Videos reveal birds, bats and bugs near Ivanpah solar project power towers

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Video surveillance is the most effective method for detecting animals flying around solar power towers, according to a study of various techniques by the U.S. Geological Survey and its partners at the Ivanpah Solar Electric Generating System facility in southeastern California.

This study is the first to examine a variety of remote sensing and sampling techniques to determine which technology might be most effective for monitoring how solar power facilities impact flying animals. The information will be used to further study the effects of solar power infrastructure on flying animals—a subject about which little is known—and to develop ways to lessen harmful effects.

At Ivanpah, evidence of flying animals impacted by intense heat near the solar towers had been observed. The new study showed that although birds and bats were occasionally seen near the towers at Ivanpah, most observations involved insects.

Video camera technologies were useful in detecting the presence of animals flying near solar towers, differentiating birds and bats from insects, and for observing quantities and behaviors of these animals. Hundreds of hours of video surveillance footage helped determine that most of the small smoking objects observed in the solar flux field were insects. Although this study did not quantify impacts, fewer than 15 birds were observed being impacted by the solar flux in more than 700 hours of video.

"Our goal of this pilot study was to evaluate several surveillance methods, determine their benefits and limitations, and assess whether they would be appropriate for future use to study potential impacts of solar towers on flying animals," said Robb Diehl, USGS research ecologist and lead author of the study.

In this study scientists worked at the Ivanpah facility for several weeks in May and September of 2014, representing periods of bird, insect and bat migration and seasonal abundance. They used a combination of radar, videography and insect sampling for detecting and observing the daytime and nighttime presence, diversity, movement and animal behavior near operating solar towers.

The facility, the world's largest solar project, uses large fields of mirrors to reflect and concentrate sunlight toward solar receivers that sit on top of towers that are over 450 feet in height. During operation, a region of highly concentrated sunlight known as a solar flux fills the airspace around these tower receivers. Flying animals that enter this solar flux may be exposed to intense heating, enough to cause injury or death.

Scientists used a combination of radar, videography and insect sampling for detecting and observing the daytime and nighttime presence, diversity, movement and behavior of birds, bats and insects near operating solar towers.

Round-the-clock radar recorded over a million tracks of birds, bats and larger-bodied insects such as dragonflies, and the intensity and timing of movement varied throughout the study period.

Scientists used insect traps to capture flying insects at heights up to almost ten feet. The insects collected varied in the number and type between different trap locations, time of day and season.

"Although radar offers useful information on animal activity over the facility as a whole, videography methods showed the greatest potential for directly observing and identifying animals flying in the solar flux," said Paul Cryan, USGS research biologist and co-author of the study.

More extensive research could test the utility of these technologies to automatically detect and observe flying animals near solar towers to advance understanding about their effects on wildlife.

The article "Evaluating the Effectiveness of Wildlife Detection and Observation Technologies at a Solar Power Tower Facility" is published in the scientific journal *PLOS ONE*.

More information: Robert H. Diehl et al. Evaluating the Effectiveness of Wildlife Detection and Observation Technologies at a Solar Power Tower Facility, *PLOS ONE* (2016). DOI: 10.1371/journal.pone.0158115

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