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## Effects of Weather on Noise

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Airport Noise Programs Office receives many comments from citizens who notice that aircraft noise is much worse on one day versus another.

Generally, the amount of noise emitted from a particular jet aircraft during land, departure, or engine testing does not change from day to day, however, several factors may affect the sound level heard by a citizen at a given location. Noise propagation is a complex phenomenon that can be influenced by wind, temperature, cloud cover, fog, and topography also by man made barriers such as homes and buildings.

Noise is essentially a sound wave distributed in equal directions away from the source. Generally, noise levels decrease as the distance increases between the source and the receiver. However, the direction in which the sound waves travel can be altered by weather conditions, which may result in varying noise levels at the same location at different times. For example, cloud cover tends to bend sound waves downward towards the ground that can increase the sound heard by a receiver. Inversions, which occur when the air temperature increases as altitude increases, have the same effect on noise as does cloud cover. These types of weather conditions slow the atmospheric absorption of the noise waves and may cause jet aircraft noise to sound louder.

Wind is another factor that generally causes sound waves to bend in the direction it flows. Winds in the Puget Sound Region are generally from north or south, however, on occasion winds may flow from east or west. When this occurs, residents on either side of the flight track path may hear changes in noise levels. These differing weather conditions do not cover all the possibilities but provide an indication of how weather may alter the propagation of sound waves.