

January-March 2012

B O S Q U E

Crane Crescendo

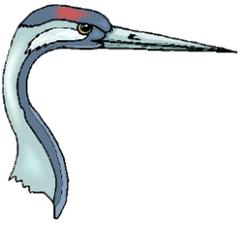


Crane Vocalizations: P. 6

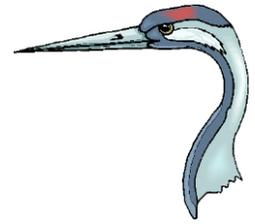
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T R A C K S



Sandhill Cranes Don't Speak With One Voice



By

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The conspicuous sandhill crane flocks that spend the winter between Albuquerque and Bosque del Apache are one of the treasured wildlife spectacles of our state, but few New Mexicans appreciate the diversity that exists within these flocks. In fact, there are two very different breeding populations that mix together along the Rio Grande between October and March.

The Rocky Mountain population is an isolated group of sandhill cranes that breeds in Montana, Idaho, Utah, Wyoming, and Colorado. It is classified as part of the subspecies known as the greater sandhill crane (*Grus canadensis tabida*), which is characterized by large mass, typically in excess of five kg. The entire Rocky Mountain population is only about 20,000 individuals, the majority of which winter here in the Middle Rio Grande Valley of New Mexico. These cranes are very long-lived (often 30 years or more!) and they reproduce slowly. After a normal nesting season, only eight-to-ten percent of wintering cranes are in their first year of life, but the proportion of yearlings can drop as low as two percent during drought years (Drewien et al 1995).

This slow rate of reproduction is very unusual for a population that is subject to a hunting season. The Rocky Mountain population was nearly driven to extinction during the late 19th century to early 20th century, probably due to a combination of overhunting and habitat change. Although the cranes that currently enliven the winter landscape of the bosque seem plentiful, many of them come from this small, isolated population that is vulnerable to decline.

In contrast, the mid-continent population of sandhill cranes is globally abundant, with an estimated population size of roughly half a million. It breeds from the Great Lakes region across central and northern Canada all the way to Alaska and Siberia. Birds in the southern part of this population are the large-bodied greater sandhill crane (subspecies *G. c. tabida*, ~ five kg); birds in the north are the diminutive lesser sandhill crane (subspecies *G. c. canadensis*, ~ three kg); and birds at mid-

latitudes are the intermediate-sized Canadian sandhill crane (subspecies *G. c. rowani*, ~ four kg). However, the cranes from the mid-continent population that winter in New Mexico are only the smaller and intermediate size classes that breed at northern latitudes.

Whether you're at the Rio Grande Nature Center or Bosque del Apache, the cranes you see during migration and winter are likely to be a mix of the Rocky Mountain and mid-continent populations. They frequently occur in the same flocks during the non-breeding season and, although pair formation and courtship occurs on the wintering grounds, they are not known to interbreed. Size is the definitive way to distinguish the two, but size is notoriously difficult to judge in the field. I find that the most useful field mark is the shape of the upper mandible, or

culmen. As a rule of thumb, if the culmen appears to curve downward, you're probably looking at a greater sandhill crane from the Rocky Mountain population. If the culmen

appears to be straight as an arrow, you're probably looking at a

lesser sandhill crane from the mid-continent population. The intermediate Canadian sandhill is the least common size class in the Rio Grande Valley. The difficulty of distinguishing these in the field makes it very difficult to monitor the population size of the globally rare Rocky Mountain birds and detect year-to-year fluctuations. For example, crane censuses at Bosque del Apache NWR don't even attempt to distinguish the size classes.

Hunter check stations administered by New Mexico Department of Game and Fish (NMDGF) take careful measurements of each hunted crane in order to detect the relative proportions of each crane size class and make sure that the Rocky Mountain population is not overhunted. But the hunter data show substantial variability from year to year and are prone to various biases.



Greater sandhill cranes from the Rocky Mountain populations fly with a single lesser sandhill crane (second from left) from the mid-continent population near San Antonio, New Mexico, December 2010.

Matt Jones, an undergraduate at UNM, thought there must be a better way to identify Rocky Mountain birds in the field than waiting for a hunter to shoot them. Delving into the literature, Matt quickly realized that there were no known vocal differences among the size classes. But he did find an extensive literature on the phenomenon of “tracheal elongation.” Cranes, along with some species of landfowl and waterfowl and a few other bird species, have tracheae (windpipes) that are coiled up inside the body so that they are much longer than the distance from the bird’s lungs to its bill. In cranes and swans, the trachea is actually coiled inside the breastbone. The reason is thought to be that the longer trachea affects the quality of the vocalization, making the bird seem larger than it really is. Evolution has favored birds with longer and longer tracheae, presumably because those individuals are able to make themselves seem larger and are thus more successful in acquiring high quality mates. The physics of sound production dictate that birds with longer tracheae will have reduced *formant spacing*, that is, each note in its call will have more densely spaced peaks of acoustic energy across the frequency spectrum. This is not something that the average human ear can detect, but it turns out to be easy to measure in a sonogram with the aid of a computer. We think that birds can make the subtle distinctions between conspecifics of different trachea length.

Matt and some of his lab mates at UNM volunteered to help biologist Tim Mitchusson at the NMDGF hunter check

stations. Matt talked hunters into donating their crane carcasses to UNM’s Museum of Southwestern Biology in exchange for the breast and thigh filets. Matt later prepared each crane as a complete skeleton and measured out the length of its trachea.

Sure enough, larger sandhill cranes were found to have proportionately longer tracheae and correspondingly lower predicted formant spacing.

Matt then went into the field with a digital recorder to capture crane vocalizations along the Rio Grande from Bernardo all the way to Hatch. As predicted, the sonograms showed two distinct levels of formant spacing corresponding to the Rocky Mountain and the mid-continent population, respectively. The proportion of each vocal type corresponds to the proportion of individuals from each breeding population. Matt found that approximately seventy five percent of cranes between Albuquerque and Bosque del Apache NWR were from the Rocky Mountain population. South of Caballo Lake, however, eighty-seven percent were from the mid-continent population.

In a scientific paper to be published imminently (Jones and Witt, in press), Matt and I have proposed that this new technique be used, in conjunction with traditional censuses, as a way of non-invasively monitoring our treasured Rocky Mountain cranes. Thanks to Matt’s work, anyone armed with a smartphone or video camera can now gather data that reveals the origins of the sandhill flocks that they are listening to. Just hit “record!”

References:

Drewien, R.C. et al. “Recruitment in Rocky Mountain Greater Sandhill Cranes and Comparison With Other Crane Populations.” *Journal of Wildlife Management*. 59:339-356,1995.; Jones, M.R. and Witt, C. C.. “Vocal Formant Spacing Reveals Subspecies Composition of Non-breeding Sandhill Crane Populations.” *Wildlife Society Bulletin*, in press.



Volunteer Terry King, builder of a handsome new compost bin in Mariposaville, the pollinator garden, adds a final log.



Volunteer Mary Kotzen demonstrates her invertebrate capture technique at the Discovery Pond.

Photos: Mason