Early analysis finds eclipse had noticeable effect on birds

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Early results from a study of the April 8 total solar eclipse show a more noticeable effect on bird behavior than during the last eclipse.

Research led by the Cornell Lab of Ornithology used weather surveillance radar to measure the activity of birds, insects, spiders, and bats in the atmosphere before, during, and after the moon blocked out the sun, showing an increase in activities normally seen at night.

"From the data we've analyzed so far, it looks like a similar pattern of aerial biological activity that we documented during the 2017 solar eclipse, but it was even more pronounced," said Cornell Lab researcher Andrew Farnsworth.

"The 13 weather radar stations in the path of the April eclipse measured noticeable decreases in typical daytime biological activities such as the movements of hawks and other soaring and insect-eating birds like swallows—but, as in 2017, the daytime darkness was not enough to trigger nocturnal migration activity."

The researchers are analyzing data from the U.S. Next Generation Weather Radar (NEXRAD) system, a network of 160 high-resolution Doppler weather radars jointly operated by the National Weather Service, the Federal Aviation Administration, and the U.S. Air Force.

The system detects precipitation and wind, and its data can be processed to map precipitation patterns and movement. For this study, the researchers are removing patterns that come from the radar beam that sampled weather events, leaving patterns from data representing birds, insects, and bats. Reports from observers will also inform the study.

"There was lots of engagement, much more excitement and human participation in the eclipse than in 2017," Farnsworth said.

"We got some audio recordings that document the drop-off in some of the daytime sounds of birds and an increase in nighttime sounds of some insects during the eclipse, differences in the number of birds people

were seeing, and other clear signals of the light-level change—vultures and other birds starting to roost, for example. All along the eclipse path, many people reported hearing barred owls spontaneously vocalizing as if it were dusk when the owls would normally be ready to start hunting."

The analysis of eclipse data is just beginning and will involve looking for any other possible associations with bird behavior. For example, the team will investigate whether there was a relationship between the behaviors and the position of the eclipse in the sky, the duration of sunlight that day, and the time of day when the eclipse occurred. They'll also look at whether birds, insects, and bats behaved differently in areas that had wind or rain during the eclipse.

Two total solar eclipses occurring within seven years is exceptionally rare, and Cornell Lab studies should provide good baseline data for some of the questions regarding bird behavior during such events, Farnsworth said.

The next total solar eclipse in North America won't roll around until Aug. 23, 2044. But scientists won't have to wait 20 years to look for more evidence and patterns, at least in the U.S. Instead, they'll look back through the full archive of radar data dating to the mid-1990s to assess the patterns during previous eclipses in North America.

The team will conduct a separate study to see if birds behaved differently during what is known as annular solar eclipses in 1994, 2021, and 2023. According to NASA, what happened from the 1990s through 2016 were "annular" eclipses, when the moon was farther away from Earth and did not cover the entire sun, leaving a ring of light. In contrast, during a total eclipse, the moon is closer to Earth and covers the entire sun, so only the corona is visible.

Information about how animals are impacted by change in their

environment is valuable, Farnsworth said. "What aerial bird behaviors does a reduction in light levels shut down? What doesn't it shut down?" he said. "It's more than a curiosity that lasts for a few minutes. You can expand it to a much bigger picture examination of the ways animals perceive cues from their environment, a grander sort of sensory ecology study."

Provided by Cornell University

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