

The goal here is to present information regarding noise levels effects on livestock, with notes on how noise intensity is measured, noise over distance, and common sources.

Two papers which pulled from numerous professional publications on noise effects on animals and livestock are attached, along with a university publication on noise in milking operations.

University of Wisconsin Ventilation Fan Noise in Dairy Buildings discusses acceptable noise level standards for dairy milking operations. It indicates that “good” farms are able to keep noise in the 70-75 dB range.

The Role of Sound in Livestock Farming—Selected Aspects: Includes charts describing the most important effects of sound and noise on different species of livestock (at end of paper).

Effect of Noise on Performance, Stress, and Behavior of Animals: “compares the results of previous studies on noise assessment, in particular housing situations and to demonstrate the impact and significance of the noise problem for farm animal welfare, housing, design and management.”

Noise intensity is measured in decibels (dB). It appears that 70 dB is a benchmark or standard of sort for noise in agricultural operations. The papers describe various effects on livestock at levels of 75-90 dB and higher.

The higher dB noises can cause behavioral and physiological changes that vary across species. Depending on the noise level, frequency, and species, changes can include things such as: decreased foraging and feed intake, decreased weight gain, increased heart rate, stress responses including hormonal changes and decreased milk quality, and difficult handling. Sudden loud noises might cause flight, biting or kicking.

Research indicates animals adapt well to common and consistent noises in the environment. For example, cattle adapt on pastures next to highways, or near tractors and farm machinery. The US Department Transportation has a National Transportation Noise Map that shows dB levels of highways all over the country. Highway 71 south of Maryville is shown to experience dB levels of 45-69 dB throughout the day. <https://maps.dot.gov/BTS/NationalTransportationNoiseMap/> .

Low frequency (long wave) humming sounds emitted from equipment such as fans and generators can travel long distances depending on environmental factors and obstacles in the terrain. The reduction of noise over distance is called attenuation. The formula used to calculate reduction of sound is inverse square law. There are calculators available where you can input the source sound dB level, an initial reference distance, then a distance in which to estimate the reduction in dB. A simple calculator is available at AZCalculator.com:

<https://www.azcalculator.com/calculators/decibels-distance-calculator>

Examples:

Calculate Target Decibel Level (L_2)

Initial Decibel Level (L_1) (dB)

Reference Distance (R_1)

Meters ▾

Target Distance (R_2)

Meters

Calculate

Reset

Calculation Results

The Target Decibel Level (L_2) at the new distance is: 46.02 dB

Calculate Target Decibel Level (L_2)

Initial Decibel Level (L_1) (dB)

Reference Distance (R_1)

Meters ▾

Target Distance (R_2)

Meters

Calculate

Reset

Calculation Results

The Target Decibel Level (L_2) at the new distance is: 40.00 dB

× [Geographic Reference](#)

Noise impacts on Livestock
Tom Patterson, Nodaway County Health Center

Examples of decibel levels with common sources:

Decibel level (dB)	Source>
140	Threshold of pain: gunshot, siren at 100 feet
135	Jet take off, amplified music
120	Chain saw, jack hammer, snowmobile
100	Tractor, farm equipment, power saw
90	OSHA limit — hearing damage if excessive exposure to noise levels above 90 dB
85	Inside acoustically insulated tractor cab
75	Average radio, vacuum cleaner
60	Normal conversation
45	Rustling leaves, soft music
30	Whisper
15	Threshold of hearing
0	Acute threshold of hearing — weakest sound

Every 10 dB increase represents a 10× jump in sound intensity — and a perceived doubling of loudness.

<https://commercial-acoustics.com/sound-advice/decibel-level-chart/>

70 dB sounds twice as loud as 60dB,

80 dB sounds about four times louder than 60 dB,

90 dB sounds about eight times louder than 60 dB.

<https://extension.missouri.edu/publications/g1962>

Note:

Some entities specialize in modeling and assessments for data center planning such as LSARS

<https://www.lsars.com/>

These can offer community dashboards and advanced modeling of current and projected health factors and risks down to zip code level in instances, plus assistance. There is a demo of a health and risk modeling assessment on their website.