

## What is noise and how is it measured?

Noise is generally defined as unwanted sound. The noise in a given area may be comprised of a variety of sounds with different sources and intensities, and will vary greatly over time due to variations in the number, distance, and intensity of noise sources as well as ambient weather conditions. Noise is commonly measured in units of “decibels.” The scale to the right shows the typical decibel noise level associated with common, everyday sources, providing context for the noise impacts associated with the Great Northern Transmission Line Project discussed on page 2.



## How is noise regulated?

The Minnesota Pollution Control Agency (MPCA) has established standards for the maximum noise allowable in a certain area based on the type of activities occurring in the area. Because noise in a particular area varies greatly over time, the MPCA uses two noise metrics to set limits on outdoor noise levels:  $L_{10}$  and  $L_{50}$ .

**$L_{10}$**  represents the noise level that may be exceeded for 10% of the time, or for 6 minutes in an hour.

**$L_{50}$**  represents the noise level that may be exceeded for 50% of the time, or for 30 minutes in an hour.

As shown in the table below, the  $L_{50}$  nighttime limit for residential land use areas is the most stringent MPCA noise standard, limiting noise to 50 decibels in any location where the residential land use includes overnight lodging.

Time of Day	$L_{10}$	$L_{50}$
 <b>DAYTIME</b> (7am – 10pm)	65 decibels	60 decibels
 <b>NIGHTTIME</b> (10pm – 7am)	55 decibels	50 decibels

Source: MPCA 2008. A Guide to Noise Control in Minnesota: Acoustical Properties, Measurement, Analysis, and Regulation.

decibels

130



Rock Concert

120



Construction Noise

110

100

90



Typical City Traffic

80

70



Conversational Speech

60

50



Nighttime Urban Setting

40



Nighttime Rural Setting

30

20

10



Threshold of human hearing

## Do transmission lines make noise?

Transmission line wires produce noise under certain conditions. The level of noise produced depends on weather conditions, the condition of the transmission line wires and hardware, and the voltage of the transmission line. Transmission line noise is highest during light rain, dense fog, snow and other times when there is moisture in the air, and is usually described as a faint buzzing or crackling sound. In many cases, background noise from other sources such as wind, rain, and nearby traffic is greater than the noise from the transmission line, even in the least favorable weather conditions. During dry weather conditions, transmission line noise is typically barely perceptible.

## How much noise will be generated by the Project?

The figure below illustrates the predicted  $L_{50}$  noise on the ground beneath a typical 500 kV transmission line like the Great Northern Transmission Line during foggy weather conditions. The figure represents the noise attributable to the transmission line "in a vacuum" – ignoring any existing noise sources in the surrounding area, such as wind and traffic, and any obstacles in the path between the transmission line and the noise receiver, such as trees and buildings. The presence of other noise sources and obstacles throughout the project area will significantly lessen the perception of noise due to the Great Northern Transmission Line.

The curved shape demonstrates that the noise attributable to the transmission line decreases as the distance from the wires located in the middle of the right-of-way increases. To provide some context for the transmission line noise shown in the figure, the typical noise levels from the chart on page 1 are also included in the figure.

When existing noise sources and obstacles in the surrounding area are factored in, the additional impact of the transmission line noise is expected to be negligible and Minnesota Power does not expect the Great Northern Transmission Line to contribute to noise levels in excess of the MPCA noise standards at any location inside or outside of the right-of-way.

## Transmission Line Noise

