

THE SILENT MENACE

Wind turbine infrasound: What you can't hear can hurt you

Part 2 of 2

INFRASOUND IS CLASSIFIED AS ANY noise with frequencies less than 20 Hertz (twenty cycles per second), the typical lower limit of human hearing. The previous article in this series discussed hazards of infrasound exposure over extended periods of time, whether people are aware of the source or not. This follow-up article explores the potential for damage to pets and wildlife, and wraps up the infrasound discussion with a factual look at the U.S. President's recent controversial comment that the noise from industrial wind turbines can cause cancer.

It is at the cellular level where cancer occurs and where infrasound is believed to cause damage, possibly even down to the DNA level. One of the more curious reports along these lines came out of Denmark in 2014, when a breaking news story from the World Council for Nature went viral, and newspaper headlines around the world reported that 1,600 minks on a Denmark farm were born prematurely, most stillborn¹. Scientists researching the phenomenon were unable to link the mass deaths to disease or toxins. The only unique factor they found was that the incident occurred after four industrial wind turbines were placed 328 meters from the farm. If the wind turbines were the cause, it is unknown whether the birth defects were the result of infrasound vibrations affecting fetal cells during mitosis or whether the harm was due to electrical effects from the wind tur-

bine cables buried in the moist ground nearby. Such a report raises questions concerning harm caused to wildlife and especially to their developing young. Moreover, a concern that is in need of resolution is the effect that infrasonic vibrations might produce on pregnant humans, as well as the effects on pets and livestock.

According to Hearing Health USA website, scientific studies show that out of the ten animals known to possess the most sensitive hearing, three of those species are dogs, cats, and horses². Considering the tendency to put wind energy developments on rural lands, where such animal partners are prevalent, it is possible that humankind's domesticated animals may also suffer, especially when one realizes that infrasound is a human designation based on what sound frequencies are audible to our ears. What has been classified as infrasound can be quite audible to animals with a hearing spectrum wider than our own.

In reference to laboratory animals, U.S. Animal Welfare Act regulations fail to address noise, but the Institute for Laboratory Animal Research *Guide for the Care and Use of Laboratory Animals* provides recommendations for considering noise control when designing and operating animal facilities³. Back in 1996, a researcher at Merck Research Laboratories provided evidence that rats who were unintentionally exposed to infrasound (due to a malfunctioning ventilation system) suffered from a variety of effects. Dr. Sherri Motzel cited clear-cut effects of sound on response to drug treatment, water intake, blood pressure, reproduction, glucose metabolism, and

immune function. One study conducted at Merck Research Laboratories by Dr. Motzel and her colleagues demonstrated that infrasound in the range 1-10 Hertz was responsible for weight loss in rats in the study. This study and other reports in the literature indicate that much more emphasis should be placed on monitoring and controlling noise levels at multiple frequency and intensity ranges outside human hearing ranges in animal facilities because of the potential for adverse effects on study data and outcomes⁴.

Many animals are known to be able to hear infrasound, such as cows, cuttlefish, ferret, goldfish, horses, octopi, pigeons, rock doves, squid, and whales. Likewise, not only are some animals able to hear infrasound frequencies, but certain species such as alligators, elephants, giraffe, hippopotamus, okapi, and rhinoceros use infrasound frequencies in their communications. When a record-breaking twenty-nine sperm whales beached themselves on North Sea shores in 2016, Utrecht University in the Netherlands performed studies into the cause of the deaths. Natural and unnatural (i.e. manmade) factors were explored, but manmade trauma was limited to possibilities of entanglement, ship-strikes, ingestion of plastics, or chemical pollution⁵. Industrial wind turbine infrasound was never considered for the fatal strandings despite the fact that many of the whales died in view of massive offshore wind turbines.

Important honey bee communication takes place between 12-13 Hertz⁶. How the production of infrasound from wind turbines might effect their ability

to communicate directions may represent a threat to bee populations and pollination and needs to be investigated. There are no shortage of studies by the World Health Organization that warn of the health consequences of audible noise damage⁷, but if a certain species is unable to hear infrasound noise, they may still be vulnerable to adverse effects: infrasound produces vibrations in the inner ear canal that causes stress to the brain. Moreover, as the mink farm in Denmark may have indicated, vibrations occurring at a cellular level might interfere with the normal reproduction of cells and produce birth defects.

Many animals, including humans, can be vulnerable to the ravages of cancer, and in this current century, scientists have pinpointed many newly suspected causes of the disease. When President Donald J. Trump suggested in a speech, on April 2, 2019 (at a Republican fund raising event) that infrasound can cause cancer, newspapers nationwide had a field day with that comment⁸, soundly suggesting that no such evidence has ever been gathered or surmised, and that the President's comment was an unfounded attack on "green" wind energy. But was it?

An unclassified military study conducted in Portugal over a 20-year period was titled, *Low Frequency Noise: A Major Risk Factor in Military Operations*⁹. It is noteworthy that there is no question mark punctuating the end of that title. According to that medical study, 70% of individuals are susceptible to the development of Vibroacoustic Disease due to the cumulative effects of noises below the threshold of human hearing. Such adverse effects have been especially documented among pilots and other members of flight crews, who are continuously exposed to infrasound noise from the spinning of jet turbines or propellers. Moreover, according to that report, low frequency noise can trigger early aging processes and is not uncommonly responsible for forcing flight crew members into early retirement.



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Some cases cited in the Portuguese study included data showing that 10% of workers who were regularly exposed to infrasound in an aeronautical plant developed late-onset epilepsy, which is a rate that is fifty times higher than what would be diagnosed in a general population. Using electron microscopy studies, researchers found that among infrasound exposed populations, low frequency noise damage appears to target the respiratory system, causing bronchitis, recurring infections of the oropharynx, and pleural effusion. Furthermore, high resolution CT scans identified atypical instances of lung fibrosis among non-smokers. Likewise, cardiovascular diseases represent a significant threat from infrasound where the thickening of the pericardium is known as a hallmark of Vibroacoustic Disease. That thickening acts like a blanket that covers the walls of major blood vessels, pericardia, aortic and mitral valves, and carotid arteries, diminishing their effectiveness.

But what about the claim of cancer caused by infrasound noise as suggested by POTUS? The Portuguese military study went on to claim, "*The genotoxic component of LFN [Low Frequency Noise]*

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has already been demonstrated in both animal and human models." The medical term "genotoxic" refers to toxins (carcinogens, mutagens, and teratogens) that cause damage to DNA, which in turn may produce cancer, birth defects, and other genetic mutations. Specifically, when it comes to cancers caused by infrasound, low frequency noise-induced tumors have been identified in squamous cell carcinoma in the lungs, and similarly infrasound-induced cancerous tumors have been found in hollow organs such as the bladder, colon, kidney, and larynx, since hollow organs are more affected by vibrations and suffer worse. The report also stated, "*Lupus is a common observation among LFN flight attendants and other LFN-exposed populations.*" Military studies conducted in the U.S. add credence to the study from Portugal.

Corporations that profit from the wind energy industry claim, with some measure of justification, that there is limited evidence pointing to the adverse health effects of infrasound noise from industrial wind turbines. However, what they fail to mention is that a plethora of evidence exists on the pathogenic effects

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Hawks Valley with the goal of reaching the big playa of Hawksy Walksy before returning to pavement. Expect significant driving on rough roads, intriguing volcanic formations, raptors, expansive views, and to be very much alone. Limit 12. Contact leader: Dave Oline olined@sou.edu (541) 552-1195

RETURN TO CROOKED CREEK FIELD STATION (E/S)

White Mountains, CA

Thursday-Sunday morning

September 26–29, 2019

Did you miss the chance to stay at the high elevation research center last August? We will return this year in September with three nights at Crooked Creek Field Station, 10,200', ten miles south of the Patriarch Grove in the White Mountains. \$70 per person per night includes a bed in either the station dorm or rooms if available (bring sheets/sleeping bag) and three amazing meals a day cooked by their professional chef. Activities include lounging, hiking, bristlecone groves, and an outdoor fire pit at night. Fall colors and a new moon will be an added bonus. Limit 15. Anyone is welcome to sign up, but first preference to Desert Survivors members who did not attend Crooked Creek weekend in 2018. Contact Leader: Michael Wells (530) 367-4372 michaele-van@sebastiancorp.net

DESERT SURVIVORS 2019 ANNUAL GENERAL MEETING (E/M)

Sugarloaf Ridge State Park

Kenwood, CA

Friday-Sunday

October 11–13, 2019

This year we will host the AGM retreat at Sugarloaf Ridge State Park, one and a half hour's drive north of Berkeley. Adventure and exploration await in the stunning Valley of the Moon, known not only for its wineries but also for a number of points of historic interest, including Jack London State Historic Park where author and bohemian adventurer Jack London lived and wrote at his pristine Beauty Ranch. Ample opportunity for hiking, cycling, wine tasting. More information to come. Contact Activities Director: Marisa Seaman: seaman.marisa@gmail.com

LONESOME MINER TRAIL BACKPACK (OPEROSE)

Inyo Wilderness, California

Friday-Thursday

Oct 25–31, 2019

We will begin at the Pat Keyes trailhead in Owens Valley on Thursday and will traverse the Inyo range, dropping into and climbing out of several of the canyons in the range, eventually coming out in Saline Valley via Little Hunter Canyon. All of the canyons have historic mining trails, mills, and sites, and we will explore many of them. There is water, but you must be able to carry a 2-day supply. Option to spend Halloween at Saline Hot Springs. Car shuttle required. Limit 6. Contact Leader: Stacy Goss stacy.goss@comcast.net

FALL MEETING OF THE SIERRA CLUB DESERT COMMITTEE (E)

Saturday-Sunday

November 9–10, 2019

The Sierra Club Desert Committee will feature presentations and discussions on a wide variety of issues toward preserving our deserts as vital wilderness. All Desert Survivors are encouraged to attend; the general public is welcome. No limit. Notification will be sent when the date and location have been determined. Contact Stacy Goss stacy.goss@comcast.net

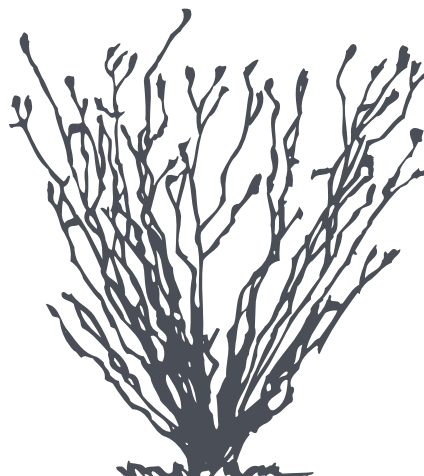
CHRISTMAS HOLIDAY PARTY (E)

Oakland, CA

Saturday

Dec 7, 2019

It's that wonderful time of year when friends and family get together to celebrate the holidays. Join us for our annual holiday party to meet old and new members, share food, add or get rid of old gear at the auction, and meet the new board of directors. Contact Hostess: Cathy Luchetti cathy-luchetti@gmail.com



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of infrasound from other sources, and that wind turbines produce infrasound in the same frequency range as these other sources. The key to researching the dangers of wind turbines then is to research what is already known about the health effects of infrasound (low frequency noise) to exposed subjects in fields such as aviation, and to study the symptoms and sources of Vibroacoustic Diseases in general.

On the basis of the evidence presented in these two articles, it is reasonable to be concerned about the adverse effects on human health that are caused by wind turbine infrasound. In matters of land planning where consequences to the environment are anticipated, it is usual that projects are rejected only if negative effects have been demonstrated. Such a policy is in contrast to the way in which medical devices and pharmaceuticals are approved. When human health is involved, the FDA does not license a product until its safety has been demonstrated. Because infrasound may have serious consequences on human health, it is appropriate that approval of wind turbine facilities be proactive: safety must be assured before permits are awarded.

The references cited above all are given (with links) in the NOTES section of the website for *Desert Report* (www.desertreport.org). This section also includes an extension of this article reporting on a rather detailed 2018 report by the World Health Organization concerning health effects attributable to infrasound from wind turbans.

Dr. Donald Allen Deeever is a former park ranger, science teacher, flight instructor, freelance journalist, and PhD with majors in nursing education, software development, and writing pedagogy. He recently helped defeat the Crescent Peak Wind project in Southern Nevada, one of the most misplaced wind energy developments in history. He and his wife live in Searchlight on their own ten-acre nature preserve.