How reliable are traditional wildlife surveys?

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Sandhill Cranes from the Rocky Mountain population have been monitored annually for over thirty years. Credit: T. Cacek

To effectively manage a wildlife species, one of the most basic things you need to know is how many of them are out there. However, it's almost never feasible to count every single individual—so how do the results of wildlife surveys compare to true population size? A new study

in *The Condor: Ornithological Applications* tests this using the results of more than thirty years of surveys of the Rocky Mountain population of Sandhill Cranes.

A three-year "moving average" is often used to smooth out year-to-year irregularities in survey results, but this approach has never been evaluated. Brian Gerber of Colorado State University and William Kendall of the U. S. Geological Survey assessed whether the annual population changes reported by these moving averages were realistic, based on what is known about crane demographics, and how they compared to the results of a more sophisticated statistical approach called a hierarchical Bayesian time series model. They found that while the moving average population estimates were reasonable, the more complex method performed better over a large number of scenarios.

Bayesian approaches offer a structured way to incorporate new information as it becomes available. "The model-based approach we looked at is very flexible and has some major advantages over other methods," says Gerber. "By taking a Bayesian approach, we can include additional information about both the observation process and the true population to obtain more realistic estimates and predictions. Also, the model-based approach includes measures of uncertainty about our population estimates, which are not usually provided by more common approaches and are crucial for understanding the level of confidence we have about our estimates."

Evidence suggests that management practices over the last twenty years have largely met the annual population objectives for the Rocky Mountain Sandhill Crane population. "Looking forward," adds Gerber, "managers may still be interested in adopting our more robust modeling approach due to its flexible framework, which makes implementing any changes relevant to the survey easier." The investment in collecting these long-term data may pay off not just for crane management, but for an

advance in methods that can be applied to other species as well.

More information: "Evaluating and improving count-based population inference: A case study from 31 years of monitoring Sandhill Cranes" americanornithologypubs.org/do … 1650/CONDOR-16-137.1

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