

10th Grade Student
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Abstract

Most people wouldn't expect there to be an electrical current running through a stream. To prove that there is a harmful electrical current in our creeks, I asked the question, "Is there an electrical current in our streams, and does it have negative effects on the living things in or near a stream?" In my opinion there is an electrical current running through our streams, and it is harming the living things in and near them. The first thing I did was found out everything I could about my topic using the internet. Then I tested the stream near my school for the amount of current that was running through it. I found 1.088 volts AC with 74.5 milliamps flowing in the stream. That is 931 times more current required to stop a human heart and 1241 times more current required to stop a dogs heart if the current were to pass directly through them. (Riley) The electrical current harms everything from humans, cows, and frogs. I found out that there should not be any alternating current in a stream.

Introduction

Two years ago my aunt was diagnosed with Multiple Sclerosis (MS). Her symptoms included numbness, double vision, fatigue, loss of taste and smell, sleep disturbances, and memory loss. Now it has been determined that her symptoms were the results of electrical pollution, not MS. The school that she teaches at and her home were tested for electrical pollution. The oscilloscope readings showed the amplitude of high frequency readings riding on the utility supplied 60-cycle waveform was over 150 milli volts at a frequency of 25 kilohertz. The numbers should have been zero. An electrical consultant came into her school, did some testing, and put filters into the outlets that removes or reduces the high frequency events on the wires. Now that there are filters in her home and school she is completely symptom free from her diagnosed illness.

I became curious about electrical pollution because of my aunt's situation. Then I started researching more about it. Not only does electrical pollution effect humans (Neal Cherry), it also affects cows (Hillman, Stetzer). My assumption is that frogs are also affected by electrical pollution.

Methods and Materials

Mr. Dave Stetzer, a power quality expert, travels the world measuring power quality and ground currents. He supplied the equipment, and his knowledge about how electricity works. Electricity can be confusing to many people, but Mr. Stetzer showed and explained the seriousness of ground currents in a way that I could understand.

We tested the stream behind the high school on Sunday, December 14. Testing at

8:30 on a Sunday morning would be considered a low time for electrical usage. When school is in progress and people are up and doing their normal daily routine, the levels of electricity will read higher. It was a cold, snowy day. The stream was frozen over, so we had to break the ice in two places. Two holes were broken 100 feet apart in a narrow part of the stream. To measure the amount of current in the stream we hooked one wire to two shunts (3 ft. by 3 ft. piece of metal, mesh wiring). Then we ran both wires back to a 12.47-volt battery. A special clamp on amp meter was then used with a Tektronix 720 P oscilloscope to measure the amount of DC current that was flowing between the battery posts. By knowing the current and the voltage we could then calculate the resistance of the stream. (Ohms Law) After that the wires from the shunts were connected to a Fluke 105B Oscilloscope. The oscilloscope measures and displays the voltage waveforms in the stream. By knowing the impedance, or resistance of the stream and now the AC (Alternating current) voltage we could then use Ohms Law to calculate the amount of alternating current that was flowing in the stream. Initial calculations of the amount of current in the stream were very high. We questioned the accuracy of this meter. We tried two other similar meters that displayed the same information as the first. We were surprised to see the magnitude of the meter reading, but the first reading was accurate. The levels were much higher than expected on a quiet, Sunday morning. I find myself asking two questions. What is the current doing in a stream? What effects is this electrical current having on people, cows, and frogs?

Hypothesis

The electrical currents in the stream are harming the people, cows, and frogs.

Research

The formula used to find voltage is $V = IR$. (Ohms Law) V stands for voltage, I stands for current, and R stands for resistance. The 12.47-volt battery represented the voltage applied to the shunts in the stream, the amp meter measured the applied current, and thus the resistance between the 2 points could be calculated.

In 1992, the electric companies put ground rods into every electrical pole throughout the states of Minnesota, Wisconsin, Iowa and several others. The ground rods allowed electricity to travel on the ground rather than on the neutral wire. By 1998 seventy percent of electricity was through or on the earth back to the substation. (EPRI and Minnesota Science Advisory Report) In 1995, deformed frogs were being discovered throughout Minnesota.

Research has been done for possible reasons for the deformity of frogs, such as chemicals, pesticides, ultraviolet lighting, and parasites. Some of the malformations include missing limbs, extra limbs, partial limbs, skin webbing, malformed jaws, and missing or extra eyes. This has been studied since 1995. Nine years have passed, and the researchers are no closer to an answer to why the frogs are deformed.

I again ask a question. Could the electrical current be causing these malformations? The levels we measured of electrical current found in this creek are dangerously high. Therefore, I think there is enough empirical evidence that these high levels of electrical current should be investigated further.

In 1995, Dahlberg and Falk observed cows in dairy barns. They found that the cows were suffering from a variety of health problems. It ranged in seriousness from twitching muscles, falling to the floor, and some even died immediately. Many farmers have filed lawsuits against the electrical companies because of this. What once was commonly called stray voltage is now known as a ground current problem.

The demand for electricity keeps increasing from year to year. That's why more ground rods have been put into the electrical poles. Poles to lower the primary neutral voltage. (Wisconsin Public Service Commission) It is also why electrical pollution is becoming a greater problem. According to studies done by Mr. Stetzer and Dr. Martin Graham, Professor Emeritus at UC Berkeley, people with poor wiring and no filters are experiencing unnecessary symptoms. Some symptoms include headaches, fatigue, dizziness, sleep disturbances, memory loss, and numbness. These symptoms are associated with the diseases of the 80's and 90's. They include fibromyalgia, chronic fatigue syndrome, ADD, ADHD, birth defects, and miscarriages. (Dr. Robert O Becker)

Summary

While investigating this problem of electrical pollution I find it to be a very serious concern. I have also discovered that the solutions are simple and inexpensive. These solutions include a bigger neutral wire, or another neutral wire, and reducing the number of ground rods from the electrical poles. The NESC (National Electrical Safety Council) already has set codes, but they are not being enforced. One NESC Rule, 92D, states that there shall be no objectionable flow of current over the grounding conductor. To further help humans the installation of filters are needed to reduce the levels of electrical pollution. These filters are simply plugged into the outlets throughout your home and work place. The filters will then reduce the amount of electrical pollution being forced upon a person's body. I have personally seen the positive results of people who have filtered their homes and work place.

It would be interesting to compare the results that I found on a quiet, Sunday morning to a busy school day. Based on what I have learned, I would expect the readings to be much higher.

I am 15-years-old, and I have personally found endless information on the health concerns associated with electrical pollution. World famous doctors, physicists, and ordinary people experiencing amazing results document the above concerns. There is too much information and empirical evidence about electrical pollution to sit back and do nothing. Something needs to be done now!

Sources

NESC- National Electrical Safety Code Rule 92D

Current in grounding conductor ground connection points shall be so arranged that under normal circumstances there will be no objectionable flow of current over the grounding conductor.

Dave Stetzer - Power Quality Expert, Electrical Consultant

EPRI - Electrical Power Research Institute
Minnesota Science Advisory Report
70% of current returns via the ground

J. Patrick Riley - Applied Bioelectricity

The smallest current having an observable effect- that of heart rhythm disturbance- occurred at 60 micro amps in dogs, and at 80 micro amps, in humans.

D. Hillman, D. Stetzer

Monitoring Electrical Power Quality: Effects on Milk Production and Behaviors of Dairy Cattle

Dr. Robert O Becker

Cross Currents and The Body Electric