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Light Pollution Can Impact Nocturnal Bird Migration

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Heard on **All Things Considered**

NELL GREENFIELDBOYCE

A new study of how birds react to the annual light tribute to September 11th in New York City provides compelling evidence for how artificial light can disorient large numbers of migrating birds.

ROBERT SIEGEL, HOST:

Right now we're in the peak of the fall migration season. Billions of birds are making their way south. Many species travel at night, and a new study shows how artificial light can affect their journey through darkness. NPR's Nell Greenfieldboyce reports.

NELL GREENFIELDBOYCE, BYLINE: This time of year the night sky is full of birds.

KYLE HORTON: Sparrows, warblers, thrushes, grosbeaks, tanagers.

GREENFIELDBOYCE: Kyle Horton works at the Cornell Lab of Ornithology. He says flying at night makes a lot of sense.

HORTON: These birds are effectively running or flying marathons through the air space. And it's cooler at night. The air space is calmer.

GREENFIELDBOYCE: And there's fewer predators. The night travelers navigate using the stars and landmarks like rivers and coastlines. As they look down at the world below, they also see bright lights. Horton says there's evidence that birds can sometimes be drawn toward them.

HORTON: Things like a low cloud ceiling or fog paired with light, that really disorients migrants.

GREENFIELDBOYCE: But this hasn't been studied much, so he decided to do a kind of opportunistic experiment using some really powerful, unique lights. Each year on September 11, New York City has something called the Tribute in Light. To remember the lives lost in the Twin Towers, two vertical columns of light are created by searchlights.

HORTON: The lights that you would see maybe one or two, let's say, for a grand opening of something. And we're talking about 88 of those pointed skyward. The magnitude of the light is in many ways overwhelming.

GREENFIELDBOYCE: It's been known for years that this draws in migrating birds. They circle around in the beams. If volunteers on the ground see more than a thousand, the tribute gets turned off for about 20 minutes. But Horton and his colleagues used radar data and found many, many more birds than the volunteers could see.

HORTON: What we're detecting on the radar are estimates of hundreds of thousands of birds.

GREENFIELDBOYCE: More than a million birds were affected over the seven nights in the study. The results are described in the Proceedings of the National Academy of Sciences. Jeffrey Buler is a researcher at the University of Delaware who also uses radar to study bird migrations. He says the sheer number of birds affected by this light display is surprising. So was the way the birds quickly scattered into the night whenever the lights got turned off.

JEFFREY BULER: The figures from the paper are just amazing where they show when the lights are on and when the lights are off and how the numbers of the birds just oscillate up and down.

GREENFIELDBOYCE: He says this light was so extreme it makes the birds' response easy to see. But his recent research suggests this is happening on a much larger scale. Migrating birds seem to be drawn towards the ordinary nighttime glow of big cities.

BULER: We're concerned that we are drawing birds into more urbanized landscapes where there are less suitable habitats for them to stop over.

GREENFIELDBOYCE: They could have trouble finding food or be delayed, and that would make their long migrations that much harder.

Yearly 9/11 Tribute Shows Light Pollution's Effects on Birds

New York Times

Science

By Douglas Quenqua

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Scientists have long known that artificial light can attract and disorient birds at night, causing collisions and wreaking mischief with their migratory path. Now, the annual September 11 "Tribute in Light Memorial" in Manhattan has provided a unique opportunity to study and quantify the effect.

The multiyear study, published in the Proceedings of the National Academy of Sciences, found that birds gathered in greater densities, flew repeatedly in circles and vocalized loudly when the memorial's powerful beams were illuminated.

However, when the lights were turned off for brief periods, the birds were quick to resume their normal flight paths and behaviors. Although the researchers were not calling for any changes to the annual event, their findings suggest a simple fix for ongoing light pollution in other places.

"Wherever we can turn lights off at night, we should be doing it," said Andrew Farnsworth, an ornithologist with Cornell University and an author of the study, which claims to be the first to quantify bird responses to urban nighttime light.

Researchers from Cornell and the New York City Audubon Society have been monitoring the memorial, which consists of two pillars of 44 spotlights aimed directly upward to simulate the fallen Twin Towers, since it was first presented in 2002. In 2008, the team began using radar and acoustic sensors to track how many birds the light was attracting and how it affected their behavior.

In 2010, the beams attracted so many birds that the researchers convinced the memorial's operators to turn off the lights for 20 minute intervals, which presented "a unique opportunity" to study "behavior in birds when these incredibly powerful lights were on versus when they were off," said Dr. Farnsworth. The lights were briefly extinguished again in 2012, 2013, 2015 and 2016.

Compiling data from seven nonconsecutive years, the researchers found that bird density near the installation was 20 times greater than surrounding areas, causing sometimes fatal collisions with structures and other birds. Alterations to the birds' migratory paths also put them at risk of death and starvation from arriving late to their destinations.

All such behaviors ceased within minutes of the lights being turned off. The installation affected more than 1.1 million birds cumulatively in those seven years, the researchers said.

Though the study makes no specific recommendations about the 9/11 Memorial, it does recommend that cities consider "selective removal of light during nights with substantial bird migration." Sports stadiums, car dealerships, mountaintop monuments and large buildings are among the worst offenders when it comes to nighttime light, said Dr. Farnsworth.

So what? Why should we care about migrating birds? Using evidence from the text, along with your thoughts on this subject, briefly explain why light pollution might be a problem, and then how we might solve the problem.