 13.6 ± 1.2 | 0.8 ± 0.2 | 0.6 ± 0.2 | 1.9 ± 1.2 | 0.4 ± 0.2 | 0.7 ± 0.1 | 600.3 ± 1.4 |
| Junpr.Mt. | 10/23 | 6 | 84 | 9.2 | 38.9 ± 2.5 | 8.3 ± 0.9 | 2.5 ± 0.7 | 1.5 ± 0.3 | 50.5 ± 0.7 | 18.9 ± 0.9 | 6.0 ± 0.3 | 0.5 ± 0.1 | 1.4 ± 0.8 | 1.5 ± 0.3 | 0.3 ± 0.1 | 31.6 ± 1.2 |

# Table 4.3.4

## Measured and Calculated Component Contributions to Total Light Extinction at Baggs

| Site | Date | Hr | RH | Cln Air | bsp | Ebsp | babs | Ebabs | bext | Ebext | Esul | Enit | Eoc | Eec | Esoil | Unid. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Baggs | 2/23 | 6 | 62 | 9.5 | 8.311 + 0.8 | 9.6 + 1.9 | 1.6 + 1.4 | 6.3 + 1.2 | 19.4 + 2.2 | 25.4 + 2.3 | 2.3 + 0.1 | 1.3 + 0.1 | 5.7 + 1.9 | 6.3 + 1.2 | 0.4 + 0.2 | -6.0 + 3.2 |
| Baggs | 2/23 | 12 | 48 | 9.5 | 8.0 ± 0.6 | 7.5 ± 1.8 | 1.6 ± 1.4 | 3.8 ± 0.8 | 19.1 ± 2.2 | 20.9 ± 2.0 | 3.3 ± 0.2 | 1.2 ± 0.1 | 2.7 ± 1.8 | 3.8 ± 0.8 | 0.4 ± 0.2 | -1.7 ± 3.0 |
| Baggs | 8/7 | 6 | 23 | 9.5 | 17.5 ± 0.6 | 17.4 ± 2.2 | 11.8 ± 1.6 | 4.4 ± 1.7 | 38.8 ± 1.6 | 31.3 ± 2.8 | 3.1 ± 0.2 | 0.4 ± 0.1 | 12.6 ± 2.2 | 4.4 ± 1.7 | 1.3 ± 0.2 | 7.4 ± 3.2 |
| Baggs | 8/7 | 12 | 13 | 9.5 | 15.8 ± 0.3 | 11.4 ± 1.8 | 11.1 ± 1.5 | 5.0 ± 1.3 | 36.5 ± 1.5 | 25.9 ± 2.2 | 2.5 ± 0.1 | 0.3 ± 0.1 | 7.9 ± 1.8 | 5.0 ± 1.3 | 0.8 ± 0.2 | 10.5 ± 2.7 |
| Baggs | 8/8 | 6 | 32 | 9.5 | 23.0 ± 2.3 | 21.3 ± 2.3 | 14.4 ± 1.6 | 3.8 ± 1.5 | 46.9 ± 1.6 | 34.7 ± 2.7 | 3.9 ± 0.2 | 0.7 ± 0.1 | 14.1 ± 2.2 | 3.8 ± 1.5 | 2.6 ± 0.2 | 12.2 ± 3.1 |
| Baggs | 8/8 | 12 | 24 | 9.5 | 16.0 ± 0.8 | 21.8 ± 2.8 | 10.4 ± 1.6 | 11.9 ± 3.8 | 35.9 ± 1.6 | 43.2 ± 4.7 | 2.2 ± 0.1 | 0.7 ± 0.1 | 16.6 ± 2.8 | 11.9 ± 3.8 | 2.2 ± 0.2 | -7.3 ± 5.0 |
| Baggs | 8/9 | 6 | 30 | 9.5 | 10.5 ± 0.6 | 13.7 ± 2.0 | 3.3 ± 1.5 | 0.5 ± 0.5 | 23.3 ± 1.5 | 23.7 ± 2.0 | 1.4 ± 0.1 | 0.3 ± 0.1 | 9.7 ± 2.0 | 0.5 ± 0.5 | 2.3 ± 0.2 | -0.4 ± 2.5 |
| Baggs | 8/9 | 12 | 14 | 9.5 | 9.1 ± 0.3 | 13.1 ± 1.9 | 3.5 ± 1.5 | 4.7 ± 1.7 | 22.1 ± 1.5 | 27.3 ± 2.6 | 1.6 ± 0.1 | 0.4 ± 0.1 | 9.1 ± 1.9 | 4.7 ± 1.7 | 1.9 ± 0.2 | -5.2 ± 3.0 |
| Baggs | 8/14 | 6 | 50 | 9.5 | 6.5 ± 0.4 | 10.7 ± 2.2 | 0.0 ± 1.5 | 7.5 ± 1.4 | 16.0 ± 1.5 | 27.6 ± 2.6 | 1.0 ± 0.1 | 0.6 ± 0.1 | 8.4 ± 2.2 | 7.5 ± 1.4 | 0.6 ± 0.2 | -11.6 ± 3.0 |
| Baggs | 8/21 | 6 | --- | 9.5 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Baggs | 8/21 | 12 | --- | 9.5 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Baggs | 8/22 | 6 | 56 | 9.5 | 14.8 ± 0.8 | 16.1 ± 2.4 | 5.4 ± 1.6 | 2.8 ± 1.2 | 29.8 ± 1.6 | 28.4 ± 2.6 | 5.1 ± 0.3 | 0.3 ± 0.1 | 10.3 ± 2.3 | 2.8 ± 1.2 | 0.4 ± 0.2 | 1.3 ± 3.1 |
| Baggs | 8/22 | 12 | 37 | 9.5 | 12.5 ± 0.3 | 17.5 ± 2.2 | 5.5 ± 1.6 | 6.0 ± 2.2 | 27.5 ± 1.6 | 33.0 ± 3.1 | 4.5 ± 0.2 | 0.3 ± 0.1 | 12.5 ± 2.2 | 6.0 ± 2.2 | 0.3 ± 0.2 | -5.5 ± 3.5 |
| Baggs | 8/23 | 6 | 58 | 9.5 | 14.8 ± 0.6 | 15.3 ± 2.4 | 3.7 ± 1.6 | 3.1 ± 1.2 | 28.0 ± 1.6 | 27.9 ± 2.7 | 3.8 ± 0.2 | 0.2 ± 0.1 | 10.8 ± 2.4 | 3.1 ± 1.2 | 0.4 ± 0.2 | 0.1 ± 3.1 |
| Baggs | 8/23 | 12 | 41 | 9.5 | 12.5 ± 0.5 | 12.4 ± 2.0 | 5.5 ± 1.6 | 1.8 ± 0.8 | 27.5 ± 1.6 | 23.7 ± 2.2 | 4.7 ± 0.3 | 0.2 ± 0.1 | 7.1 ± 2.0 | 1.8 ± 0.8 | 0.3 ± 0.2 | 3.8 ± 2.7 |
| Baggs | 8/24 | 6 | 60 | 9.5 | 15.5 ± 1.0 | 19.4 ± 2.6 | 5.4 ± 1.6 | 4.0 ± 1.5 | 30.4 ± 1.6 | 32.9 ± 3.0 | 5.6 ± 0.3 | 0.4 ± 0.1 | 13.0 ± 2.5 | 4.0 ± 1.5 | 0.4 ± 0.2 | -2.6 ± 3.4 |
| Baggs | 8/24 | 12 | 56 | 9.5 | 12.6 ± 1.6 | 18.1 ± 2.6 | 3.6 ± 1.6 | 2.8 ± 1.1 | 25.8 ± 1.6 | 30.4 ± 2.9 | 2.9 ± 0.2 | 0.4 ± 0.1 | 14.3 ± 2.6 | 2.8 ± 1.1 | 0.5 ± 0.2 | -4.6 ± 3.3 |
| Baggs | 8/25 | 6 | 64 | 9.5 | 19.5 ± 1.2 | 19.4 ± 2.7 | 5.2 ± 1.5 | 3.1 ± 1.2 | 34.2 ± 1.5 | 32.1 ± 3.0 | 3.3 ± 0.2 | 0.3 ± 0.1 | 15.5 ± 2.7 | 3.1 ± 1.2 | 0.4 ± 0.2 | 2.1 ± 3.4 |
| Baggs | 8/25 | 12 | 32 | 9.5 | 16.5 ± 0.8 | 17.3 ± 2.3 | 5.3 ± 1.6 | 2.1 ± 0.9 | 31.3 ± 1.6 | 28.9 ± 2.5 | 3.4 ± 0.2 | 0.2 ± 0.1 | 13.3 ± 2.3 | 2.1 ± 0.9 | 0.4 ± 0.2 | 2.4 ± 2.9 |
| Baggs | 8/26 | 6 | 47 | 9.5 | 11.5 ± 0.8 | 19.7 ± 2.6 | 1.8 ± 1.5 | 9.7 ± 1.7 | 22.8 ± 1.5 | 38.9 ± 3.1 | 4.4 ± 0.2 | 0.4 ± 0.1 | 14.5 ± 2.5 | 9.7 ± 1.7 | 0.3 ± 0.2 | -16.2 ± 3.4 |
| Baggs | 8/26 | 12 | 24 | 9.5 | 7.8 ± 0.4 | 13.2 ± 2.1 | 1.8 ± 1.5 | 9.5 ± 1.7 | 19.1 ± 1.5 | 32.2 ± 2.7 | 3.0 ± 0.2 | 0.4 ± 0.1 | 9.4 ± 2.1 | 9.5 ± 1.7 | 0.4 ± 0.2 | -13.1 ± 3.1 |
| Baggs | 8/27 | 6 | 41 | 9.5 | 14.1 ± 0.8 | 14.9 ± 2.3 | 1.8 ± 1.5 | 4.1 ± 0.9 | 25.4 ± 1.5 | 28.5 ± 2.5 | 3.0 ± 0.2 | 0.4 ± 0.1 | 11.0 ± 2.3 | 4.1 ± 0.9 | 0.5 ± 0.2 | -3.1 ± 2.9 |
| Baggs | 8/27 | 12 | 24 | 9.5 | 9.3 ± 0.4 | 13.3 ± 2.1 | 3.6 ± 1.6 | 6.4 ± 1.3 | 22.4 ± 1.6 | 29.2 ± 2.4 | 3.0 ± 0.2 | 0.3 ± 0.1 | 9.6 ± 2.1 | 6.4 ± 1.3 | 0.3 ± 0.2 | -6.8 ± 2.9 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Baggs | 9/2 | 6 | 42 | 9.5 | 19.3 ± 0.3 | 19.9 ± 2.4 | 3.5 ± 1.5 | 7.6 ± 1.4 | 32.3 ± 1.5 | 37.0 ± 2.8 | 5.7 ± 0.3 | 0.5 ± 0.1 | 13.2 ± 2.4 | 7.6 ± 1.4 | 0.5 ± 0.2 | -4.7 ± 3.2 |
| Baggs | 9/2 | 12 | 33 | 9.5 | 14.1 ± 1.5 | 12.1 ± 2.1 | 1.7 ± 1.5 | 1.8 ± 0.6 | 25.4 ± 1.5 | 23.4 ± 2.2 | 2.8 ± 0.2 | 0.3 ± 0.1 | 8.5 ± 2.0 | 1.8 ± 0.6 | 0.4 ± 0.2 | 2.0 ± 2.6 |
| Baggs | 9/17 | 6 | 36 | 9.5 | 10.6 ± 0.5 | 17.0 ± 2.5 | 3.6 ± 1.6 | 4.4 ± 1.0 | 23.7 ± 1.6 | 30.9 ± 2.6 | 1.9 ± 0.1 | 0.4 ± 0.1 | 14.0 ± 2.4 | 4.4 ± 1.0 | 0.7 ± 0.2 | -7.2 ± 3.1 |
| Baggs | 9/17 | 12 | 28 | 9.5 | 10.6 ± 0.8 | 18.7 ± 2.5 | 3.7 ± 1.6 | 4.2 ± 1.0 | 23.9 ± 1.6 | 32.4 ± 2.7 | 2.7 ± 0.2 | 0.3 ± 0.1 | 14.0 ± 2.5 | 4.2 ± 1.0 | 1.6 ± 0.2 | -8.5 ± 3.1 |
| Baggs | 9/18 | 6 | 89 | 9.5 | 39.1 ± 5.9 | 35.4 ± 4.8 | 5.4 ± 1.6 | 5.1 ± 1.1 | 54.0 ± 1.6 | 50.1 ± 5.0 | 13.7 ± 0.8 | 0.9 ± 0.3 | 20.2 ± 4.8 | 5.1 ± 1.1 | 0.7 ± 0.3 | 3.9 ± 5.2 |
| Baggs | 9/18 | 12 | 82 | 9.5 | 21.8 ± 2.0 | 22.6 ± 3.4 | 3.6 ± 1.6 | 6.2 ± 1.2 | 34.9 ± 1.6 | 38.3 ± 3.6 | 7.9 ± 0.4 | 0.5 ± 0.2 | 13.5 ± 3.4 | 6.2 ± 1.2 | 0.7 ± 0.3 | -3.4 ± 4.0 |
| Baggs | 9/19 | 6 | 85 | 9.5 | 475.6 ± 397.7 | 26.4 ± 3.8 | 1.8 ± 1.5 | 7.3 ± 1.3 | 486.9 ± 1.5 | 43.2 ± 4.1 | 9.0 ± 0.5 | 1.5 ± 0.3 | 15.5 ± 3.8 | 7.3 ± 1.3 | 0.4 ± 0.3 | 443.7 ± 4.4 |
| Baggs | 9/19 | 12 | 54 | 9.5 | 13.0 ± 1.5 | 15.0 ± 2.5 | 3.7 ± 1.6 | 9.0 ± 1.6 | 26.2 ± 1.6 | 33.6 ± 3.0 | 2.1 ± 0.1 | 0.4 ± 0.1 | 11.8 ± 2.5 | 9.0 ± 1.6 | 0.8 ± 0.2 | -7.4 ± 3.4 |
| Baggs | 9/20 | 6 | 78 | 9.5 | 26.1 ± 3.6 | 16.3 ± 3.0 | 1.8 ± 1.5 | 6.4 ± 1.3 | 37.4 ± 1.5 | 32.2 ± 3.2 | 6.3 ± 0.4 | 0.6 ± 0.2 | 9.1 ± 2.9 | 6.4 ± 1.3 | 0.3 ± 0.2 | 5.2 ± 3.6 |
| Baggs | 9/20 | 12 | 60 | 9.5 | 13.3 ± 0.8 | 8.9 ± 2.2 | 1.8 ± 1.6 | 3.6 ± 0.9 | 24.6 ± 1.6 | 22.1 ± 2.4 | 3.6 ± 0.2 | 0.2 ± 0.1 | 4.9 ± 2.2 | 3.6 ± 0.9 | 0.2 ± 0.2 | 2.5 ± 2.9 |
| Baggs | 9/21 | 6 | 61 | 9.5 | 5.6 ± 0.7 | 7.4 ± 2.3 | 0.0 ± 1.6 | 4.0 ± 0.9 | 15.2 ± 1.6 | 20.9 ± 2.5 | 2.1 ± 0.2 | 0.2 ± 0.1 | 5.1 ± 2.3 | 4.0 ± 0.9 | 0.1 ± 0.2 | -5.7 ± 2.9 |
| Baggs | 9/21 | 12 | 36 | 9.5 | 4.3 ± 0.4 | 6.2 ± 2.0 | 0.0 ± 1.6 | 0.0 ± 0.6 | 13.8 ± 1.6 | 15.8 ± 2.0 | 0.9 ± 0.1 | 0.2 ± 0.1 | 4.7 ± 2.0 | 0.0 ± 0.6 | 0.4 ± 0.2 | -1.9 ± 2.6 |
| Baggs | 9/24 | 6 | 46 | 9.5 | 12.6 ± 1.4 | 11.5 ± 1.6 | 2.7 ± 0.8 | 2.3 ± 1.0 | 24.9 ± 0.8 | 23.3 ± 1.9 | 4.3 ± 0.2 | 0.3 ± 0.1 | 6.3 ± 1.6 | 2.3 ± 1.0 | 0.6 ± 0.1 | 1.6 ± 2.0 |
| Baggs | 9/24 | 12 | 31 | 9.5 | 8.8 ± 0.2 | 6.7 ± 2.1 | 1.8 ± 1.6 | 0.0 ± 0.6 | 20.1 ± 1.6 | 16.2 ± 2.2 | 3.2 ± 0.2 | 0.1 ± 0.1 | 3.1 ± 2.1 | 0.0 ± 0.6 | 0.3 ± 0.2 | 3.9 ± 2.7 |
| Baggs | 9/27 | 6 | --- | 9.5 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Baggs | 9/27 | 12 | --- | 9.5 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Baggs | 9/30 | 6 | 89 | 9.5 | --- ± --- | 15.0 ± 5.2 | 0.0 ± 1.6 | 2.5 ± 1.2 | 13.3 ± 1.6 | 27.0 ± 5.3 | 2.4 ± 0.3 | 0.6 ± 0.3 | 11.7 ± 5.1 | 2.5 ± 1.2 | 0.3 ± 0.3 | -13.7 ± 5.5 |
| Baggs | 9/30 | 12 | 69 | 9.5 | 15.0 ± 0.7 | 13.8 ± 3.1 | 1.8 ± 1.6 | 0.0 ± 0.5 | 26.3 ± 1.6 | 23.3 ± 3.2 | 4.0 ± 0.2 | 0.2 ± 0.1 | 9.2 ± 3.1 | 0.0 ± 0.5 | 0.3 ± 0.2 | 3.0 ± 3.5 |
| Baggs | 10/1 | 6 | 63 | 9.5 | 14.3 ± 4.3 | 8.5 ± 2.6 | 0.0 ± 1.6 | 3.5 ± 1.6 | 23.8 ± 1.6 | 21.6 ± 3.1 | 2.9 ± 0.2 | 0.3 ± 0.1 | 4.9 ± 2.6 | 3.5 ± 1.6 | 0.4 ± 0.2 | 2.2 ± 3.5 |
| Baggs | 10/1 | 12 | 37 | 9.5 | 4.5 ± 0.2 | 8.9 ± 2.5 | 1.9 ± 1.6 | 1.2 ± 0.8 | 15.9 ± 1.6 | 19.6 ± 2.6 | 0.9 ± 0.1 | 0.1 ± 0.1 | 7.5 ± 2.5 | 1.2 ± 0.8 | 0.3 ± 0.2 | -3.7 ± 3.1 |
| Baggs | 10/2 | 6 | 61 | 9.5 | 8.8 ± 0.7 | 7.0 ± 2.2 | 0.0 ± 1.6 | 4.1 ± 0.9 | 18.3 ± 1.6 | 20.6 ± 2.4 | 1.8 ± 0.1 | 0.8 ± 0.1 | 3.9 ± 2.2 | 4.1 ± 0.9 | 0.4 ± 0.2 | -2.3 ± 2.9 |
| Baggs | 10/2 | 12 | 29 | 9.5 | 5.0 ± 0.4 | 7.6 ± 2.0 | 0.0 ± 1.6 | 1.1 ± 0.6 | 14.5 ± 1.6 | 18.2 ± 2.1 | 1.0 ± 0.1 | 0.5 ± 0.1 | 5.9 ± 2.0 | 1.1 ± 0.6 | 0.3 ± 0.2 | -3.7 ± 2.6 |
| Baggs | 10/7 | 6 | 45 | 9.5 | 6.5 ± 0.5 | 5.9 ± 2.2 | 0.0 ± 1.6 | 1.9 ± 1.1 | 16.0 ± 1.6 | 17.3 ± 2.5 | 1.7 ± 0.1 | 0.2 ± 0.1 | 3.0 ± 2.2 | 1.9 ± 1.1 | 1.0 ± 0.2 | -1.3 ± 3.0 |
| Baggs | 10/7 | 12 | 27 | 9.5 | 7.3 ± 0.6 | 5.3 ± 2.1 | 1.8 ± 1.6 | 1.9 ± 1.1 | 18.7 ± 1.6 | 16.7 ± 2.3 | 1.6 ± 0.1 | 0.2 ± 0.1 | 2.8 ± 2.1 | 1.9 ± 1.1 | 0.8 ± 0.2 | 1.9 ± 2.8 |
| Baggs | 10/8 | 6 | 66 | 9.5 | 25.1 ± 3.6 | 13.4 ± 3.0 | 5.5 ± 1.6 | 8.6 ± 3.4 | 40.1 ± 1.6 | 31.5 ± 4.5 | 3.2 ± 0.2 | 1.2 ± 0.2 | 8.2 ± 3.0 | 8.6 ± 3.4 | 0.8 ± 0.2 | 8.6 ± 4.8 |
| Baggs | 10/8 | 12 | 27 | 9.5 | 8.0 ± 0.5 | 5.7 ± 2.1 | 1.8 ± 1.6 | 1.9 ± 1.0 | 19.3 ± 1.6 | 17.0 ± 2.4 | 1.3 ± 0.1 | 0.1 ± 0.1 | 3.7 ± 2.1 | 1.9 ± 1.0 | 0.5 ± 0.2 | 2.3 ± 2.8 |
| Baggs | 10/9 | 6 | 43 | 9.5 | 8.5 ± 0.3 | 5.5 ± 2.2 | 3.6 ± 1.6 | 1.2 ± 0.8 | 21.6 ± 1.6 | 16.2 ± 2.4 | 1.6 ± 0.1 | 0.3 ± 0.1 | 3.0 ± 2.2 | 1.2 ± 0.8 | 0.7 ± 0.2 | 5.4 ± 2.9 |
| Baggs | 10/9 | 12 | 26 | 9.5 | 7.6 ± 0.2 | 6.7 ± 2.3 | 0.0 ± 1.6 | 1.8 ± 1.1 | 17.2 ± 1.6 | 18.0 ± 2.6 | 1.1 ± 0.1 | 0.3 ± 0.1 | 4.4 ± 2.3 | 1.8 ± 1.1 | 1.0 ± 0.2 | -0.8 ± 3.0 |
| Baggs | 10/10 | 6 | 40 | 9.5 | 11.5 ± 0.2 | 8.7 ± 2.0 | 3.6 ± 1.6 | 1.7 ± 0.7 | 24.6 ± 1.6 | 19.9 ± 2.1 | 1.5 ± 0.1 | 0.4 ± 0.1 | 6.0 ± 2.0 | 1.7 ± 0.7 | 0.8 ± 0.2 | 4.8 ± 2.7 |
| Baggs | 10/10 | 12 | 25 | 9.5 | 7.8 ± 0.3 | 8.5 ± 2.0 | 3.7 ± 1.6 | 2.5 ± 0.7 | 21.0 ± 1.6 | 20.5 ± 2.1 | 1.1 ± 0.1 | 0.5 ± 0.1 | 6.3 ± 2.0 | 2.5 ± 0.7 | 0.7 ± 0.2 | 0.5 ± 2.7 |
| Baggs | 10/11 | 6 | 36 | 9.5 | 7.8 ± 0.2 | 7.0 ± 2.3 | 3.6 ± 1.6 | 1.1 ± 0.8 | 20.9 ± 1.6 | 17.7 ± 2.4 | 1.1 ± 0.1 | 0.1 ± 0.1 | 5.1 ± 2.3 | 1.1 ± 0.8 | 0.7 ± 0.2 | 3.3 ± 2.9 |
| Baggs | 10/11 | 12 | 19 | 9.5 | 9.3 ± 0.6 | 11.3 ± 2.6 | 3.7 ± 1.6 | 1.7 ± 1.0 | 22.6 ± 1.6 | 22.6 ± 2.8 | 1.4 ± 0.1 | 0.2 ± 0.1 | 8.5 ± 2.6 | 1.7 ± 1.0 | 1.2 ± 0.2 | 0.0 ± 3.2 |
| Baggs | 10/12 | 6 | 36 | 9.5 | 16.1 ± 0.3 | 11.4 ± 2.5 | 7.3 ± 1.6 | 4.1 ± 1.8 | 32.9 ± 1.6 | 25.0 ± 3.0 | 3.6 ± 0.2 | 0.2 ± 0.1 | 6.7 ± 2.4 | 4.1 ± 1.8 | 0.9 ± 0.2 | 7.9 ± 3.4 |
| Baggs | 10/12 | 12 | 40 | 9.5 | 15.5 ± 1.7 | 9.2 ± 2.4 | 3.7 ± 1.6 | 0.0 ± 0.6 | 28.7 ± 1.6 | 18.7 ± 2.4 | 2.5 ± 0.1 | 0.3 ± 0.1 | 4.9 ± 2.3 | 0.0 ± 0.6 | 1.5 ± 0.2 | 10.0 ± 2.9 |
| Baggs | 10/13 | 6 | 56 | 9.5 | 3.8 ± 0.3 | 5.5 ± 2.4 | 1.8 ± 1.6 | 1.9 ± 1.1 | 15.1 ± 1.6 | 16.9 ± 2.6 | 0.8 ± 0.1 | 0.3 ± 0.1 | 3.9 ± 2.4 | 1.9 ± 1.1 | 0.5 ± 0.2 | -1.8 ± 3.1 |
| Baggs | 10/13 | 12 | 25 | 9.5 | 2.5 ± 0.2 | 3.4 ± 2.0 | 0.0 ± 1.8 | 0.1 ± 0.6 | 12.0 ± 1.8 | 13.0 ± 2.1 | 0.6 ± 0.1 | 0.1 ± 0.1 | 2.1 ± 2.0 | 0.1 ± 0.6 | 0.6 ± 0.2 | -1.0 ± 2.7 |
| Baggs | 10/14 | 6 | 37 | 9.5 | 4.1 ± 0.3 | 2.6 ± 2.0 | 1.8 ± 1.6 | 0.8 ± 0.7 | 15.5 ± 1.6 | 13.0 ± 2.1 | 0.7 ± 0.1 | 0.2 ± 0.1 | 1.2 ± 2.0 | 0.8 ± 0.7 | 0.5 ± 0.2 | 2.5 ± 2.7 |
| Baggs | 10/14 | 12 | 28 | 9.5 | 2.6 ± 0.3 | 7.5 ± 2.4 | 1.8 ± 1.6 | 2.2 ± 1.1 | 14.0 ± 1.6 | 19.2 ± 2.6 | 0.8 ± 0.1 | 0.2 ± 0.1 | 6.2 ± 2.4 | 2.2 ± 1.1 | 0.4 ± 0.2 | -5.2 ± 3.1 |

# Table 4.3.5

# Measured and Calculated Component Contributions to Total Light Extinction at Hayden VOR

| Site | Date | Hr | RH | Cln Air | bsp | Ebsp | babs | Ebabs | bext | Ebext | Esul | Enit | Eoc | Eec | Esoil | Unid. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hdn.VOR | 2/16 | 6 | --- | 9.4 | --- + --- | --- + --- | --- + --- | --- + --- | --- + --- | --- + --- | --- + --- | --- + --- | --- + --- | --- + --- | --- + --- | --- + --- |
| Hdn.VOR | 2/16 | 12 | 47 | 9.4 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Hdn.VOR | 2/17 | 6 | 37 | 9.4 | 13.5 ± 0.5 | --- ± --- | 3.4 ± 0.8 | --- ± --- | 26.4 ± 4.2 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Hdn.VOR | 2/17 | 12 | 35 | 9.4 | 13.1 ± 0.8 | 2.2 ± 3.0 | 2.8 ± 2.4 | 6.9 ± 2.4 | 25.3 ± 4.7 | 18.4 ± 3.9 | 0.7 ± 0.2 | 0.8 ± 0.1 | 0.2 ± 3.0 | 6.9 ± 2.4 | 0.4 ± 0.0 | 6.8 ± 6.1 |
| Hdn.VOR | 2/19 | 6 | 68 | 9.4 | 18.6 ± 7.9 | --- ± --- | 4.1 ± 0.9 | --- ± --- | 32.1 ± 6.4 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Hdn.VOR | 2/19 | 12 | --- | 9.4 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Hdn.VOR | 2/23 | 6 | 55 | 9.4 | 8.3 ± 0.8 | 10.5 ± 1.6 | --- ± --- | 3.2 ± 0.7 | --- ± --- | 23.1 ± 1.7 | 3.2 ± 0.2 | 1.8 ± 0.1 | 4.8 ± 1.6 | 3.2 ± 0.7 | 0.7 ± 0.0 | --- ± --- |
| Hdn.VOR | 2/23 | 12 | 47 | 9.4 | 9.4 ± 0.9 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Hdn.VOR | 2/24 | 6 | 67 | 9.4 | 17.1 ± 3.1 | 19.1 ± 4.3 | 2.9 ± 2.5 | 12.0 ± 3.8 | 29.4 ± 5.3 | 40.6 ± 5.7 | 4.2 ± 0.4 | 2.1 ± 0.2 | 12.0 ± 4.2 | 12.0 ± 3.8 | 0.9 ± 0.0 | -11.2 ± 7.8 |
| Hdn.VOR | 2/24 | 12 | 43 | 9.4 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Hdn.VOR | 2/26 | 6 | 70 | 9.4 | 19.8 ± 2.7 | 16.7 ± 2.6 | 6.8 ± 1.5 | 3.7 ± 1.3 | 35.9 ± 5.2 | 29.9 ± 2.9 | 8.3 ± 0.5 | 4.7 ± 0.3 | 2.4 ± 2.5 | 3.7 ± 1.3 | 1.2 ± 0.0 | 6.1 ± 6.0 |
| Hdn.VOR | 2/26 | 12 | 60 | 9.4 | 11.8 ± 0.8 | 14.9 ± 2.5 | 1.8 ± 1.5 | 4.7 ± 1.7 | 22.9 ± 4.0 | 29.0 ± 3.0 | 4.1 ± 0.3 | 2.0 ± 0.1 | 8.0 ± 2.5 | 4.7 ± 1.7 | 0.8 ± 0.0 | -6.1 ± 5.0 |
| | | | | | | | | | | | | | | | | |
| Hdn.VOR | 8/7 | 6 | 31 | 9.4 | 16.3 ± 0.7 | 12.2 ± 2.2 | 12.4 ± 1.5 | 6.5 ± 2.2 | 38.1 ± 9.5 | 28.1 ± 3.1 | 2.3 ± 0.2 | 0.3 ± 0.1 | 8.5 ± 2.2 | 6.5 ± 2.2 | 1.0 ± 0.0 | 10.0 ± 10.0 |
| Hdn.VOR | 8/7 | 12 | 17 | 9.4 | 13.1 ± 0.2 | 11.9 ± 1.9 | 11.5 ± 1.5 | 4.1 ± 1.4 | 34.0 ± 8.7 | 25.4 ± 2.4 | 3.5 ± 0.2 | 0.3 ± 0.1 | 6.7 ± 1.9 | 4.1 ± 1.4 | 1.4 ± 0.0 | 8.6 ± 9.0 |
| Hdn.VOR | 8/8 | 6 | 31 | 9.4 | 18.6 ± 0.7 | 14.6 ± 2.1 | 12.8 ± 1.7 | 3.7 ± 1.3 | 40.8 ± 10.5 | 27.7 ± 2.4 | 4.3 ± 0.2 | 0.4 ± 0.1 | 8.4 ± 2.0 | 3.7 ± 1.3 | 1.6 ± 0.0 | 13.1 ± 10.8 |
| Hdn.VOR | 8/8 | 12 | 27 | 9.4 | 18.1 ± 0.8 | 17.0 ± 2.1 | 12.7 ± 1.5 | 3.7 ± 1.3 | 40.2 ± 10.3 | 30.2 ± 2.5 | 3.5 ± 0.2 | 0.6 ± 0.1 | 10.9 ± 2.1 | 3.7 ± 1.3 | 2.1 ± 0.1 | 10.0 ± 10.6 |
| Hdn.VOR | 8/9 | 6 | 41 | 9.4 | 19.1 ± 2.2 | 15.9 ± 2.1 | 6.3 ± 1.4 | 4.5 ± 1.6 | 34.8 ± 10.8 | 29.8 ± 2.6 | 3.1 ± 0.2 | 0.6 ± 0.1 | 8.7 ± 2.1 | 4.5 ± 1.6 | 3.5 ± 0.1 | 5.0 ± 11.1 |
| Hdn.VOR | 8/9 | 12 | 16 | 9.4 | 8.3 ± 0.4 | 17.9 ± 2.4 | 3.3 ± 1.4 | 5.0 ± 1.7 | 20.9 ± 6.8 | 32.3 ± 2.9 | 1.7 ± 0.1 | 0.5 ± 0.1 | 13.7 ± 2.4 | 5.0 ± 1.7 | 1.9 ± 0.1 | -11.3 ± 7.4 |
| Hdn.VOR | 8/14 | 6 | 52 | 9.4 | 6.6 ± 0.9 | 7.5 ± 2.1 | 1.6 ± 1.4 | 6.6 ± 1.2 | 17.6 ± 6.2 | 23.5 ± 2.4 | 1.6 ± 0.2 | 0.5 ± 0.1 | 4.7 ± 2.1 | 6.6 ± 1.2 | 0.8 ± 0.0 | -6.0 ± 6.7 |
| Hdn.VOR | 8/14 | 12 | 38 | 9.4 | 3.4 ± 0.3 | 9.3 ± 2.1 | 0.0 ± 1.4 | 6.2 ± 1.2 | 12.8 ± 4.9 | 24.9 ± 2.4 | 1.2 ± 0.1 | 0.4 ± 0.1 | 7.3 ± 2.1 | 6.2 ± 1.2 | 0.4 ± 0.0 | -12.0 ± 5.4 |
| Hdn.VOR | 8/21 | 6 | 62 | 9.4 | 17.6 ± 1.5 | 25.3 ± 2.8 | 4.7 ± 1.4 | 4.7 ± 1.6 | 31.7 ± 10.0 | 39.4 ± 3.2 | 7.6 ± 0.4 | 1.2 ± 0.1 | 13.5 ± 2.7 | 4.7 ± 1.6 | 3.0 ± 0.1 | -7.6 ± 10.5 |
| Hdn.VOR | 8/21 | 12 | 43 | 9.4 | 16.4 ± 0.7 | 18.4 ± 2.3 | 4.7 ± 1.4 | 4.6 ± 1.6 | 30.5 ± 9.8 | 32.4 ± 2.8 | 6.2 ± 0.3 | 0.7 ± 0.1 | 9.9 ± 2.3 | 4.6 ± 1.6 | 1.5 ± 0.0 | -1.8 ± 10.2 |
| Hdn.VOR | 8/22 | 6 | 71 | 9.4 | 18.9 ± 2.3 | 18.9 ± 2.8 | 3.1 ± 1.4 | 5.0 ± 1.7 | 31.5 ± 10.9 | 33.3 ± 3.3 | 5.4 ± 0.3 | 0.8 ± 0.1 | 12.1 ± 2.8 | 5.0 ± 1.7 | 0.6 ± 0.0 | -1.8 ± 11.4 |
| Hdn.VOR | 8/22 | 12 | 47 | 9.4 | 12.3 ± 0.3 | 13.2 ± 2.2 | 1.6 ± 1.4 | 3.8 ± 1.3 | 23.3 ± 8.0 | 26.4 ± 2.6 | 4.0 ± 0.2 | 0.4 ± 0.1 | 8.3 ± 2.2 | 3.8 ± 1.3 | 0.5 ± 0.0 | -3.1 ± 8.4 |
| Hdn.VOR | 8/23 | 6 | 66 | 9.4 | 15.8 ± 0.7 | 16.3 ± 2.4 | 1.6 ± 1.4 | 1.0 ± 0.7 | 26.8 ± 9.6 | 26.7 ± 2.5 | 6.5 ± 0.4 | 0.7 ± 0.1 | 7.4 ± 2.4 | 1.0 ± 0.7 | 1.7 ± 0.1 | 0.1 ± 9.9 |
| Hdn.VOR | 8/23 | 12 | 61 | 9.4 | 12.9 ± 0.7 | 14.9 ± 2.3 | 0.0 ± 1.3 | 3.4 ± 1.2 | 22.3 ± 8.6 | 27.7 ± 2.6 | 5.0 ± 0.3 | 0.5 ± 0.1 | 8.6 ± 2.3 | 3.4 ± 1.2 | 0.8 ± 0.0 | -5.4 ± 9.0 |
| Hdn.VOR | 8/24 | 6 | 69 | 9.4 | 16.3 ± 2.5 | 20.8 ± 2.8 | 3.2 ± 1.4 | 5.3 ± 1.8 | 28.8 ± 9.9 | 35.5 ± 3.3 | 6.3 ± 0.4 | 0.7 ± 0.1 | 12.6 ± 2.7 | 5.3 ± 1.8 | 1.1 ± 0.0 | -6.7 ± 10.4 |
| Hdn.VOR | 8/24 | 12 | 51 | 9.4 | 8.9 ± 0.4 | 18.3 ± 2.4 | 1.6 ± 1.4 | 5.0 ± 1.7 | 19.9 ± 7.0 | 32.6 ± 3.0 | 3.9 ± 0.2 | 0.5 ± 0.1 | 11.9 ± 2.4 | 5.0 ± 1.7 | 2.0 ± 0.1 | -12.7 ± 7.6 |
| Hdn.VOR | 8/25 | 6 | 72 | 9.4 | 13.9 ± 1.0 | 23.2 ± 2.8 | 3.1 ± 1.3 | 5.2 ± 1.8 | 26.4 ± 8.8 | 37.8 ± 3.4 | 9.5 ± 0.5 | 0.9 ± 0.1 | 11.3 ± 2.8 | 5.2 ± 1.8 | 1.5 ± 0.0 | -11.4 ± 9.4 |
| Hdn.VOR | 8/25 | 12 | 32 | 9.4 | 8.4 ± 0.5 | 20.1 ± 2.7 | 3.5 ± 1.5 | 5.1 ± 1.8 | 21.3 ± 6.8 | 34.7 ± 3.2 | 3.9 ± 0.2 | 0.6 ± 0.1 | 14.8 ± 2.7 | 5.1 ± 1.8 | 0.8 ± 0.0 | -13.4 ± 7.5 |
| Hdn.VOR | 8/26 | 6 | 54 | 9.4 | 13.6 ± 1.5 | 24.1 ± 2.7 | 3.1 ± 1.4 | 4.5 ± 1.0 | 26.1 ± 8.9 | 38.0 ± 2.9 | 4.8 ± 0.3 | 0.9 ± 0.1 | 15.8 ± 2.7 | 4.5 ± 1.0 | 2.6 ± 0.1 | -11.9 ± 9.3 |
| Hdn.VOR | 8/26 | 12 | 23 | 9.4 | 6.8 ± 0.2 | 13.5 ± 2.0 | 0.0 ± 1.4 | 5.0 ± 1.0 | 16.2 ± 6.2 | 27.8 ± 2.2 | 3.2 ± 0.2 | 0.8 ± 0.1 | 8.4 ± 2.0 | 5.0 ± 1.0 | 1.1 ± 0.0 | -11.7 ± 6.5 |
| Hdn.VOR | 8/27 | 6 | 46 | 9.4 | 15.4 ± 1.9 | 22.8 ± 2.4 | 1.5 ± 1.3 | 2.4 ± 0.7 | 26.4 ± 9.4 | 34.6 ± 2.5 | 4.8 ± 0.3 | 3.9 ± 0.3 | 12.9 ± 2.4 | 2.4 ± 0.7 | 1.3 ± 0.0 | -8.2 ± 9.8 |
| Hdn.VOR | 8/27 | 12 | 29 | 9.4 | 7.4 ± 0.3 | 15.8 ± 2.1 | 4.8 ± 1.4 | 6.1 ± 1.2 | 21.6 ± 6.3 | 31.3 ± 2.4 | 3.1 ± 0.2 | 0.6 ± 0.1 | 9.6 ± 2.1 | 6.1 ± 1.2 | 2.5 ± 0.1 | -9.7 ± 6.8 |
| | | | | | | | | | | | | | | | | |
| Hdn.VOR | 9/2 | 6 | --- | 9.4 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hdn.VOR | 9/2 | 12 | 27 | 9.4 | --- ± --- | --- ± --- | 0.0 ± 3.0 | --- ± --- | 22.3 ± 8.9 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Hdn.VOR | 9/17 | 6 | 35 | 9.4 | 8.6 ± 1.4 | 17.8 ± 2.4 | 3.1 ± 1.4 | 2.7 ± 0.8 | 21.1 ± 7.1 | 30.0 ± 2.5 | 2.6 ± 0.2 | 0.3 ± 0.1 | 13.4 ± 2.4 | 2.7 ± 0.8 | 1.6 ± 0.0 | -8.9 ± 7.5 |
| Hdn.VOR | 9/17 | 12 | 22 | 9.4 | 6.9 ± 0.6 | 12.3 ± 2.0 | 1.6 ± 1.4 | 1.7 ± 0.7 | 17.9 ± 6.3 | 23.4 ± 2.2 | 2.5 ± 0.2 | 0.3 ± 0.1 | 8.0 ± 2.0 | 1.7 ± 0.7 | 1.4 ± 0.0 | -5.5 ± 6.7 |
| Hdn.VOR | 9/18 | 6 | 84 | 9.4 | 69.6 ± 21.6 | 41.2 ± 4.2 | 1.6 ± 1.4 | 5.8 ± 1.1 | 80.6 ± 35.2 | 56.4 ± 4.4 | 18.0 ± 1.0 | 3.4 ± 0.3 | 18.8 ± 4.1 | 5.8 ± 1.1 | 1.0 ± 0.0 | 24.2 ± 35.5 |
| Hdn.VOR | 9/18 | 12 | 80 | 9.4 | 23.9 ± 2.7 | 20.6 ± 3.4 | 3.2 ± 1.4 | 4.4 ± 1.0 | 36.5 ± 12.7 | 34.5 ± 3.5 | 7.6 ± 0.5 | 0.7 ± 0.2 | 11.6 ± 3.3 | 4.4 ± 1.0 | 0.7 ± 0.0 | 2.1 ± 13.1 |
| Hdn.VOR | 9/19 | 6 | 89 | 9.4 | 1942.3 ± 764.2 | 64.5 ± 5.4 | 4.9 ± 1.4 | 5.9 ± 1.2 | 1956.6 ± #### | 79.8 ± 5.5 | 46.1 ± 2.6 | 3.0 ± 0.3 | 14.3 ± 4.7 | 5.9 ± 1.2 | 1.1 ± 0.1 | 1876.7 ± #### |
| Hdn.VOR | 9/19 | 12 | 49 | 9.4 | 12.9 ± 1.5 | 12.7 ± 2.3 | 3.4 ± 1.5 | 3.6 ± 0.9 | 25.7 ± 8.7 | 25.7 ± 2.4 | 2.7 ± 0.2 | 0.7 ± 0.1 | 8.1 ± 2.2 | 3.6 ± 0.9 | 1.2 ± 0.0 | 0.1 ± 9.0 |
| Hdn.VOR | 9/20 | 6 | 77 | 9.4 | 19.8 ± 1.6 | 14.2 ± 2.8 | 3.1 ± 1.4 | 2.1 ± 0.7 | 32.3 ± 11.2 | 25.7 ± 2.9 | 5.1 ± 0.3 | 0.7 ± 0.2 | 7.1 ± 2.8 | 2.1 ± 0.7 | 1.2 ± 0.0 | 6.5 ± 11.5 |
| Hdn.VOR | 9/20 | 12 | 65 | 9.4 | 13.3 ± 1.3 | 15.4 ± 2.6 | 3.1 ± 1.4 | 5.8 ± 1.1 | 25.8 ± 8.5 | 30.6 ± 2.8 | 4.1 ± 0.3 | 0.6 ± 0.1 | 9.8 ± 2.6 | 5.8 ± 1.1 | 1.0 ± 0.0 | -4.8 ± 9.0 |
| Hdn.VOR | 9/21 | 6 | 85 | 9.4 | 12.4 ± 1.3 | 12.2 ± 3.5 | 1.6 ± 1.4 | 1.2 ± 0.7 | 23.4 ± 8.5 | 22.9 ± 3.6 | 4.7 ± 0.4 | 0.9 ± 0.2 | 6.2 ± 3.5 | 1.2 ± 0.7 | 0.3 ± 0.0 | 0.6 ± 9.2 |
| Hdn.VOR | 9/21 | 12 | 44 | 9.4 | 4.3 ± 0.8 | 9.3 ± 2.0 | 1.6 ± 1.4 | 4.2 ± 1.0 | 15.3 ± 5.1 | 22.9 ± 2.3 | 4.0 ± 0.2 | 0.3 ± 0.1 | 4.5 ± 2.0 | 4.2 ± 1.0 | 0.6 ± 0.0 | -7.6 ± 5.6 |
| Hdn.VOR | 9/24 | 6 | 63 | 9.4 | 10.3 ± 0.6 | 9.8 ± 2.6 | 3.2 ± 1.4 | 3.1 ± 1.3 | 22.8 ± 7.3 | 22.3 ± 2.9 | 3.1 ± 0.2 | 0.7 ± 0.1 | 5.3 ± 2.6 | 3.1 ± 1.3 | 0.8 ± 0.0 | 0.6 ± 7.9 |
| Hdn.VOR | 9/24 | 12 | 30 | 9.4 | 7.3 ± 0.2 | 7.5 ± 2.1 | 1.5 ± 1.3 | 2.2 ± 1.0 | 18.2 ± 6.1 | 19.1 ± 2.3 | 2.4 ± 0.2 | 0.2 ± 0.1 | 4.3 ± 2.1 | 2.2 ± 1.0 | 0.5 ± 0.0 | -0.9 ± 6.6 |
| Hdn.VOR | 9/27 | 6 | 45 | 9.4 | 11.3 ± 0.8 | 11.2 ± 2.0 | 1.5 ± 1.3 | 4.8 ± 1.0 | 22.2 ± 7.7 | 25.4 ± 2.2 | 3.6 ± 0.2 | 0.6 ± 0.1 | 5.7 ± 2.0 | 4.8 ± 1.0 | 1.3 ± 0.0 | -3.2 ± 8.0 |
| Hdn.VOR | 9/27 | 12 | 24 | 9.4 | 13.9 ± 2.4 | 15.4 ± 2.1 | 3.0 ± 1.3 | 9.0 ± 1.6 | 26.4 ± 9.0 | 33.8 ± 2.6 | 3.3 ± 0.2 | 0.8 ± 0.1 | 9.9 ± 2.0 | 9.0 ± 1.6 | 1.5 ± 0.0 | -7.5 ± 9.4 |
| Hdn.VOR | 9/30 | 6 | 96 | 9.4 | 1022.1 ± 578.0 | 22.7 ± 10.9 | 1.6 ± 1.4 | 1.5 ± 0.9 | 1033.1 ± 648.1 | 33.6 ± 10.9 | 1.9 ± 1.1 | 1.9 ± 0.7 | 18.7 ± 10.8 | 1.5 ± 0.9 | 0.1 ± 0.1 | 999.6 ± 648.2 |
| Hdn.VOR | 9/30 | 12 | 69 | 9.4 | 16.4 ± 1.1 | 14.8 ± 3.2 | 3.3 ± 1.4 | 4.7 ± 1.9 | 29.1 ± 9.7 | 29.0 ± 3.7 | 4.9 ± 0.3 | 0.6 ± 0.1 | 8.8 ± 3.2 | 4.7 ± 1.9 | 0.5 ± 0.0 | 0.1 ± 10.4 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Hdn.VOR | 10/1 | 6 | 68 | 9.4 | 36.1 ± 11.6 | 20.4 ± 3.0 | 5.0 ± 1.5 | 2.3 ± 1.1 | 50.5 ± 19.7 | 32.1 ± 3.2 | 11.3 ± 0.6 | 0.8 ± 0.1 | 5.9 ± 2.9 | 2.3 ± 1.1 | 2.4 ± 0.1 | 18.4 ± 19.9 |
| Hdn.VOR | 10/1 | 12 | 38 | 9.4 | 5.3 ± 0.4 | 7.1 ± 2.5 | 0.0 ± 1.5 | 1.2 ± 0.8 | 14.7 ± 5.9 | 17.7 ± 2.6 | 1.1 ± 0.1 | 0.4 ± 0.1 | 4.8 ± 2.5 | 1.2 ± 0.8 | 0.8 ± 0.0 | -3.0 ± 6.4 |
| Hdn.VOR | 10/2 | 6 | 59 | 9.4 | 7.3 ± 0.8 | 10.8 ± 2.3 | 1.6 ± 1.4 | 2.4 ± 0.8 | 18.3 ± 6.4 | 22.7 ± 2.5 | 2.0 ± 0.2 | 1.4 ± 0.1 | 6.3 ± 2.3 | 2.4 ± 0.8 | 1.2 ± 0.0 | -4.4 ± 6.8 |
| Hdn.VOR | 10/2 | 12 | 32 | 9.4 | 2.3 ± 0.2 | 6.4 ± 2.0 | 0.0 ± 1.5 | 3.0 ± 0.8 | 11.7 ± 4.3 | 18.8 ± 2.2 | 1.0 ± 0.1 | 0.5 ± 0.1 | 4.1 ± 2.0 | 3.0 ± 0.8 | 0.7 ± 0.0 | -7.2 ± 4.8 |
| Hdn.VOR | 10/7 | 6 | 52 | 9.4 | 9.6 ± 2.2 | 9.5 ± 2.3 | 0.0 ± 1.3 | 1.8 ± 0.9 | 19.0 ± 7.4 | 20.6 ± 2.5 | 2.0 ± 0.2 | 0.4 ± 0.1 | 3.3 ± 2.3 | 1.8 ± 0.9 | 3.8 ± 0.1 | -1.6 ± 7.8 |
| Hdn.VOR | 10/7 | 12 | 25 | 9.4 | 7.4 ± 0.3 | 8.3 ± 2.2 | 1.5 ± 1.3 | 1.7 ± 0.9 | 18.4 ± 6.3 | 19.4 ± 2.3 | 2.0 ± 0.1 | 0.3 ± 0.1 | 4.2 ± 2.1 | 1.7 ± 0.9 | 1.8 ± 0.1 | -1.0 ± 6.7 |
| Hdn.VOR | 10/8 | 6 | 61 | 9.4 | 21.6 ± 1.9 | 12.8 ± 2.7 | 6.6 ± 1.5 | 3.0 ± 1.3 | 37.6 ± 11.9 | 25.2 ± 3.0 | 3.2 ± 0.2 | 1.9 ± 0.2 | 4.7 ± 2.7 | 3.0 ± 1.3 | 2.9 ± 0.1 | 12.5 ± 12.2 |
| Hdn.VOR | 10/8 | 12 | 25 | 9.4 | 7.9 ± 0.4 | 9.6 ± 2.4 | 3.2 ± 1.4 | 2.0 ± 1.0 | 20.6 ± 6.5 | 21.0 ± 2.6 | 1.7 ± 0.1 | 0.4 ± 0.1 | 6.2 ± 2.4 | 2.0 ± 1.0 | 1.4 ± 0.0 | -0.4 ± 7.0 |
| Hdn.VOR | 10/9 | 6 | 41 | 9.4 | 7.8 ± 0.4 | 8.6 ± 2.4 | 5.0 ± 1.5 | 3.0 ± 1.3 | 22.1 ± 6.5 | 20.9 ± 2.7 | 1.7 ± 0.1 | 0.4 ± 0.1 | 4.2 ± 2.4 | 3.0 ± 1.3 | 2.3 ± 0.1 | 1.2 ± 7.1 |
| Hdn.VOR | 10/9 | 12 | 22 | 9.4 | 7.8 ± 0.3 | 11.7 ± 2.6 | 3.1 ± 1.4 | 3.1 ± 1.3 | 20.3 ± 6.5 | 24.2 ± 2.9 | 1.3 ± 0.1 | 0.7 ± 0.1 | 7.0 ± 2.6 | 3.1 ± 1.3 | 2.7 ± 0.1 | -3.9 ± 7.1 |
| Hdn.VOR | 10/10 | 6 | 37 | 9.4 | 10.1 ± 0.2 | 9.9 ± 2.1 | 1.7 ± 1.4 | 2.2 ± 0.8 | 21.2 ± 7.1 | 21.6 ± 2.2 | 1.4 ± 0.1 | 0.9 ± 0.1 | 5.6 ± 2.1 | 2.2 ± 0.8 | 2.0 ± 0.1 | -0.4 ± 7.5 |
| Hdn.VOR | 10/10 | 12 | 24 | 9.4 | 9.1 ± 0.5 | 8.6 ± 2.0 | 1.7 ± 1.4 | 4.1 ± 1.0 | 20.2 ± 6.8 | 22.2 ± 2.2 | 1.1 ± 0.1 | 0.5 ± 0.1 | 4.8 ± 2.0 | 4.1 ± 1.0 | 2.2 ± 0.1 | -2.0 ± 7.2 |
| Hdn.VOR | 10/11 | 6 | 38 | 9.4 | 7.3 ± 0.5 | 8.2 ± 2.4 | 3.3 ± 1.4 | 3.4 ± 1.4 | 19.9 ± 6.5 | 21.1 ± 2.8 | 0.9 ± 0.1 | 0.3 ± 0.1 | 5.2 ± 2.4 | 3.4 ± 1.4 | 1.8 ± 0.1 | -1.1 ± 7.1 |
| Hdn.VOR | 10/11 | 12 | 15 | 9.4 | 4.9 ± 0.2 | 8.7 ± 2.3 | 1.7 ± 1.5 | 2.2 ± 1.1 | 16.0 ± 5.6 | 20.3 ± 2.5 | 1.1 ± 0.1 | 0.7 ± 0.1 | 5.3 ± 2.3 | 2.2 ± 1.1 | 1.6 ± 0.0 | -4.3 ± 6.1 |
| Hdn.VOR | 10/12 | 6 | 33 | 9.4 | 18.4 ± 0.6 | 14.2 ± 2.5 | 5.0 ± 1.5 | 4.4 ± 1.8 | 32.8 ± 10.3 | 28.0 ± 3.1 | 4.5 ± 0.2 | 0.5 ± 0.1 | 7.1 ± 2.5 | 4.4 ± 1.8 | 2.2 ± 0.1 | 4.8 ± 10.7 |
| Hdn.VOR | 10/12 | 12 | 57 | 9.4 | 18.4 ± 1.0 | 16.9 ± 2.9 | 3.3 ± 1.5 | 6.9 ± 2.6 | 31.2 ± 10.3 | 33.3 ± 3.9 | 5.3 ± 0.3 | 0.6 ± 0.1 | 7.8 ± 2.9 | 6.9 ± 2.6 | 3.1 ± 0.1 | -2.1 ± 11.0 |
| Hdn.VOR | 10/13 | 6 | 53 | 9.4 | 4.4 ± 0.4 | 3.4 ± 2.2 | 0.0 ± 1.4 | 2.3 ± 1.1 | 13.8 ± 5.2 | 15.1 ± 2.4 | 1.1 ± 0.1 | 0.4 ± 0.1 | 0.7 ± 2.2 | 2.3 ± 1.1 | 1.2 ± 0.0 | -1.2 ± 5.8 |
| Hdn.VOR | 10/13 | 12 | 25 | 9.4 | 2.9 ± 0.2 | 5.2 ± 2.1 | 0.0 ± 1.4 | 4.2 ± 1.7 | 12.3 ± 4.6 | 18.8 ± 2.7 | 0.8 ± 0.1 | 0.4 ± 0.1 | 2.8 ± 2.1 | 4.2 ± 1.7 | 1.1 ± 0.0 | -6.4 ± 5.3 |
| Hdn.VOR | 10/14 | 6 | 33 | 9.4 | 4.9 ± 0.3 | 4.3 ± 2.0 | 1.6 ± 1.4 | 4.7 ± 1.8 | 15.9 ± 5.7 | 18.4 ± 2.7 | 0.8 ± 0.1 | 0.3 ± 0.1 | 2.0 ± 2.0 | 4.7 ± 1.8 | 1.2 ± 0.0 | -2.5 ± 6.3 |
| Hdn.VOR | 10/14 | 12 | 26 | 9.4 | 3.6 ± 0.7 | 4.1 ± 1.9 | 0.0 ± 1.4 | 2.6 ± 1.1 | 13.0 ± 4.8 | 16.1 ± 2.2 | 0.7 ± 0.1 | 0.2 ± 0.1 | 2.4 ± 1.9 | 2.6 ± 1.1 | 0.7 ± 0.0 | -3.1 ± 5.2 |
|  |  |  |  |  | - | - | - | - | - | - | - | - | - | - | - | - |

# Table 4.3.6

# Measured and Calculated Component Contributions to Total Light Extinction at Hayden Waste Water

| Site | Date | Hr | RH | Cln Air | bsp | Ebsp | babs | Ebabs | bext | Ebext | Esul | Enit | Eoc | Eec | Esoil | Unid. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hdn.WW | 2/16 | 6 | --- | 9.6 | --- + --- | --- + --- | --- + --- | --- + --- | --- + --- | --- + --- | --- + --- | --- + --- | --- + --- | --- + --- | --- + --- | --- + --- |
| Hdn.WW | 2/16 | 12 | 57 | 9.6 | 16.9 ± 0.8 | 24.0 ± 3.5 | 10.9 ± 2.4 | 13.6 ± 4.9 | 37.4 ± 6.7 | 47.2 ± 6.0 | 3.4 ± 0.4 | 6.8 ± 0.4 | 11.5 ± 3.4 | 13.6 ± 4.9 | 2.3 ± 0.1 | -9.8 ± 9.0 |
| Hdn.WW | 2/17 | 6 | 65 | 9.6 | 24.2 ± 0.8 | 11.6 ± 2.0 | 8.5 ± 1.5 | 5.8 ± 2.2 | 42.3 ± 8.0 | 27.0 ± 3.0 | 2.2 ± 0.3 | 5.9 ± 0.4 | 2.9 ± 2.0 | 5.8 ± 2.2 | 0.6 ± 0.0 | 15.4 ± 8.5 |
| Hdn.WW | 2/17 | 12 | 55 | 9.6 | 19.9 ± 2.2 | 15.3 ± 1.9 | 9.6 ± 1.5 | 4.8 ± 1.9 | 39.1 ± 7.1 | 29.7 ± 2.7 | 2.8 ± 0.3 | 6.2 ± 0.4 | 5.4 ± 1.9 | 4.8 ± 1.9 | 0.9 ± 0.0 | 9.3 ± 7.6 |
| Hdn.WW | 2/19 | 6 | 82 | 9.6 | 32.4 ± 4.6 | 21.4 ± 3.0 | 4.9 ± 1.4 | 2.8 ± 1.3 | 46.9 ± 10.3 | 33.8 ± 3.2 | 6.2 ± 0.5 | 5.6 ± 0.4 | 9.2 ± 2.9 | 2.8 ± 1.3 | 0.4 ± 0.0 | 13.1 ± 10.8 |
| Hdn.WW | 2/19 | 12 | 63 | 9.6 | 14.9 ± 2.4 | 7.6 ± 1.9 | 6.4 ± 1.4 | 1.5 ± 0.9 | 30.9 ± 6.2 | 18.7 ± 2.1 | 2.3 ± 0.3 | 3.1 ± 0.2 | 1.6 ± 1.9 | 1.5 ± 0.9 | 0.6 ± 0.0 | 12.3 ± 6.5 |
| Hdn.WW | 2/23 | 6 | 77 | 9.6 | 55.1 ± 12.0 | 27.1 ± 2.8 | 8.5 ± 1.5 | 5.8 ± 1.2 | 73.2 ± 16.4 | 42.6 ± 3.0 | 8.2 ± 0.6 | 11.6 ± 0.5 | 4.9 ± 2.7 | 5.8 ± 1.2 | 2.5 ± 0.1 | 30.6 ± 16.7 |
| Hdn.WW | 2/23 | 12 | --- | 9.6 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Hdn.WW | 2/24 | 6 | 71 | 9.6 | 24.6 ± 1.5 | 15.5 ± 2.1 | 7.9 ± 1.4 | 4.4 ± 1.8 | 42.1 ± 8.0 | 29.5 ± 2.8 | 4.9 ± 0.4 | 5.7 ± 0.4 | 3.8 ± 2.1 | 4.4 ± 1.8 | 1.2 ± 0.0 | 12.5 ± 8.5 |
| Hdn.WW | 2/24 | 12 | 57 | 9.6 | 19.2 ± 1.4 | 29.2 ± 2.7 | 8.3 ± 1.5 | 10.3 ± 3.6 | 37.1 ± 6.9 | 49.0 ± 4.5 | 3.9 ± 0.3 | 4.3 ± 0.2 | 16.2 ± 2.6 | 10.3 ± 3.6 | 4.8 ± 0.1 | -11.9 ± 8.2 |
| Hdn.WW | 2/26 | 6 | 78 | 9.6 | 67.7 ± 10.7 | 41.8 ± 3.3 | 13.6 ± 1.6 | 6.2 ± 2.3 | 91.0 ± 18.7 | 57.5 ± 4.0 | 8.4 ± 0.6 | 15.8 ± 1.0 | 15.0 ± 3.1 | 6.2 ± 2.3 | 2.6 ± 0.1 | 33.4 ± 19.2 |
| Hdn.WW | 2/26 | 12 | 66 | 9.6 | 28.1 ± 3.1 | 23.4 ± 2.4 | 6.5 ± 1.4 | 6.7 ± 2.5 | 44.1 ± 9.1 | 39.7 ± 3.5 | 7.1 ± 0.5 | 4.7 ± 0.2 | 10.8 ± 2.4 | 6.7 ± 2.5 | 0.8 ± 0.0 | 4.4 ± 9.7 |
| Hdn.WW | 8/7 | 6 | 37 | 9.6 | 20.1 ± 0.6 | 15.9 ± 1.8 | 13.8 ± 1.4 | 5.4 ± 2.0 | 43.4 ± 7.0 | 30.9 ± 2.7 | 3.8 ± 0.2 | 0.4 ± 0.1 | 10.1 ± 1.8 | 5.4 ± 2.0 | 1.7 ± 0.1 | 12.5 ± 7.5 |
| Hdn.WW | 8/7 | 12 | 18 | 9.6 | 15.2 ± 0.5 | 17.4 ± 1.9 | 12.1 ± 1.4 | 6.4 ± 2.4 | 36.9 ± 6.0 | 33.4 ± 3.0 | 4.0 ± 0.2 | 0.4 ± 0.1 | 12.0 ± 1.9 | 6.4 ± 2.4 | 1.1 ± 0.0 | 3.5 ± 6.7 |
| Hdn.WW | 8/8 | 6 | 39 | 9.6 | 23.1 ± 1.2 | 22.4 ± 2.3 | 14.7 ± 1.5 | 5.7 ± 2.1 | 47.4 ± 7.8 | 37.7 ± 3.1 | 4.7 ± 0.3 | 0.4 ± 0.1 | 15.8 ± 2.2 | 5.7 ± 2.1 | 1.5 ± 0.0 | 9.7 ± 8.4 |
| Hdn.WW | 8/8 | 12 | 26 | 9.6 | 20.1 ± 0.6 | 18.1 ± 1.9 | 13.2 ± 1.4 | 3.9 ± 1.5 | 42.8 ± 6.8 | 31.6 ± 2.5 | 2.9 ± 0.2 | 0.5 ± 0.1 | 12.5 ± 1.9 | 3.9 ± 1.5 | 2.3 ± 0.1 | 11.2 ± 7.3 |
| Hdn.WW | 8/9 | 6 | 49 | 9.6 | 19.9 ± 1.6 | 15.7 ± 1.9 | 8.9 ± 1.4 | 4.1 ± 1.6 | 38.4 ± 6.9 | 29.4 ± 2.5 | 2.8 ± 0.2 | 0.7 ± 0.1 | 9.5 ± 1.9 | 4.1 ± 1.6 | 2.7 ± 0.1 | 9.1 ± 7.3 |
| Hdn.WW | 8/9 | 12 | 16 | 9.6 | 11.1 ± 0.5 | 12.1 ± 1.7 | 0.0 ± 1.3 | 4.2 ± 1.6 | 20.7 ± 5.0 | 25.8 ± 2.3 | 1.8 ± 0.2 | 0.4 ± 0.1 | 7.9 ± 1.7 | 4.2 ± 1.6 | 2.0 ± 0.1 | -5.2 ± 5.5 |
| Hdn.WW | 8/14 | 6 | 56 | 9.6 | 11.1 ± 2.2 | 9.4 ± 1.9 | 3.0 ± 1.3 | 7.0 ± 1.4 | 23.7 ± 5.1 | 26.0 ± 2.4 | 1.7 ± 0.2 | 0.5 ± 0.1 | 6.1 ± 1.9 | 7.0 ± 1.4 | 1.2 ± 0.0 | -2.4 ± 5.6 |
| Hdn.WW | 8/14 | 12 | 37 | 9.6 | 5.4 ± 0.2 | 7.1 ± 1.8 | 0.0 ± 1.3 | 6.6 ± 1.3 | 15.0 ± 3.4 | 23.4 ± 2.2 | 1.2 ± 0.2 | 0.3 ± 0.1 | 5.1 ± 1.8 | 6.6 ± 1.3 | 0.5 ± 0.0 | -8.4 ± 4.1 |
| Hdn.WW | 8/21 | 6 | 76 | 9.6 | --- ± --- | 30.1 ± 5.5 | 7.0 ± 3.0 | 5.4 ± 2.6 | 41.6 ± 8.9 | 45.1 ± 6.0 | 9.1 ± 0.9 | 0.9 ± 0.3 | 18.4 ± 5.4 | 5.4 ± 2.6 | 1.7 ± 0.1 | -3.5 ± 10.7 |
| Hdn.WW | 8/21 | 12 | 36 | 9.6 | 22.9 ± 2.8 | 18.2 ± 2.8 | 6.8 ± 2.0 | 7.2 ± 2.8 | 39.3 ± 7.9 | 35.0 ± 3.9 | 5.2 ± 0.4 | 0.4 ± 0.1 | 11.7 ± 2.8 | 7.2 ± 2.8 | 0.9 ± 0.0 | 4.2 ± 8.8 |
| Hdn.WW | 8/22 | 6 | --- | 9.6 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Hdn.WW | 8/22 | 12 | 46 | 9.6 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Hdn.WW | 8/23 | 6 | 65 | 9.6 | 22.4 ± 1.7 | 14.7 ± 2.0 | 5.7 ± 1.3 | 3.6 ± 1.5 | 37.7 ± 7.4 | 27.9 ± 2.5 | 5.6 ± 0.4 | 0.5 ± 0.1 | 7.8 ± 2.0 | 3.6 ± 1.5 | 0.9 ± 0.0 | 9.8 ± 7.8 |
| Hdn.WW | 8/23 | 12 | 59 | 9.6 | 17.6 ± 1.3 | 25.3 ± 2.6 | 5.8 ± 1.3 | 7.9 ± 2.8 | 32.9 ± 6.3 | 42.8 ± 3.9 | 5.4 ± 0.3 | 1.4 ± 0.1 | 17.7 ± 2.6 | 7.9 ± 2.8 | 0.8 ± 0.0 | -9.8 ± 7.4 |
| Hdn.WW | 8/24 | 6 | 69 | 9.6 | 20.9 ± 3.2 | 15.4 ± 2.2 | 5.8 ± 1.3 | 6.2 ± 2.3 | 36.3 ± 7.5 | 31.2 ± 3.1 | 5.2 ± 0.4 | 0.9 ± 0.1 | 8.9 ± 2.1 | 6.2 ± 2.3 | 0.5 ± 0.0 | 5.2 ± 8.2 |
| Hdn.WW | 8/24 | 12 | 49 | 9.6 | 12.4 ± 0.8 | 15.1 ± 1.9 | 4.4 ± 1.3 | 1.0 ± 0.7 | 26.4 ± 5.4 | 25.7 ± 2.1 | 4.2 ± 0.3 | 0.3 ± 0.1 | 9.7 ± 1.9 | 1.0 ± 0.7 | 0.9 ± 0.0 | 0.7 ± 5.8 |
| Hdn.WW | 8/25 | 6 | 68 | 9.6 | 16.9 ± 1.3 | 15.6 ± 2.3 | 5.8 ± 1.3 | 3.1 ± 1.3 | 32.3 ± 6.2 | 28.3 ± 2.6 | 4.1 ± 0.3 | 0.4 ± 0.1 | 9.9 ± 2.2 | 3.1 ± 1.3 | 1.1 ± 0.0 | 3.9 ± 6.7 |
| Hdn.WW | 8/25 | 12 | 32 | 9.6 | 9.8 ± 0.6 | 13.4 ± 1.9 | 4.9 ± 1.4 | 4.4 ± 1.8 | 24.3 ± 4.8 | 27.4 ± 2.6 | 4.0 ± 0.3 | 0.4 ± 0.1 | 8.5 ± 1.9 | 4.4 ± 1.8 | 0.6 ± 0.0 | -3.2 ± 5.5 |
| Hdn.WW | 8/26 | 6 | 54 | 9.6 | 17.6 ± 1.9 | 12.7 ± 2.0 | 3.1 ± 1.3 | 3.8 ± 0.9 | 30.2 ± 6.5 | 26.1 ± 2.2 | 3.8 ± 0.3 | 0.5 ± 0.1 | 7.5 ± 2.0 | 3.8 ± 0.9 | 0.9 ± 0.0 | 4.2 ± 6.9 |
| Hdn.WW | 8/26 | 12 | 25 | 9.6 | 9.2 ± 0.2 | 11.5 ± 1.8 | 1.5 ± 1.3 | 3.2 ± 0.9 | 20.4 ± 4.2 | 24.2 ± 2.0 | 2.8 ± 0.2 | 0.3 ± 0.1 | 7.9 ± 1.8 | 3.2 ± 0.9 | 0.4 ± 0.0 | -3.9 ± 4.7 |
| Hdn.WW | 8/27 | 6 | 52 | 9.6 | 20.9 ± 2.2 | 12.5 ± 1.9 | 3.1 ± 1.3 | 2.2 ± 0.8 | 33.6 ± 7.2 | 24.3 ± 2.1 | 5.5 ± 0.3 | 0.4 ± 0.1 | 5.5 ± 1.9 | 2.2 ± 0.8 | 1.0 ± 0.0 | 9.3 ± 7.5 |
| Hdn.WW | 8/27 | 12 | 33 | 9.6 | 11.2 ± 0.4 | 13.0 ± 1.9 | 3.1 ± 1.4 | 3.0 ± 0.9 | 23.9 ± 5.2 | 25.7 ± 2.1 | 3.0 ± 0.2 | 0.4 ± 0.1 | 8.7 ± 1.9 | 3.0 ± 0.9 | 0.9 ± 0.0 | -1.7 ± 5.6 |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hdn.WW | 9/2 | 6 | --- | 9.6 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Hdn.WW | 9/2 | 12 | --- | 9.6 | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- | --- ± --- |
| Hdn.WW | 9/17 | 6 | 46 | 9.6 | 13.1 ± 1.1 | 11.8 ± 2.1 | 5.3 ± 1.6 | 3.4 ± 1.0 | 28.0 ± 5.6 | 24.7 ± 2.3 | 2.5 ± 0.2 | 0.4 ± 0.1 | 7.8 ± 2.1 | 3.4 ± 1.0 | 1.1 ± 0.0 | 3.3 ± 6.0 |
| Hdn.WW | 9/17 | 12 | 23 | 9.6 | 9.9 ± 0.4 | 9.8 ± 2.3 | --- ± --- | 0.0 ± 0.9 | --- ± --- | 19.4 ± 2.5 | 2.4 ± 0.3 | 0.6 ± 0.1 | 6.1 ± 2.3 | 0.0 ± 0.9 | 0.7 ± 0.0 | --- ± --- |
| Hdn.WW | 9/18 | 6 | 81 | 9.6 | 54.9 ± 11.8 | 31.0 ± 3.2 | 3.0 ± 1.3 | 7.4 ± 1.4 | 67.5 ± 16.4 | 48.0 ± 3.5 | 12.1 ± 0.7 | 3.5 ± 0.3 | 14.5 ± 3.1 | 7.4 ± 1.4 | 0.9 ± 0.0 | 19.6 ± 16.8 |
| Hdn.WW | 9/18 | 12 | 73 | 9.6 | 20.2 ± 1.1 | 26.5 ± 4.3 | 3.0 ± 1.3 | 7.9 ± 1.8 | 32.8 ± 7.0 | 44.0 ± 4.7 | 6.1 ± 0.6 | 1.0 ± 0.2 | 19.1 ± 4.3 | 7.9 ± 1.8 | 0.3 ± 0.0 | -11.1 ± 8.4 |
| Hdn.WW | 9/19 | 6 | 83 | 9.6 | 96.9 ± 36.6 | 44.9 ± 3.3 | 4.7 ± 1.4 | 5.0 ± 1.1 | 111.2 ± 32.0 | 59.5 ± 3.5 | 31.5 ± 1.7 | 2.1 ± 0.2 | 10.2 ± 2.9 | 5.0 ± 1.1 | 1.1 ± 0.0 | 51.7 ± 32.2 |
| Hdn.WW | 9/19 | 12 | 48 | 9.6 | 13.2 ± 1.5 | 11.7 ± 1.9 | 4.7 ± 1.4 | 6.4 ± 1.3 | 27.6 ± 5.4 | 27.8 ± 2.3 | 3.1 ± 0.3 | 0.6 ± 0.1 | 7.2 ± 1.9 | 6.4 ± 1.3 | 0.9 ± 0.0 | -0.2 ± 5.9 |
| Hdn.WW | 9/20 | 6 | 80 | 9.6 | 24.2 ± 1.4 | 18.3 ± 3.1 | 4.8 ± 1.4 | 3.2 ± 0.9 | 38.6 ± 8.0 | 31.1 ± 3.2 | 8.1 ± 0.6 | 1.2 ± 0.2 | 8.4 ± 3.0 | 3.2 ± 0.9 | 0.7 ± 0.0 | 7.5 ± 8.6 |
| Hdn.WW | 9/20 | 12 | 62 | 9.6 | 16.6 ± 1.9 | 11.6 ± 2.0 | 3.1 ± 1.4 | 2.0 ± 0.7 | 29.3 ± 6.4 | 23.2 ± 2.1 | 4.7 ± 0.3 | 0.5 ± 0.1 | 5.9 ± 2.0 | 2.0 ± 0.7 | 0.5 ± 0.0 | 6.1 ± 6.8 |
| Hdn.WW | 9/21 | 6 | 75 | 9.6 | 8.2 ± 1.0 | 10.9 ± 2.2 | 1.6 ± 1.4 | 0.0 ± 0.6 | 19.4 ± 4.3 | 20.5 ± 2.3 | 5.7 ± 0.4 | 0.4 ± 0.1 | 4.4 ± 2.2 | 0.0 ± 0.6 | 0.5 ± 0.0 | -1.1 ± 4.9 |
| Hdn.WW | 9/21 | 12 | 44 | 9.6 | 5.7 ± 0.9 | 6.1 ± 1.7 | 1.6 ± 1.4 | 0.0 ± 0.6 | 16.9 ± 3.6 | 15.7 ± 1.8 | 2.6 ± 0.2 | 0.2 ± 0.1 | 2.7 ± 1.7 | 0.0 ± 0.6 | 0.6 ± 0.0 | 1.2 ± 4.1 |
| Hdn.WW | 9/24 | 6 | 65 | 9.6 | 14.9 ± 1.6 | 9.1 ± 2.4 | 1.6 ± 1.4 | 2.2 ± 1.2 | 26.1 ± 6.0 | 20.9 ± 2.7 | 3.4 ± 0.3 | 0.5 ± 0.1 | 4.6 ± 2.4 | 2.2 ± 1.2 | 0.6 ± 0.0 | 5.2 ± 6.6 |
| Hdn.WW | 9/24 | 12 | 29 | 9.6 | --- ± --- | 9.2 ± 2.2 | 1.5 ± 1.3 | 3.6 ± 1.7 | --- ± --- | 22.3 ± 2.8 | 2.1 ± 0.2 | 0.2 ± 0.1 | 6.6 ± 2.2 | 3.6 ± 1.7 | 0.2 ± 0.0 | --- ± --- |
| Hdn.WW | 9/27 | 6 | 51 | 9.6 | 15.2 ± 1.7 | 10.4 ± 1.9 | 4.5 ± 1.3 | 4.5 ± 1.1 | 29.3 ± 6.0 | 24.6 ± 2.2 | 4.1 ± 0.3 | 0.5 ± 0.1 | 5.1 ± 1.9 | 4.5 ± 1.1 | 0.8 ± 0.0 | 4.7 ± 6.4 |
| Hdn.WW | 9/27 | 12 | 27 | 9.6 | 15.6 ± 1.6 | 10.3 ± 1.8 | 4.5 ± 1.3 | 5.3 ± 1.2 | 29.7 ± 6.1 | 25.2 ± 2.1 | 3.4 ± 0.2 | 0.6 ± 0.1 | 5.5 ± 1.8 | 5.3 ± 1.2 | 0.8 ± 0.1 | 4.5 ± 6.4 |
| Hdn.WW | 9/30 | 6 | 86 | 9.6 | 4.1 ± 0.8 | 7.5 ± 3.8 | 0.0 ± 1.4 | 2.8 ± 1.4 | 13.7 ± 3.5 | 19.9 ± 4.0 | 0.9 ± 0.5 | 0.3 ± 0.2 | 6.1 ± 3.7 | 2.8 ± 1.4 | 0.1 ± 0.0 | -6.2 ± 5.3 |
| Hdn.WW | 9/30 | 12 | 65 | 9.6 | 16.9 ± 1.1 | 11.9 ± 2.4 | 3.1 ± 1.4 | 2.4 ± 1.3 | 29.6 ± 6.2 | 23.9 ± 2.7 | 6.9 ± 0.4 | 0.4 ± 0.1 | 3.9 ± 2.3 | 2.4 ± 1.3 | 0.7 ± 0.0 | 5.7 ± 6.8 |
| Hdn.WW | 10/1 | 6 | 69 | 9.6 | 25.6 ± 6.4 | 14.9 ± 2.7 | 3.2 ± 1.4 | 4.7 ± 2.0 | 38.3 ± 9.0 | 29.1 ± 3.4 | 6.3 ± 0.4 | 0.8 ± 0.1 | 7.1 ± 2.7 | 4.7 ± 2.0 | 0.7 ± 0.0 | 9.2 ± 9.6 |
| Hdn.WW | 10/1 | 12 | 37 | 9.6 | 5.2 ± 0.3 | 9.6 ± 2.3 | 0.0 ± 1.4 | 5.3 ± 2.3 | 14.8 ± 3.5 | 24.5 ± 3.3 | 1.4 ± 0.2 | 0.3 ± 0.1 | 7.3 ± 2.3 | 5.3 ± 2.3 | 0.6 ± 0.0 | -9.7 ± 4.8 |
| Hdn.WW | 10/2 | 6 | 67 | 9.6 | 16.2 ± 4.3 | 8.0 ± 2.1 | 3.2 ± 1.4 | 1.2 ± 0.7 | 29.0 ± 6.6 | 18.8 ± 2.2 | 4.0 ± 0.3 | 1.0 ± 0.1 | 2.4 ± 2.0 | 1.2 ± 0.7 | 0.7 ± 0.0 | 10.2 ± 7.0 |
| Hdn.WW | 10/2 | 12 | 33 | 9.6 | 4.2 ± 0.3 | 8.0 ± 1.8 | 1.6 ± 1.4 | 0.2 ± 0.7 | 15.4 ± 3.3 | 17.8 ± 2.0 | 0.9 ± 0.2 | 0.8 ± 0.1 | 6.2 ± 1.8 | 0.2 ± 0.7 | 0.2 ± 0.0 | -2.4 ± 3.8 |
| Hdn.WW | 10/7 | 6 | 56 | 9.6 | 13.2 ± 1.8 | 9.8 ± 2.2 | 3.0 ± 1.3 | 4.7 ± 2.0 | 25.9 ± 5.6 | 24.1 ± 3.0 | 2.7 ± 0.2 | 0.5 ± 0.1 | 5.1 ± 2.2 | 4.7 ± 2.0 | 1.4 ± 0.0 | 1.8 ± 6.3 |
| Hdn.WW | 10/7 | 12 | 24 | 9.6 | 7.2 ± 0.4 | 7.4 ± 1.9 | 3.0 ± 1.3 | 0.8 ± 0.8 | 19.9 ± 4.1 | 17.8 ± 2.1 | 2.1 ± 0.2 | 0.3 ± 0.1 | 4.0 ± 1.9 | 0.8 ± 0.8 | 1.1 ± 0.0 | 2.1 ± 4.6 |
| Hdn.WW | 10/8 | 6 | 62 | 9.6 | 25.4 ± 2.3 | 13.7 ± 2.5 | 6.1 ± 1.4 | 7.5 ± 3.1 | 41.1 ± 8.2 | 30.9 ± 3.9 | 4.3 ± 0.3 | 1.5 ± 0.1 | 6.9 ± 2.4 | 7.5 ± 3.1 | 0.9 ± 0.0 | 10.3 ± 9.1 |
| Hdn.WW | 10/8 | 12 | 27 | 9.6 | 10.1 ± 0.5 | 2.9 ± 1.6 | 3.1 ± 1.4 | 2.5 ± 1.3 | 22.8 ± 4.6 | 15.0 ± 2.1 | 1.4 ± 0.2 | 0.4 ± 0.1 | 0.6 ± 1.6 | 2.5 ± 1.3 | 0.5 ± 0.0 | 7.8 ± 5.0 |
| Hdn.WW | 10/9 | 6 | 54 | 9.6 | 12.2 ± 1.2 | 8.4 ± 2.1 | 3.1 ± 1.4 | 5.6 ± 2.4 | 24.9 ± 5.4 | 23.6 ± 3.2 | 2.7 ± 0.2 | 0.4 ± 0.1 | 4.5 ± 2.1 | 5.6 ± 2.4 | 0.7 ± 0.0 | 1.3 ± 6.3 |
| Hdn.WW | 10/9 | 12 | 24 | 9.6 | 8.4 ± 0.3 | 7.4 ± 1.9 | 3.2 ± 1.4 | 2.6 ± 1.3 | 21.2 ± 4.2 | 19.6 ± 2.3 | 1.5 ± 0.2 | 0.2 ± 0.1 | 4.2 ± 1.9 | 2.6 ± 1.3 | 1.5 ± 0.0 | 1.6 ± 4.8 |
| Hdn.WW | 10/10 | 6 | 51 | 9.6 | 15.7 ± 1.9 | 8.1 ± 1.9 | 6.4 ± 1.4 | 3.8 ± 0.9 | 31.7 ± 6.2 | 21.5 ± 2.1 | 1.8 ± 0.2 | 0.5 ± 0.1 | 4.7 ± 1.9 | 3.8 ± 0.9 | 1.0 ± 0.0 | 10.3 ± 6.6 |
| Hdn.WW | 10/10 | 12 | 25 | 9.6 | 9.7 ± 0.6 | 7.5 ± 1.8 | 3.2 ± 1.4 | 3.1 ± 0.9 | 22.5 ± 4.7 | 20.2 ± 2.0 | 1.3 ± 0.2 | 0.6 ± 0.1 | 4.7 ± 1.7 | 3.1 ± 0.9 | 0.9 ± 0.0 | 2.3 ± 5.1 |
| Hdn.WW | 10/11 | 6 | 45 | 9.6 | 9.4 ± 1.0 | 4.6 ± 3.2 | 3.3 ± 1.4 | 3.0 ± 1.9 | 22.3 ± 4.5 | 17.2 ± 3.7 | 1.3 ± 0.3 | 0.7 ± 0.2 | 1.6 ± 3.2 | 3.0 ± 1.9 | 1.0 ± 0.0 | 5.1 ± 5.8 |
| Hdn.WW | 10/11 | 12 | 20 | 9.6 | 5.6 ± 0.6 | 5.6 ± 1.8 | 1.6 ± 1.4 | 2.5 ± 1.3 | 16.8 ± 3.6 | 17.7 ± 2.2 | 1.3 ± 0.2 | 0.3 ± 0.1 | 2.9 ± 1.8 | 2.5 ± 1.3 | 1.1 ± 0.0 | -0.9 ± 4.3 |
| Hdn.WW | 10/12 | 6 | 48 | 9.6 | 21.9 ± 1.7 | 8.6 ± 2.0 | 6.2 ± 1.4 | 5.9 ± 2.5 | 37.7 ± 7.4 | 24.1 ± 3.2 | 4.0 ± 0.3 | 0.3 ± 0.1 | 3.3 ± 2.0 | 5.9 ± 2.5 | 1.1 ± 0.0 | 13.6 ± 8.0 |
| Hdn.WW | 10/12 | 12 | 55 | 9.6 | 19.4 ± 1.8 | 9.5 ± 2.1 | 4.7 ± 1.4 | 2.8 ± 1.4 | 33.7 ± 6.9 | 21.9 ± 2.5 | 4.7 ± 0.3 | 0.3 ± 0.1 | 3.5 ± 2.1 | 2.8 ± 1.4 | 1.0 ± 0.0 | 11.8 ± 7.4 |
| Hdn.WW | 10/13 | 6 | 59 | 9.6 | 10.2 ± 2.5 | 8.0 ± 2.1 | 3.1 ± 1.3 | 4.9 ± 2.1 | 22.9 ± 5.0 | 22.5 ± 3.0 | 3.6 ± 0.3 | 0.6 ± 0.1 | 3.0 ± 2.1 | 4.9 ± 2.1 | 0.8 ± 0.0 | 0.4 ± 5.8 |
| Hdn.WW | 10/13 | 12 | 27 | 9.6 | 3.9 ± 0.2 | 2.1 ± 1.8 | 0.0 ± 1.4 | 3.2 ± 1.6 | 13.5 ± 3.3 | 15.0 ± 2.4 | 0.9 ± 0.2 | 0.2 ± 0.1 | 0.2 ± 1.8 | 3.2 ± 1.6 | 0.8 ± 0.0 | -1.5 ± 4.1 |
| Hdn.WW | 10/14 | 6 | 47 | 9.6 | 6.9 ± 0.9 | 6.9 ± 2.1 | 3.1 ± 1.3 | 7.3 ± 3.0 | 19.6 ± 4.1 | 23.8 ± 3.6 | 1.4 ± 0.2 | 0.4 ± 0.1 | 4.5 ± 2.0 | 7.3 ± 3.0 | 0.6 ± 0.0 | -4.2 ± 5.5 |
| Hdn.WW | 10/14 | 12 | 27 | 9.6 | 2.1 ± 0.5 | 2.5 ± 1.8 | 0.0 ± 1.4 | 3.8 ± 1.8 | 11.7 ± 3.3 | 15.9 ± 2.6 | 0.5 ± 0.2 | 0.1 ± 0.1 | 1.5 ± 1.8 | 3.8 ± 1.8 | 0.4 ± 0.0 | -4.2 ± 4.2 |

# Table 4.3.7

## Calculated Component Contributions to Calculated Extinction

| | <15 Mm$^{-1}$ | | | | 15 - <20 Mm$^{-1}$ [a] | | | | 20 - <30 Mm$^{-1}$ [a] | | | | - 60 Mm$^{-1}$ [a] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0-10% | 10-25% | 25-50% | >50% | 0-10% | 10-25% | 25-50% | >50% | 0-10% | 10-25% | 25-50% | [illegible] | 0-10% | 10-25% | 25-50% | >50% |
| **Buffalo Pass** | | | # of incidents in category: 19 | | | | # of incidents in category: 14 | | | | # of incidents in category: [illegible] | | | | # of incidents in category: 14 | |
| Clean Air (Rayleigh) | 0 | 0 | 5 | 14 | 0 | 0 | 7 | 7 | 0 | 0 | 19 | [illegible] | 1 | 1 | 12 | 0 |
| Organics | 6 | 11 | 2 | 0 | 2 | 7 | 5 | 0 | 2 | 8 | 10 | [illegible] | 4 | 4 | 6 | 0 |
| Elemental Carbon | 5 | 13 | 1 | 0 | 7 | 7 | 0 | 0 | 12 | 7 | 1 | [illegible] | 12 | 2 | 0 | 0 |
| Ammonium Sulfate | 12 | 7 | 0 | 0 | 1 | 11 | 2 | 0 | 3 | 12 | 5 | [illegible] | 0 | 6 | 6 | 2 |
| Ammonium Nitrate | 19 | 0 | 0 | 0 | 13 | 1 | 0 | 0 | 20 | 0 | 0 | [illegible] | 13 | 1 | 0 | 0 |
| Soil | 17 | 2 | 0 | 0 | 13 | 1 | 0 | 0 | 17 | 3 | 0 | [illegible] | 11 | 3 | 0 | 0 |
| **Gilpin Creek** | | | # of incidents in category: 3 | | | | # of incidents in category: 11 | | | | # of incidents in category: [illegible] | | | | # of incidents in category: 10 | |
| Clean Air (Rayleigh) | 0 | 0 | 1 | 2 | 0 | 0 | 7 | 4 | 0 | 6 | 6 | [illegible] | 0 | 3 | 6 | 1 |
| Organics | 3 | 0 | 0 | 0 | 6 | 3 | 2 | 0 | 6 | 2 | 2 | [illegible] | 4 | 2 | 3 | 1 |
| Elemental Carbon | 2 | 0 | 1 | 0 | 0 | 1 | 9 | 1 | 1 | 4 | 3 | [illegible] | 1 | 3 | 6 | 0 |
| Ammonium Sulfate | 2 | 1 | 0 | 0 | 4 | 7 | 0 | 0 | 3 | 10 | 1 | [illegible] | 3 | 5 | 2 | 0 |
| Ammonium Nitrate | 3 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 14 | 0 | 0 | [illegible] | 10 | 0 | 0 | 0 |
| Soil | 3 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 14 | 0 | 0 | [illegible] | 9 | 1 | 0 | 0 |
| **Juniper Mt.** | | | # of incidents in category: 5 | | | | # of incidents in category: 3 | | | | # of incidents in category: [illegible] | | | | # of incidents in category: 10 | |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Clean Air (Rayleigh) | 0 | 0 | 1 | 4 | 0 | 0 | 2 | 1 | 0 | 0 | 17 | 0 | 0 | 10 | 0 |
| Organics | 2 | 2 | 1 | 0 | 0 | 2 | 1 | 0 | 1 | 12 | 9 | 1 | 3 | 6 | 0 |
| Elemental Carbon | 1 | 4 | 0 | 0 | 0 | 3 | 0 | 0 | 1 | 17 | 4 | 1 | 9 | 0 | 0 |
| Ammonium Sulfate | 4 | 1 | 0 | 0 | 1 | 2 | 0 | 0 | 9 | 13 | 0 | 2 | 7 | 1 | 0 |
| Ammonium Nitrate | 5 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 22 | 0 | 0 | 10 | 0 | 0 | 0 |
| Soil | 5 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 21 | 1 | 0 | 9 | 1 | 0 | 0 |

| **Baggs** | | | # of incidents in category: 5 | | | | # of incidents in category: 13 | | | | # of incidents in category: | | | # of incidents in category: 13 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Clean Air (Rayleigh) | 0 | 0 | 2 | 3 | 0 | 0 | 7 | 6 | 0 | 1 | 20 | 0 | 3 | 10 | 0 |
| Organics | 0 | 1 | 4 | 0 | 1 | 9 | 2 | 0 | 0 | 4 | 21 | 0 | 0 | 13 | 0 |
| Elemental Carbon | 4 | 1 | 0 | 0 | 2 | 9 | 2 | 0 | 12 | 11 | 2 | 2 | 9 | 2 | 0 |
| Ammonium Sulfate | 5 | 0 | 0 | 0 | 12 | 1 | 0 | 0 | 11 | 14 | 0 | 3 | 9 | 1 | 0 |
| Ammonium Nitrate | 5 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 25 | 0 | 0 | 13 | 0 | 0 | 0 |
| Soil | 5 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 25 | 0 | 0 | 13 | 0 | 0 | 0 |

| **Hayden VOR** | | | # of incidents in category: 6 | | | | # of incidents in category: 12 | | | | # of incidents in category: | | | s in category: 14 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Clean Air (Rayleigh) | 0 | 0 | 1 | 5 | 0 | 1 | 10 | 1 | 0 | 2 | 21 | 0 | 1 | 13 | 0 |
| Organics | 1 | 3 | 2 | 0 | 0 | 7 | 5 | 0 | 0 | 4 | 19 | 0 | 3 | 11 | 0 |
| Elemental Carbon | 1 | 5 | 0 | 0 | 3 | 7 | 2 | 0 | 5 | 17 | 1 | 2 | 12 | 0 | 0 |
| Ammonium Sulfate | 6 | 0 | 0 | 0 | 6 | 6 | 0 | 0 | 9 | 13 | 1 | 1 | 12 | 1 | 2 |
| Ammonium Nitrate | 6 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 22 | 1 | 0 | 14 | 0 | 0 | 0 |
| Soil | 6 | 0 | 0 | 0 | 11 | 1 | 0 | 0 | 21 | 2 | 0 | 12 | 2 | 0 | 0 |

| **Hayden Waste Water** | | | # of incidents in category: 4 | | | | # of incidents in category: 7 | | | | # of incidents in category: | | | # of incidents in category: 20 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Clean Air (Rayleigh) | 0 | 0 | 2 | 2 | 0 | 0 | 3 | 4 | 0 | 0 | 18 | 0 | 3 | 17 | 0 |
| Organics | 2 | 0 | 2 | 0 | 0 | 6 | 1 | 0 | 2 | 11 | 8 | 0 | 6 | 14 | 0 |
| Elemental Carbon | 0 | 4 | 0 | 0 | 4 | 1 | 2 | 0 | 3 | 17 | 1 | 1 | 19 | 0 | 0 |
| Ammonium Sulfate | 4 | 0 | 0 | 0 | 4 | 2 | 1 | 0 | 6 | 14 | 1 | 3 | 16 | 1 | 0 |
| Ammonium Nitrate | 4 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 21 | 0 | 0 | 20 | 0 | 0 | 0 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soil | 4 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 21 | 0 | 0 | 20 | 0 | 0 | 0 |

[a] Categories determined by measured extinction.

[b] % of calculated extinction due to component (since the measured and calculated values differ, some of the <15 $Mm^{-1}$ Rayleigh values are classified as 25-50% although they should be greater than 50%).

## Table 4.3.8

## Average, Maximum, and Minimum Calculated Light Extinction by Chemical Components for All Sites

| Site | | Esul | Enit | Eoc | Eec | Esoil | Unid. |
|---|---|---|---|---|---|---|---|
| Buffalo Pass | ave | 3.72 ± 3.60 | 0.63 ± 0.85 | 4.37 ± 3.46 | 2.45 ± 1.94 | 1.07 ± 0.90 | 1.21 ± 8.01 |
| | min | 0.47 ± 0.07 | 0.15 ± 0.09 | 0.00 ± 1.16 | 0.00 ± 0.72 | 0.19 ± 0.01 | -10.43 ± 3.60 |
| | max | 16.04 ± 0.85 | 6.58 ± 0.42 | 13.64 ± 2.71 | 10.21 ± 8.48 | 4.51 ± 0.13 | 24.91 ± 13.90 |
| | # in ave | 77 | 77 | 77 | 77 | 77 | 77 |
| Gilpin Creek | ave | 3.11 ± 1.77 | 0.76 ± 0.36 | 5.29 ± 6.65 | 9.30 ± 7.58 | 0.55 ± 0.57 | -1.60 ± 14.75 |
| | min | 0.67 ± 0.34 | 0.00 ± 0.34 | 0.00 ± 5.08 | 0.00 ± 2.56 | 0.09 ± 0.05 | -36.08 ± 18.86 |
| | max | 9.11 ± 0.64 | 1.79 ± 0.40 | 29.68 ± 7.40 | 34.48 ± 19.47 | 3.60 ± 0.11 | 26.56 ± 9.23 |
| | # in ave | 37 | 37 | 37 | 37 | 37 | 37 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Juniper Mt. | ave | 2.98 ± 1.71 | 0.38 ± 0.20 | 5.10 ± 2.91 | 3.93 ± 1.97 | 0.98 ± 1.12 | 2.43 ± 7.61 |
| | min | 0.35 ± 0.04 | 0.04 ± 0.04 | 0.83 ± 1.10 | 0.05 ± 0.41 | 0.08 ± 0.04 | -11.46 ± 2.33 |
| | max | 7.48 ± 0.38 | 1.12 ± 0.11 | 11.62 ± 1.53 | 8.44 ± 1.40 | 5.74 ± 0.25 | 31.61 ± 1.19 |
| | # in ave | 42 | 42 | 42 | 42 | 42 | 42 |
| | | | | | | | |
| Baggs | ave | 2.91 ± 2.14 | 0.39 ± 0.26 | 8.50 ± 4.33 | 3.64 ± 2.74 | 0.69 ± 0.54 | -0.81 ± 6.04 |
| | min | 0.62 ± 0.08 | 0.13 ± 0.09 | 1.18 ± 1.99 | 0.00 ± 0.55 | 0.11 ± 0.21 | -16.18 ± 3.44 |
| | max | 13.69 ± 0.75 | 1.26 ± 0.12 | 20.20 ± 4.76 | 11.94 ± 3.81 | 2.58 ± 0.18 | 12.24 ± 3.11 |
| | # in ave | 57 | 57 | 57 | 57 | 57 | 57 |
| | | | | | | | |
| Hayden VOR | ave | 3.53 ± 2.29 | 0.79 ± 0.78 | 7.51 ± 3.59 | 4.03 ± 1.94 | 1.45 ± 0.82 | -2.19 ± 6.97 |
| | min | 0.67 ± 0.19 | 0.24 ± 0.07 | 0.23 ± 3.01 | 1.00 ± 0.67 | 0.29 ± 0.02 | -13.43 ± 7.52 |
| | max | 11.33 ± 0.59 | 4.73 ± 0.25 | 15.80 ± 2.67 | 12.04 ± 3.78 | 3.80 ± 0.11 | 18.40 ± 19.95 |
| | # in ave | 69 | 69 | 69 | 69 | 69 | 69 |
| | | | | | | | |
| Hayden Waste Water | ave | 3.51 ± 1.89 | 1.12 ± 1.68 | 7.00 ± 4.25 | 4.25 ± 2.49 | 0.98 ± 0.71 | 2.92 ± 6.96 |
| | min | 0.53 ± 0.17 | 0.14 ± 0.08 | 0.21 ± 1.79 | 0.00 ± 0.62 | 0.10 ± 0.03 | -11.91 ± 8.23 |
| | max | 9.06 ± 0.89 | 6.79 ± 0.44 | 19.14 ± 4.29 | 13.60 ± 4.91 | 4.82 ± 0.14 | 15.36 ± 8.54 |
| | # in ave | 66 | 66 | 66 | 66 | 66 | 66 |

will have a greater impact at certain sites than others due to the differing concentrations of the particulate matter the added component is superimposed upon.

A similar comparison was made for organic carbon light extinction. Of the 142 cases where organic carbon was estimated to account for more than 25% of the total light extinction (not including the Gilpin Creek samples, which are subject to local wood smoke and a high carbon artifact), 26.1% were found at the Hayden VOR site, 17.6% at the Hayden Waste Water site, 12.0% at the Juniper Mountain site, 28.2% at the Baggs site, and 16.2% at the Buffalo Pass site. Most of the highest cases overlap the sulfate episodes, demonstrating that elevated light extinction is usually due to a combination of components.

Since the episodes selected for chemical analysis were chosen with a bias towards independent cases of noticeable visibility impairment caused by potentially different sources and during different meteorological conditions, the average of the chosen episodes is not representative of the overall conditions observed during the field portion of the MZVS. Therefore the results of the chemical analyses and the ELSIE modeling are presented here on an episode-by-episode basis to emphasize the different conditions that can lead to visibility degradation. The episodes are summarized below:

- <u>02/23/95</u>: This IOP day was chosen due to a sharp peak in the Buffalo Pass light scattering accompanied by a sharp 22-ppb spike of sulfur dioxide. The conditions were moist, especially at higher elevations. Chemically, the highest nitrate of the MZVS occurred at Hayden Waste Water during the morning, and the organics were uncharacteristically high for a winter sample. Although the elemental carbon was high, the soluble potassium indicative of vegetative burning was low. Also, although the selenium and sulfur dioxide, generating station emissions markers, were high at all of the sites, the sulfate remained low and regional in nature. Optically, the air (Rayleigh scattering) dominated the light extinction. At most of the sites, the organics and elemental carbon components were responsible for most of the particulate light scattering. Hayden Waste Water was an exception, with ammonium nitrate and ammonium sulfate causing the largest portion of the explained extinction.

- <u>03/26/95–03/31/95</u>: Light scattering was elevated at all sites during this non-IOP. Videos showed weather obscuration, punctuated by cloud clearing during which distant targets were moderately obscured. A 20-ppb sulfur dioxide spike occurred on the morning of 03/30/95. Also, a morning scattering peak occurred on 03/28/95 but was not accompanied by a sulfur dioxide peak. The conditions were moist throughout the region. Chemically, sulfates and soils increased during the episode with maximums at Buffalo Pass on 03/30/95 and 03/31/95. Buffalo Pass consistently showed higher selenium and sulfur dioxide concentrations than the other sites during the entire episode. Characteristic of a winter sample, the organics were low and the elemental carbon was associated with soluble potassium. Although the sulfates reached their maximums at the end of the episode, the organics, elemental carbon, and soluble potassium all peaked on 03/27/95. Since sulfate was the primary component of the aerosol, it was not surprising that most of the light scattering observed during this episode was caused by ammonium sulfate. The Rayleigh scattering was also a major contributor to the overall light extinction. The large unexplained component was probably a function of the high relative humidities causing high nephelometer readings.

- 05/06/95–05/07/95: Light scattering was elevated at all sites during this moist non-IOP. This episode was interesting because Gilpin Creek had higher selenium, sulfur dioxide, sulfate, organics, and elemental carbon than Buffalo Pass on 05/06/95. In contrast 05/07/95 displayed regional sulfate with more sulfur dioxide at Juniper Mountain than at the other sites. Although the organics were low, there was a moderate amount of elemental carbon associated with soluble potassium. The soil concentrations were elevated at all of the sites. Although the ammonium sulfate and Rayleigh components were the largest contributors to the light extinction at Buffalo Pass and Juniper Mountain, the elemental carbon contribution was larger than the ammonium sulfate contribution at Gilpin Creek. Again, due to the moisture, the unexplained portions of the measured light extinction were high at Buffalo Pass and Gilpin Creek.

- 06/14/95–06/16/95: A consistently high light scattering was found across the network during this dry period. High sulfate concentrations were observed at the sites. Buffalo Pass and Gilpin Creek track each other for selenium, sulfur dioxide, and sulfate, but Juniper Mountain led both sites by a day. The sulfate at Juniper Mountain peaked on 06/14/95 and the decreased through the rest of the episode. The sulfate concentrations at Buffalo Pass and Gilpin Creek, however, peaked on 06/15/95 and then decreased. The organics and soluble potassium started very high, but decreased through the period. Again, Gilpin Creek had higher organics, elemental carbon, and soluble potassium than the other sites. This led to Gilpin Creek having the highest light extinction of the three sites, with most of the extinction being due to the organics and elemental carbon portions of the aerosol. The light extinction due to ammonium sulfate peaked on 06/15/95 at Buffalo Pass when it was approximately the same as the Rayleigh component. At Buffalo Pass and Juniper Mountain, which exhibited higher light extinction than Buffalo Pass, the light extinction on 06/14/95 and 06/16/95 was primarily due to Rayleigh and the organics and elemental carbon fractions.

- 06/29/95–07/01/95: Very high light scattering coefficients were measured at Juniper Mountain and Baggs on 06/30/95, with rapid decrease on 07/01/95. These changes are reflected to a lesser extent in measurements from the other sites. Buffalo Pass was moist, while the other sites were relatively dry during daylight hours. The sulfate measurement at Juniper Mountain for 06/30/95 was invalid, but Buffalo Pass and Gilpin Creek both showed peaks in sulfate, sulfur dioxide, and selenium on that day. The peak in sulfate corresponded to a peak in organics at Buffalo Pass. The contributions to light extinction are highly elevated at Buffalo Pass on 06/29/95 due to the high relative humidities (the nephelometer data was invalid for this period due to the weather). On 06/30/95 and 07/01/95, both Buffalo Pass and Gilpin Creek's light extinction were dominated by Rayleigh scattering and extinction due to organics and elemental carbon.

- 07/29/95–07/31/95: Scattering was elevated during this non-IOP at all of the sites during low relative humidity conditions. There was a lot of variability in the light scattering at all sites. The sulfates at Buffalo Pass and Gilpin Creek were of approximately the same magnitude during this day. The Gilpin Creek site did show selenium and sulfur dioxide on 07/29/95 and 07/31/95. The organics and elemental carbon decreased during this episode. Accordingly, the light extinction due to organics and elemental carbon decreased during this period, but it was still the primary component at Gilpin Creek and was on the order of Rayleigh scattering at Buffalo Pass. The ammonium sulfate contribution to light extinction was small at both sites (~3-4 $Mm^{-1}$).

- 08/07/95–08/09/95: This episode had elevated light scattering at all sites during a period of low relative humidity. The light-scattering peaks were much less defined at Gilpin Creek than at the other sites. This was one of the primary episodes for modeling. This period showed the greatest forest fire impact of the MZVS. It had very high organics, elemental carbon, and soluble potassium due to the nearby forest fires listed in the fire inventory. In addition to the high fire components, this period also had high (~1.5 $\mu g/m^3$) sulfate at all of the sites (i.e. regional), high selenium and sulfur dioxide at Hayden Waste Water and Hayden VOR in the mornings, increased selenium and sulfur dioxide at Buffalo Pass on the afternoons of 08/08/95 and 08/09/95, and increased soils. The light extinction during this period was high (>30 $Mm^{-1}$) for 08/07/95 and 08/08/95 and decreased only slightly on 08/09/95. Although the sulfates observed during this period were high, their contribution to light extinction was overwhelmed by that of the elemental carbon and organics (up to 30 $Mm^{-1}$ at some of the sites).

- 08/14/95: A small morning increase in light scattering at Buffalo Pass was coincident with an increase in sulfur dioxide. Sulfate was low (~0.5 $\mu g/m^3$) at all sites during both the morning and afternoon samples although the selenium and sulfur dioxide were high at Buffalo Pass, Baggs, Hayden VOR, and Hayden Waste Water during the morning period. The soluble potassium was low despite the high elemental carbon, and the organics were lower than in the previous episode. However, there was enough elemental carbon and organics to dominate the light extinction. The contributions due to ammonium sulfate were approximately a fifth of those due to Rayleigh.

- 08/21/95–08/27/95: This was an example of high relative humidity conditions followed by a period of lower relative humidities. The light scattering was elevated and there were clear peaks in the light scattering at all of the sites. The peaks in the Gilpin Creek light scattering were some of the clearest observed during the MZVS. This was one of the primary episodes for modeling. Chemically, there were high sulfates, selenium, organics, and elemental carbon throughout the period. Every morning the sulfur dioxide and selenium were higher at Baggs, Hayden Waste Water, and Hayden VOR than in the afternoon. During 08/21/95–08/25/95, the wet period, the sulfate, sulfur dioxide, and selenium concentrations at Buffalo Pass increased every afternoon, while during 08/26/95–08/27/95, the dry period, the sulfates, sulfur dioxide, and selenium decreased at Buffalo Pass during the afternoon. Interestingly, ammonium sulfate was the primary contributor to light extinction at Buffalo Pass through 08/24/95, but not afterwards when the contributions due to organics and elemental carbon, on the order of Rayleigh, were higher than the ammonium sulfate contributions. Although the light extinction due to sulfate was noticeable at the other sites, the light scattering due to organics and elemental carbon and Rayleigh scattering dominated the light extinction.

- 09/02/95: An increase in light scattering at Buffalo Pass was partially accompanied by an increase in sulfur dioxide during the same period. This period was characterized by high sulfates throughout the network and a slight increase in sulfate at Buffalo Pass in the afternoon. Again the generating station emissions markers were higher in the morning at Baggs, Hayden VOR and Hayden Waste Water than in the afternoon. Also, all of the sites had high elemental carbon concentrations although the soluble potassium and organics were only of moderate levels (~2 $\mu g/m^3$ for organics). As expected, the elemental carbon and organics together were the largest contributors to light extinction at all of the sites. However, at Buffalo Pass, the light extinction due to ammonium sulfate was close to being on the order of the Rayleigh and elemental carbon and organics components.

- 09/17/95–09/21/95: This episode started off with low relative humidities and by the second day had very high relative humidities. (Weather affected portions of this episode.) There were some good examples of the interaction between fog and aerosols and several correspondences at Buffalo Pass between sulfur dioxide and light scattering during this episode. This was the highest priority episode for modeling. Chemically, the sulfates in this episode started out looking regional (09/17/95), but showed dramatic local influences on 09/18/95 and 09/19/95, including the highest sulfates and selenium observed during the MZVS (sulfates >4.0 $\mu g/m^3$ and selenium >2.5 $ng/m^3$, respectively, at both Hayden VOR and Hayden Waste Water). 09/20/95 and 09/21/95 showed a more regional signature, with slight local influences. During this entire period, Hayden VOR and Hayden Waste Water had higher sulfur dioxide and selenium in the mornings than in the afternoons and Buffalo Pass had increased sulfates and sulfur dioxide every afternoon except 09/21/95. The nitrates at the valley sites were also slightly elevated on the morning of 09/18/95. The organics started high and decreased through the period. There was significant elemental carbon at the sites and some corresponding soluble potassium. The light scattering on 09/17/95 was fairly low with both Buffalo Pass and Gilpin Creek having Rayleigh scattering as the primary component of light extinction. However, when the periods had high relative humidity, the light extinction rose dramatically and was dominated by organics and ammonium sulfate. For example, on the afternoon of 09/18/95, the sulfate was responsible for approximately 30 $Mm^{-1}$ of light extinction. The afternoon of 09/19/95 was drier, and all of the sites showed much lower relative humidities and ammonium sulfate and organics contributions to light extinction. On the morning of 09/21/95, Buffalo Pass showed a large contribution to light extinction from ammonium sulfate due to a large concentration of sulfate at the site and high humidity. The Hayden Waste Water site showed a similar peak in sulfate, but did not have the corresponding humidity, so had a much lower light scattering due to ammonium sulfate than the corresponding sample at Buffalo Pass.

- 09/24/95: This episode had morning peaks in light scattering at most of the sites and a distinct peak in light scattering during the late afternoon at Gilpin Creek. This episode showed regional sulfate, low organics, and some elemental carbon and soluble potassium at all sites. Although Buffalo Pass had increased sulfur dioxide and selenium in the afternoon, the sulfate decreased slightly. The light extinction at Buffalo Pass also decreased in the afternoon, but dramatically instead of slightly as the small decrease in the concentration of sulfate would suggest. Again, the high relative humidity caused a large light extinction due to the sulfate component at Buffalo Pass. This sulfate component of light extinction dominated the contributions of the other components. The other sites showed lower light extinctions than Buffalo Pass in the morning and higher light extinctions than Buffalo Pass in the afternoon, although the observed extinction decreased at all sites in the afternoon.

- 09/27/95: This was a fairly dry episode with correspondence between light scattering and sulfur dioxide. There were two peaks observed in the light scattering at most sites. Again this episode displayed regional sulfate with increased sulfur dioxide and selenium in the morning at Hayden VOR and Hayden Waste Water, and selenium and sulfur dioxide at both Gilpin Creek and Buffalo Pass. Organics, elemental carbon, and soluble potassium were elevated at Juniper Mountain, Hayden VOR, and Hayden Waste Water during the afternoon. Buffalo Pass showed the same increased organics and soluble potassium as the other sites, but the elemental carbon decreased. The total light extinction was dominated by organics, elemental carbon, and Rayleigh at all of the sites except Buffalo Pass, where ammonium sulfate was on the order of, or higher than, the combined organics and elemental carbon components.

- 09/30/95–10/02/95: Light scattering was elevated throughout the network. The relative humidity changed from very high to mid-range during the course of this episode. $SO_2$ and light scattering were correlated at Buffalo Pass on 10/01/95. This episode started with one of the cleanest IOP periods and ended with a clean period. However, the sulfates peaked on the afternoon of 09/30/95 and the morning of 10/01/95. The selenium and sulfur dioxide were at their maximum on the morning of 10/01/95 and decreased through the rest of the period. There was a strong generating station signature at all of the sites (except Juniper Mountain where the sample was invalid), but Buffalo Pass did not show a corresponding increase in its afternoon sulfate concentrations, except when regional sulfate appeared at all sites on the afternoon of 09/30/95. Gilpin Creek showed very high elemental carbon and soluble potassium concentrations during this period. Also, the organics were decreasing towards their low winter values. The high relative humidities greatly increased the light extinction at the elevated sites as evidenced by the high unexplained components. It also amplified the extinction due to ammonium sulfate and ammonium nitrate when they were present. Corresponding to the large sulfate concentration at Buffalo Pass on the afternoon of 09/30/95 was a 30 $Mm^{-1}$ contribution to light extinction from ammonium sulfate. The mornings of 10/01/95 and 10/02/95 also showed significant contributions to light extinction from ammonium sulfate and ammonium nitrate.

At the lower elevation sites, the light extinction was dominated by the combined organics and elemental carbon contributions.

- <u>10/07/95–10/14/95</u>: This episode was important because a wide variety of conditions were observed. The light scattering was elevated at all of the sites from 10/07/95 through 10/12/95 and then dropped to near Rayleigh on 10/13/95 and 10/14/95. There were two large peaks (10/08/95 and 10/12/95) in light scattering superimposed on the elevated light scattering and corresponding to peaks in the relative humidity. Also during this elevated period there were intermittent spikes of sulfur dioxide at Buffalo Pass. The 10/13/95 and 10/14/95 dates were of interest because the light scattering was very low while there were high sulfur dioxide concentrations present at Buffalo Pass. This was one of the primary episodes for modeling. Chemically, this period was very clean as far as sulfates were concerned. The sulfate was low and regional in nature. The two large peaks in light scattering corresponded to the two periods where sulfates were elevated. There was a regional increase in sulfate on 10/08/95. Juniper Mountain experienced an increase in sulfate on the afternoon of 10/11/95, while the other sites did not experience the increase until the morning of 10/12/95, when Juniper Mountain began to decrease. On 10/13/95 and 10/14/95, the concentrations of selenium and sulfur dioxide were elevated at all sites, but the sulfate concentrations were very low ($< 0.5\ \mu g/m^3$). Also, the sulfates at Buffalo Pass did not increase on the afternoons of 10/07/95 and 10/09/95 despite elevated sulfur dioxide and selenium at Hayden VOR and Hayden Waste Water in the morning. The organics, elemental carbon, and soluble potassium were elevated for typical fall/winter samples on 10/08/95, 10/10/95, and 10/12/95 (note the correspondence of two of those days to the sulfate peaks). However, 10/13/95 and 10/14/95 were far more representative of winter organics concentrations ($< 1\ \mu g/m^3$). It is also interesting to note that the soil component of the aerosol was elevated until afternoon of 10/12/95. The light extinction during this episode followed the trends in the chemical composition fairly well since the relative humidity was low. There were peaks in light scattering on the morning of 10/08/95 and 10/12/95 which were dominated by organics and elemental carbon. Ammonium sulfate was a significant contributor at Buffalo Pass, but it was not as significant as the organics and elemental carbon. Also, there was a peak in light scattering due to organics and elemental carbon at Gilpin Creek on 10/10/95. The rest of the days had light extinctions on the order of 20 $Mm^{-1}$ and were dominated by the Rayleigh scattering component.

- <u>10/16/95–10/19/95:</u> There was elevated light scattering throughout the network that decreased toward 10/19/95 at all sites except Buffalo Pass and Gilpin Creek which showed peaks in their light scattering. A prescribed burn was seen in the 10/19/95 video of the Yampa Valley from Cedar Mountain. Corresponding to the fire, the soluble potassium and elemental carbon were slightly elevated. The organics and soils were low, and became lower as the period progressed. The Buffalo Pass and Juniper Mountain sulfate concentrations were very similar, although Buffalo Pass had higher sulfur dioxide. The light extinction at both Buffalo Pass and Juniper Mountain peaked on 10/17/95 with Rayleigh being the dominant contributor. The organics and elemental carbon contributions were slightly higher at Juniper Mountain than at Buffalo Pass, while the ammonium sulfate contributions were approximately the same at both sites.

- 10/22/95–10/23/95: There was high relative humidity throughout the region and large peaks in light scattering at several of the sites. There were coincident $SO_2$ and light-scattering peaks on 10/23/95 at Buffalo Pass. This period was the cleanest period chosen for analysis during the MZVS. The soils, organics, elemental carbon, and soluble potassium were all very low. However, the Buffalo Pass sulfates, sulfur dioxide, and selenium were elevated with respect to Juniper Mountain during this period. The light extinction was also very elevated, due to the high relative humidities (e.g., high unexplained component). After Rayleigh, the contribution to light extinction from ammonium sulfate was the highest explained contribution to light extinction at Buffalo Pass on 10/22/95 and at Juniper Mountain on 10/23/95. On 10/23/95, the light extinction due to ammonium sulfate was higher than the Rayleigh contribution and much higher than any other explained component.

## 4.4 Comparison with Other Class I Areas

Table 4.4.1 compares the IMPROVE measurements for several keys species at Mt. Zirkel, Bridger, and Lone Peak Wilderness Areas and at Canyonlands, Mesa Verde, and Rocky Mountain National Parks during March through August, 1995. Figure 3.1.1 shows the locations of these sampling sites. During the spring (March through May), the average (50%) and 10% level concentrations at the Mt. Zirkel wilderness sites were approximately 10% to 30% less than the other sites. However, at the 90% level, these species concentrations were similar among all sites. The Lone Peak Wilderness Area exhibited the highest concentrations of most of the species examined, with 1.6 $\mu g/m^3$ of sulfate, 0.9 $\mu g/m^3$ of nitrate, 0.00044 $\mu g/m^3$ of selenium, and 7.1 $Mm^{-1}$ of light absorption ($b_{abs}$).

The chemical concentrations were increased in the Mt. Zirkel Wilderness Area during the summer (June through August). On average, the Bridger Wilderness Area reported 15% to 30% lower concentrations than the Mt. Zirkel Wilderness Area. Nitrate concentrations remained approximately constant between the spring and summer at most of the sites, while light absorption increased at all of the sites in summer. Except for the constant low sulfate concentrations (0.5 $\mu g/m^3$) at the Bridger Wilderness Area, sulfate concentrations at the 50% level ranged from 0.7 $\mu g/m^3$ at the Mt. Zirkel Wilderness Area to 0.9 $\mu g/m^3$ at the Mesa Verde and Rocky Mountain National Parks. These summer levels increased by 40% to 90% as compared to spring. In contrast, the sulfur dioxide concentrations experienced a 30% to 45% reduction during the summer as compared to the spring.

Average silicon concentrations varied from 0.05 $\mu g/m^3$ to 0.13 $\mu g/m^3$ during the spring and from 0.097 $\mu g/m^3$ to 0.20 $\mu g/m^3$ during the summer. The highest 90% level silicon concentration of 0.5 $\mu g/m^3$ was found at the Rocky Mountain National Park.

The concentrations presented in Table 4.4.1 are comparable to the statistics presented in Tables 4.2.1a-f, which show average concentrations of 0.8 to 1.1 $\mu g/m^3$ for sulfate, 0.07 to 0.25 $\mu g/m^3$ for nitrate, and 0.11 to 0.25 $\mu g/m^3$ for silicon.

Table 4.4.1 Comparison of 1995 IMPROVE Measurements for Major Chemical Components