|  |  |
| --- | --- |
| [Homepage](http://docs.google.com/homepage.htm)  [Abstract](http://docs.google.com/abstract.htm)  [Introduction](http://docs.google.com/introduction.htm)  [Review of the Literature](http://docs.google.com/research.htm)  [Statement of the Problem](http://docs.google.com/problem.htm)  [Hypothesis](http://docs.google.com/hypothesis.htm)  [Materials](http://docs.google.com/materials.htm)  [Procedure](http://docs.google.com/procedure.htm)  [Results](http://docs.google.com/results.htm)  [Recommendations](http://docs.google.com/recommendations.htm)  [Acknowledgments](http://docs.google.com/acknowledgements.htm)  [Daily Log](http://docs.google.com/biolog.htm)  [Images](http://docs.google.com/images.htm)  [Works Cited](http://docs.google.com/workscited.htm) | Page 3  There are many documented reports of sound having an influence on animals also. Products are being advertised to keep animals off the roads and lower road-kill. High frequency, high decibel sounds would be emitted from the road to keep animals from ever coming near the road in the first place. (13) Gophers are kept out of yards by placing high frequency sound emitters around the perimeter of the yard. Sound, however, does more than just keep animals away from a given area. Sound has been frequently documented to not only deter animals, but to inflict bodily harm upon them. The United States Navy has invented a new device that could detect the quiet submarines that stick close to shore. Old ways of detecting submarines could not detect these submarines. (14) This new plan is called Low-Frequency Active Sonar or LFA, and was planned to be deployed in 80% of the world's oceans. The system is based on the fact that very low frequencies, such as frequencies between 100Hz and 1000Hz, can travel great distances, especially underwater. (14) LFA would employ these low frequencies at incredibly high decibel level in the range of 235 decibels or higher. (14) (See diagram 6) This level is 200 billion times greater and more intense than any noise known to already disturb whales and other marine species. (14) (15) Early in 2000, four different species of whales and dolphins suddenly started beaching themselves in the Bahamas. (15) A report released by the United States Navy and the National Oceanic and Atmospheric Administration confirmed for the first time that the mass-stranding was caused by a Navy battle group using mid-frequency range active sonar in the area. (15) The mid-range active sonar is billions of times less harmful than the LFA system the Navy is trying to implement. Divers are harmed at the 160 decibel level which is millions of times less intense than the 240 decibels proposed. (15) Whales start avoiding areas with sounds ranging from 110 decibels to 120 decibels. (16) Several studies show that gray whales slow down and move around the sound source, even if it means moving into shallow surf zones, and their respiration rate increases. (16) Scientists have shown that sounds can cause sperm and humpback whales to cease vocalizing. (15) These vocalizations are incredibly important in the whale's survival. The sounds can also mask vocalizations from other animals which the animals depend on. (16) This could help explain why after a period of low frequency sound, lone calves are found when their mothers are normally close at hand. (15) The sound blasts can cause migratory whales to become very disoriented. (15) Whales have sensitive hearing that they use to follow migratory routed, locate one another, find food and care for their young. (15) Noise that keeps the whales from being able to hear threatens their survival. The sound also creates physiological damage to a marine mammal's auditory organs. All of the beached whales found had massive hemorrhaging in their ears, presumably from the intense vibrations produced by the low frequency sound. (16) These sounds can also damage the hearing organs enough that the whale can no longer hear, eventually leading to the death of that animal. (15) Gordon and Moscrop state that underwater sound cause direct tissue damage. (16) Especially vulnerable are animals that have air filled lungs since there is a large difference between the air filled lungs and the body tissues. (16) Sound also can create micro-bubbles that can block capillaries, creating disastrous effects. (16) Fish and other marine species are effected by noise pollution. (16) All of these effects have been measured with levels at least 5,000 times less intense and 70 times less pressure than the LFA system would use.  It comes as hardly a surprise, then, that plants are also affected by noise in their environment. In 1973, a woman named Dorothy Retallack published a book called The Sound of Music and Plants. (11) Her experiments dealt with the way plants responded in their growth patterns to a constant tone or a broken tone. (11) Not surprisingly, she found a great difference in the outcome depending on the frequency she used. (11) Not all sounds, however, seem to be detrimental to the organism listening to it. The myth of plants that are talked to growing better gains credibility as groups like Baroque Bouquet come out with CDs titled "Plant Music: Music to make Your Plants Healthy and Happy." (12) There have been many studies at The Center for the Neurobiology of Learning and Memory at the University of California, Irvine that now confirm what is known as the "Mozart Effect." Apparently there is something about Mozart's melodies and intricate harmonies that stimulates the brain, especially that of younger children. Jacques Cousteau observed that when Mozart was played to fish, they flocked toward the sound and swam in a circle. There is no evidence stating that Mozart can't have that same effect on plants.  There is evidence of sound being both harmful and helpful to living organisms. The sound vibrations, therefore, can have a negative or a positive impact on life, depending on the frequency and decibel level. This negative or positive effect may or may not apply to plants, but there is no concrete evidence at this time to suggest either. |