Using Visual Distance to Assess Smoke Levels

Why use visual distance to estimate health effects?

- Monitors in the Municipality are located near the most populated areas; these may not reflect conditions in your location.
- Smoke levels may change rapidly depending on weather conditions, including wind direction, and monitored data may not reflect current conditions.

This visual method of estimation can be used only under the following conditions:

- Humidity must be less than 65%. To find current relative humidity, go to the National Weather Service page at http://w1.weather.gov/data/obhistory/PANC.html
- Sun must be high in the sky - avoid sunrise or sunset.
- The limit of visual distance is determined by looking for distant targets - known landmarks such as mountains or buildings. A map or online map program must be available to determine the distance from the observer's location to the target.

Determining distance from your location to target locations / landmarks

- If you are located near National Weather Service offices near Ted Stevens International Airport, their weather page lists current visible distance in miles, so you may not need to estimate it. Go to http://w1.weather.gov/data/obhistory/PANC.html to find the header "Vis. (mi.)" for an hourly reading.
- A printed map with a key for miles may be the easiest way to determine distance from your location to your targets.
- Online map features vary. In Google maps, enter the address of a target location that is easy to view from your location. Right click at the target, and select 'measure distance' to determine the number of miles between the two sites.
- Some locations in the municipality that may be easy to use as visual targets:
    - Flattop parking lot (13101 Glen Alps Rd.)
    - TSIA traffic control tower (5200 W. International Rd.)
    - Dimond Center (800 E. Dimond Blvd.)
    - BP building (900 E. Benson Blvd.)
    - Mt. Baldy trailhead (12900 Golden Eagle Dr., Eagle River)
    - Seven Glaciers Restaurant at Alyeska (1000 Girdwood)

Basic approach

1. Select a target location that is in the direction of the sun.
2. Determine the limit of visual distance by selecting targets at known distances (miles). Choose a target that contrasts highly with its background, for example, a dark forested mountain viewed against the sky at noon.
3. The visual range, or distance, is the point at which the target is no longer visible due to smoke.
4. After determining the visual distance in miles, use the information below to identify actions to reduce smoke exposure.

Using your estimate of visual distance to reduce your smoke impact

- **Visual Range greater than 10 Miles**
  - Watch for changing conditions and moderate outdoor activity based on personal sensitivity
- **Visual Range 5-10 Miles**
  - **Healthy adult, teenager, or older child:** Moderate outdoor activity
  - **Age 65 and over, pregnant, or young child:** Minimize or avoid outdoor activity
  - **Persons with asthma, respiratory illness, lung or heart disease:** Minimize or avoid outdoor activity
- **Visual Range <5 Miles**
  - **Healthy adult, teenager, or older child:** Minimize or avoid outdoor activity
  - **Age 65 and over, pregnant, or young child:** Stay inside or in a location with good air quality
  - **Persons with asthma, respiratory illness, lung or heart disease:** Stay inside or in a location with good air quality

Other Considerations

Sensitivity to smoke can vary highly from person to person, and individuals can become more sensitive to smoke after extended periods of exposure. Individuals should pay attention to the advice of medical professionals and local health officials and adjust activity according to your particular tolerance or sensitivity.

Estimating visual range contains much uncertainty. This uncertainty stems from sighting on non-black bodies (e.g., green forested landmarks, snow-covered peaks), difficulty judging when an object is just barely visible, variations in the atmosphere and thickness of the smoke across the line of sight, and assuming the atmosphere remains constant after using an instantaneous “look” to assess conditions. This method is not effective in early morning or twilight hours when the sun is low on the horizon and should not be used during these times. Due to the uncertainties associated with estimating visual range, it is important to also use personal judgment when assessing smoke conditions.
The bottom line is that, no matter how far one can see, it’s always prudent to take extra care to stay inside or get to an area of cleaner air quality if smoke exposure is a concern.