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Class

Writing Skills for Environmental Professionals

Assignment

Science Story

Title

Can Painting a Single Wind Turbine Black Reduce Bird Mortality?

Date

December 2020

Imagine, just for a second, that you've been granted a superpower: the ability to fly. You take off from your home and spread your arms wide, looking at the ground as you soar in circles and feel free, free as a bird. But suddenly, a large, hard, metallic object comes out of nowhere, striking you in your shoulder and knocking you from the sky. You hurdle to the ground, never to soar again.

While this imaginary scenario might sound like a fantasy-turned-nightmare, it's an immense problem for thousands of birds each year.

The large, metallic objects—wind turbine blades, heralded by many as the key to weaning the world off fossil fuels—present deadly hazards to bald eagles, migratory songbirds, and even the endangered California condor. Birds are unable to see the deadly blades and are often struck mid-air. Sometimes they are killed on impact and sometimes their wings are damaged, either way if they've been hit their days are numbered. Birds that cannot fly are unable to find shelter, food, or evade predators.

However, there is hope. A new study published in the journal *Ecology and Evolution*¹ by researchers from the Norwegian Institute for Nature Research in Trondheim found what could be a simple solution to this problem: painting a single turbine blade black.

While researchers are unsure exactly why these birds are unable to perceive these massive, 100-foot blades, it is thought that the motion blur created by the white blades' constant movement makes it difficult for the birds to distinguish them against similarly colored backgrounds. Painting even just one of the turbine blades black creates enough of a visual discrepancy that the bird sees it in time to avoid a collision.

Investment in renewable energy projects, such as wind turbines, has increased in recent years as the effects of global warming resulting from fossil fuel consumption become increasingly evident. But renewable energy does not come without its drawbacks: nuclear power risks dangerous meltdowns such as the 1986 Chernobyl disaster, solar energy panels require precious minerals that use questionable labor practices or damage ocean ecosystems—and wind turbines pose significant threats to birds. Renewable energy sources can still negatively affect the environment, and steps should be taken to reduce these negative impacts.

According to the U.S. Fish & Wildlife Service, the federal agency in charge of managing natural habitats, collisions with wind turbines result in 140,000 to 500,000 bird deaths each year². And as renewable energy produces a higher proportion of the nation's energy in the years to come, those numbers are expected to rise dramatically. This makes the need to mitigate bird collisions all the more urgent.

Bird collisions have caught the attention of advocacy groups such as the Audubon Society, which advocates for wind power³—provided they are carefully located outside of known migratory corridors. Yet it's not just avid birders that should take note of the bird deaths. Many high-flying species, such as the turkey vulture and the bald eagle, play important roles in the food chain. Others, such as hawks and falcons, are responsible for controlling the rodents humans typically consider pets, while countless average citizens look forward to the migratory songbirds that appear in backyards everywhere in the spring and autumn months.

The Trondheim study expanded on a 2003 paper⁴ by researchers from the University of Maryland, which found that birds were able to perceive differently colored wind turbines more effectively in a laboratory setting.² The Norwegian researchers were the first to test the previous findings in real-world conditions and found a significant reduction in raptor collisions—birds of prey that would typically circle high in the sky—after altering the color of the turbine blades.

While the initial results of the study have proved promising, there are several hurdles to overcome. The Federal Aviation Administration requires turbines to be painted light colors so that they are more clearly visible to airline pilots, requiring additional research to identify colors that can be perceived by both humans and birds. The Trondheim researchers also note that painting existing turbines requires a significant investment of time and resources, which would be reduced if the blades were painted prior to installation.

It is difficult to generate power without unintended consequences, but as renewable energy represents an increasing share of our electricity generation, mitigation measures should be implemented to ensure that the impacts on humans, wildlife, and the environment are as small as possible. For wind turbines, that fix is simple: changing the color of a single blade helps save one of the animal kingdom's most impressive superpowers.

Works Cited

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