

Illuminate

The Effects of Light Pollution on the Natural World

Throughout this symposium class, we have researched the effects of light pollution on the rest of the ecosystem. The aim of this course is to take steps towards making Kirksville an International Dark Sky Community¹, which requires following specific guidelines including: having a specific amount of shielded lights, restricting the amount of unshielded lighting, restricting illuminated signs, limiting the the emission of short-wavelength light, and other light-related regulations.

In this course, we went out into our community and analyzed any potential problems with the lighting. Every student counted the amount of shielded, unshielded, and repurposed lights, as well as the kind of light. We were then assigned to make a map of this lighting on a certain section of campus. We were also split into different teams that allowed us to analyze light pollution from many different angles. I was assigned to Science Team II, which was focused on learning the specifics of how light pollution could affect ecosystems, especially nocturnal animals, such as insects. For more information, we were asked to come up with questions for a professor who dealt with insects and their relationships to their ecosystems. Most of these questions were along the lines of, “How much could light pollution disrupt ecosystems in the coming years?” and “In what ways would light pollution be a threat to the already decreasing populations of insects?”

Dr. Laura Fielding, a professor of biology at Truman, told us that since light pollution is a relatively new subject of interest, there are not many studies on the matter. She explained that it would be hard to quantify the impact light pollution could implement on ecosystems, especially since it is a new perspective of analyzing our world that has not been delved into by the scientific community. That being said, she did offer us some excellent information about how certain insect populations have been decreasing over the last few decades with the rise of

1. <https://www.darksky.org/our-work/conservation/idsp/communities/>

pesticides and other chemicals. It is possible that light pollution also has been responsible for these decreasing populations. Light pollution is already known to affect bird migration; birds, like insects, are attracted to lights. The hazard of this during migration is that birds will fly towards lights in cities, and then will collide against buildings. They can also get trapped flying in circles around the light sources and waste precious energy, which they need in order to successfully complete their migration.

One piece of information that stuck out to me was how moths could be affected by light pollution. When you think about insects and lights, you most likely think about moths. Moths are drawn to light at night because scientists believe that they interfere with the insect's internal navigation systems, since some insects fly at a constant angle to a distant source light, which originally would have been the moon. However, because of human technology, they are attracted to street lamps and other human light sources, which traps them as they fly around and around them, unable to escape. Since moths are nocturnal pollinators, this could also impact certain plant populations, as well as the moths themselves, since they would be unable to mate and as a result, produce smaller moth populations.

This inspired me to design an experiment on the effect of light pollution on the activity of moth pollination versus the amount of light pollution in their environment. In this experiment, there would be two plots of land, one that is affected by light pollution as seen in Kirksville, and the other would be one not affected by light pollution. Both areas would be set up so that plants that are pollinated by moths are plentiful and in good health. Each area will be controlled to be as similar as possible to each other except for the differences in light pollution. Then, they will be surveyed with wildlife infrared cameras in order to observe their activity, and the results will be recorded. This experiment will then be repeated many more times in order to get consistent results. After that, these results will be compared and analyzed, and we will be able to get an idea of how exactly light pollution affects moth pollination.

In this course, I learned a great deal about how light pollution can affect humans, plants, and animals. In order to slow this impact, I think the continuation of this course would be beneficial to decreasing light pollution in Kirksville. To continue my research into light pollution, I expect to join the Stargazer's group here at Truman, since astronomy has always been an interesting subject for me. For now, I think it is important to spread awareness about light pollution in order for further methods to be implemented to restore our skies.