

Air Pollution and Haze

Visibility impairment is caused by particles and gases in the atmosphere. Some particles and gases scatter light while others absorb light. The net effect is called “light extinction.” The result of the scattering and absorption processes is a reduction of the amount of light from a scene that is returned to the observer and scattering of light from other areas into the sight path, creating a hazy condition and obscuring the view.

The primary cause of haze in many areas is light scattering resulting from fine particles (i.e., particulate matter less than 2.5 microns in diameter, referred to as PM_{2.5}) in the atmosphere. These fine particles can contain a variety of chemical species including carbonaceous species (i.e., organics and elemental carbon), as well as ammonium nitrate, sulfates, and fine soil.

Additionally, coarse particles between 2.5 and 10 microns in diameter can contribute to light extinction. Each of these components can be naturally occurring or the result of human activity. The natural levels of these species result in some level of visibility impairment, in the absence of any human influences, and will vary with season, daily meteorology, and geography.

MoE receives a number of visibility related complaints in Williams Lake. Blue haze due to emissions from a specific point source is generally singled out by most complainants. Fine particles are more efficient at scattering light than large particles. When a beam of light strikes small particles (smaller than wavelength of visible light), only blue light is scattered because scattering efficiency is maximum. To an observer standing on the side, the haze would appear to be blue. Observer’s position relative to the sun and emission source determines the visual perception of blue haze. When particles are about the same size as incoming radiation, photons of all wavelengths are scattered equally and haze appears to be white or gray. Even though there is less mass concentrated in fine mode, it is fine particulates that are most responsible for scattering light.

For further information on visibility please refer to:

http://vista.cira.colostate.edu/improve/Education/intro_to_visibility.pdf