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Rural Inhabitant Perceptions of Sandhill Cranes in Wintering Areas of Northern Mexico

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Abstract

Trends in the mid-continent population of sandhill cranes (*Grus canadensis*) indicate that the species is increasing. A large proportion of this population winters in northern Mexico where possible conflicts between local inhabitants and cranes can occur. We conducted interviews of 40 rural inhabitants living near wetlands used by cranes in three Mexican states. All interviewees had knowledge of cranes and were capable of describing them. The arrival of cranes affected 43% of interviewees. The negative effects were mainly destroyed crops with a subsequent diminished production. Seventy percent of those affected implemented scare tactics to deter the birds, while others (15%) did nothing to mitigate crop losses and accepted such damages. While sandhill cranes continue to increase, conflicts with humans are expected to rise. Our results provide information about human attitudes toward cranes and can serve as the basis for future conservation guidelines.

Keywords: human perceptions, *Grus canadensis*, sandhill crane, human–wildlife conflicts, crop damage

Introduction

Birds represent a major source of human–wildlife conflict and cause of agriculture damage worldwide (Messmer, 2000). Forms of agricultural damage include destruction and depredation of crops often caused by common species (Conover & Decker, 1991). In North America, substantial losses in agricultural productivity have been quantified for species such as Canada geese (*Branta canadensis*), snow geese (*Chen caerulescens*)

(Ankney, 1996), red-winged blackbirds (*Agelaius phoeniceus*) (Dolbeer, 1990), and European starlings (*Sturnus vulgaris*) (White, Dolbeer, & Bookhout, 1985). Sandhill cranes (*Grus canadensis*) represent another common North American species that may potentially affect agriculture as they are increasing in abundance, expanding in range (Krapu, Brandt, Jones, & Johnson, 2011), and consuming mainly human crops (e.g., corn) (Reinecke & Krapu, 1986).

An estimated 14% (70,000) of the mid-continent population of sandhill cranes winters in northern Mexico (Drewien, Brown, & Benning, 1996). Wintering areas occur mainly in the Chihuahuan Desert in north-central Mexico, where farmers grow their crops in arid and semiarid environments (Comisión Nacional para el Conocimiento y Uso de la Biodiversidad [CONABIO], 1998). Guzman-Aranda (1995) suggested that crop damage occurred by sandhill cranes and represented a major problem in some areas such as Laguna de Babícora, Chihuahua. While human tolerance to crop losses in other countries may be motivated by financial compensation programs (Wagner, Schmidt, & Conover, 1997), this is not the case in Mexico where such programs do not exist and farming operations are small and struggle to compete with highly subsidized corn producers in the United States and Canada (Koechlin & Larudee, 1992).

Cranes occupy wetlands in northern Mexico, which receive official protection by the federal government (Diario Oficial de la Federación [DOF], 1992). However, little implementation and enforcement of environmental legislation occurs (Szekely, Martinez Morales, Spalding, & Cartron, 2005). Most wetlands are classified as Modified Rural Landscapes (MDRLs), that is, major landscapes found outside natural protected areas, with high biodiversity, that often suffer from highly destructive management regimes (Little, 1994). Successful biodiversity conservation in these wetlands requires a collaborative agreement among interested parties, particularly among those stakeholders facing crop damage (Grimble & Wellard, 1997). As the population of sandhill cranes continues to increase and expand their wintering range in northern Mexico (Lopez-Saut, Chavez-Ramirez, & Rodriguez-Estrella, 2011), conflicts between humans and cranes are expected to increase. Effective management decisions require information regarding the perceptions that people have in the areas where cranes winter.

This article contributes to that knowledge and represents the first account of human attitudes toward wildlife damage in northern Mexico. Our objectives were to: (a) document the perceptions that local inhabitants have toward sandhill cranes; (b) determine the proportion of farmers who considered that cranes affected their livelihood; (c) document methods used to mitigate those effects; and (d) assess such methods and provide recommendations for management.

Methods

Study Area

The study area included wetlands distributed within the wintering range of sandhill cranes in northern Mexico. This area comprises the Chihuahuan Desert Ecoregion as described by WWF (Dinerstein et al., 2001) (Figure 1). This region stretches north-south between central southern United States and into central Mexico, where it includes a big portion of the state of Chihuahua, most of Coahuila, east of Durango, north of Zacatecas, north and central San Luis Potosí, and some small areas of Nuevo Leon and Tamaulipas.

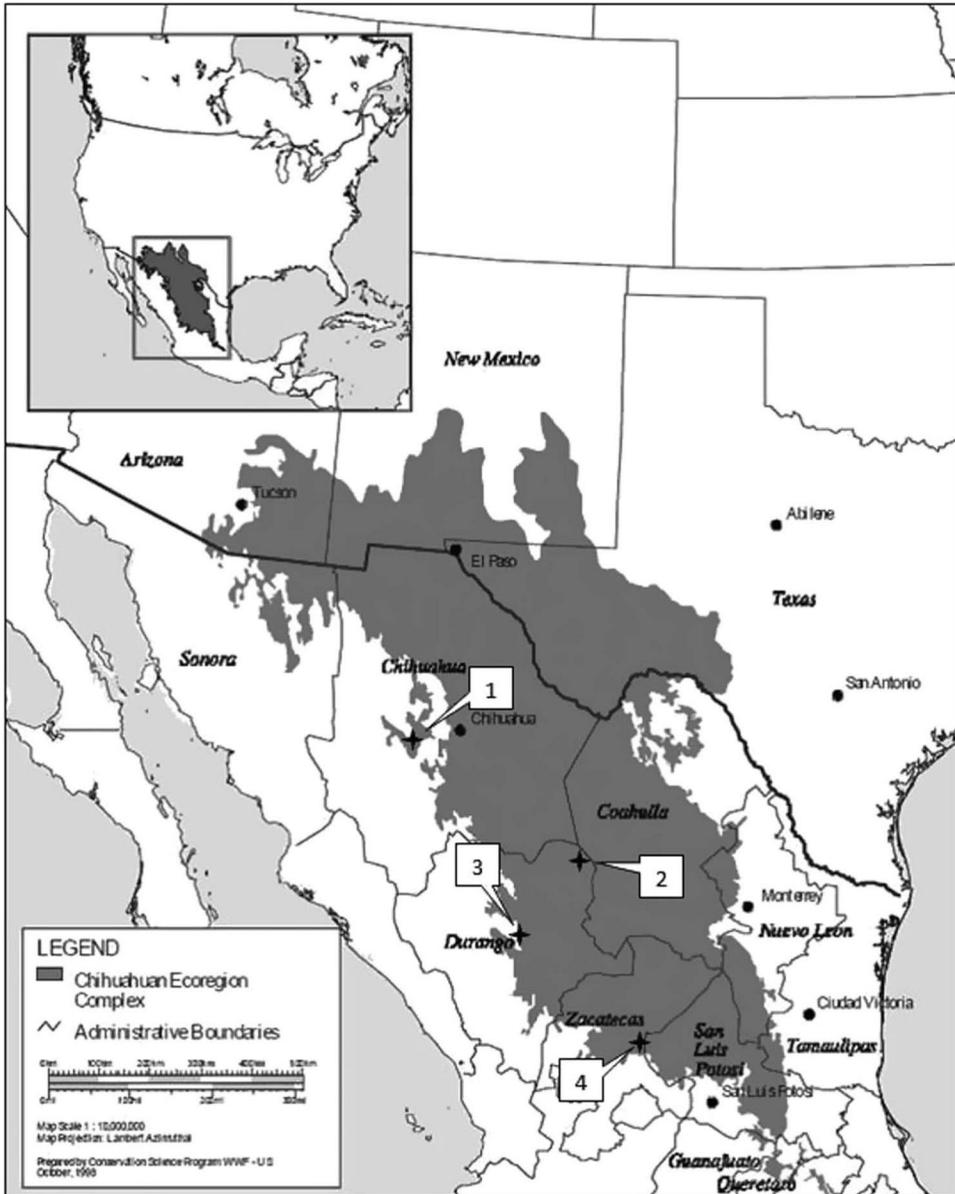


Figure 1. Location of the Chihuahuan Desert Ecoregion with the four wetlands selected for the study. Modified from Dinerstein et al. (2001). (Used with permission: Conservation Science Program WWF-US, 1998).

Wetlands represent critical habitat for cranes providing roosting sites during the night and resting sites during the hottest hours of the day. We concentrated our efforts around four wetlands where cranes had been recorded historically. The selected wetlands included (a) Laguna de Mexicanos (Chihuahua); (b) Presa San Carlos (Reserva de la Biosfera del Bolsón de Mapimí in Durango); (c) Laguna de Santiaguillo (Durango); and (d) Laguna de San Juan de Ahorcados (Zacatecas).

Data Collection

Following the findings for Laguna de Babícora, Chihuahua (Guzman-Aranda, 1995) we designed interviews to characterize rural inhabitants' perceptions on sandhill cranes and crop damage. The survey included 15 questions in Spanish, nine open-ended unstructured and six dichotomous structured questions. For each participant, sex, town, and profession was observed and annotated. We interviewed 40 farmers living around four wetlands where cranes roosted (10 people per wetland). In each of our four study sites, we approached residents about participating in our study, interviewed the first person who agreed, and employed a snowball sampling method thereafter. Snowball sampling uses information provided by insiders to locate people willing to participate in the study (Lopes, Rodrigues, & Sichieri, 1996). It is useful when the focus of interest may involve an illegal behavior because it provides access to hidden participants that would otherwise be difficult for the interviewer to locate. Our interviews included sensitive questions regarding shooting of cranes, an illegal activity in Mexico when done outside areas designated for hunting. This resulted in participants admitting their reservations to collaborate or answer honestly by being afraid of potential legal consequences. In those cases, participants would direct us to other neighbors or family members who would be willing to participate without reservations.

Some of the wetlands included in the study were located in extremely isolated areas and inhabited only by a few families. In these cases our sample size included the population of possible interviewees.

Results

Most interviewees (90%) were males between 20 and 80 years old. These findings reflect a sociodemographic scenario in northern rural Mexico where most farmers are males (Stoleson et al., 2005). All interviewees indicated that they had knowledge of cranes, saw them regularly, and were capable of describing them. Winter (December, January, and February) was the season most respondents (78%) reported seeing cranes followed by fall (September, October, and November) (20% of respondents). The three most common areas for crane observations were shallow areas of lakes (56%), agriculture fields (35%), and cattle rangelands (2%). Two-fifths (41%) of participants had seen up to 100 cranes at a time, while larger flocks were reported less frequently, 500 to 1,000 cranes (10%), and $\geq 5,000$ cranes (2%). Interviewees reported cranes eating corn (66%), oats (21%), sorghum (5%), and other items including wheat, insects, and cow droppings (2% each). Foraging was observed in agriculture fields (83%) and lakes (15%). The majority of respondents did not know where cranes came from (71%), while smaller percentages mentioned Canada (24%) and USA (2%). Nine out of 10 said they did not hunt cranes, 5% mentioned they used to hunt them, and 5% said they still hunt them.

Forty-three percent of participants believed that cranes caused harm to their crops. Of those farmers who declared crop damage, 52% responded that cranes consumed harvested corn that was left packed and drying in the fields, 38% responded that cranes consumed unharvested mature corn that was left in the fields, and 7% responded that cranes consumed newly planted corn that was just starting to grow.

Finally, regarding the methods used to reduce crop damage, 70% of the participants responded that they used scare tactics to deter the birds (e.g., making noise, driving close to cranes, and use of scarecrows), 15% did nothing and accepted such losses, 5% adjusted their harvesting times in order to avoid the time that cranes were using the fields, 5%

increased vigilance of the crops while the cranes were in the area, and 5% shot the cranes if they were feeding on their fields.

Discussion

Cranes feed on most stages of corn (Reinecke & Krapu, 1986). Avoiding harvest times that coincide with crane arrival, as some respondents reported doing, could decrease crop damage and conflict between cranes and humans. On the other hand, respondents who admitted to harvesting and leaving the corn in the fields to dry, considered cranes to affect their yield and admitted using scare tactics. Such practices can lead to daily disturbances during a critical life history time for cranes potentially deterring them from a roosting or feeding site.

According to Guzman-Aranda (1995), 50% of interviewed landowners in the Laguna de Babicora, Chihuahua wetland suffered crop losses due primarily to sandhill cranes followed by geese (*Anser* spp.). Caution is encouraged when comparing his study to ours because the magnitude of the problem varies by country and region (McIvor & Conover, 1994). For instance, most corn producers in the United States are likely to tolerate some crop losses due to wildlife and most will absorb losses of <1% of their crops (Wywiłowski, 1996). This may not be the case in our study area where farming operations are much smaller and more vulnerable to weather conditions because of the lack of irrigation. On the other hand, farmer's tolerance to wildlife damage in the United States and Canada may be driven by financial compensation (Wagner et al., 1997).

The number of respondents who admitted killing cranes as a method to reduce crop damage was much lower than in McIvor and Conover (1994), the only study that has been done regarding human attitudes toward cranes in the United States. Their study investigated the different perceptions between farmers and non-farmers toward the Rocky Mountain population of sandhill cranes in Utah and Wyoming. Forty-nine percent of farmers ranked sandhill cranes as frequent and severe consumers of their crops and 69% preferred to hunt them as a control method to reduce crop damage. Regulated hunting in Mexico is mainly practiced by sport hunters coming from the United States (Stoleson et al., 2005). Fewer Mexicans have access to hunting equipment and hunting is only allowed in a few designated areas. This may explain why hunting of cranes as a control method was less of an option in our study area.

Wildlife populations that increase in size due to protection measures, change in management approaches, and increased crop acreages are prone to cause conflicts with rural residents (Messmer, 2000). As the mid-continent population continues to increase (Sharp & Vogel, 1991) and more land is converted to human uses, so will the number of cranes migrating into northern Mexico that is already estimated in 70,000 individuals (Drewien et al., 1996). Recent studies indicate that cranes are increasing and expanding their wintering range in northern Mexico (Lopez-Saut et al., 2011). Our data suggests that cranes are causing conflicts with farmers and are viewed as a problem in this region of their wintering range. In wetlands where cranes congregate in large numbers, the impacts on field crops can be substantial.

Our results offer a glimpse of the attitudes of rural inhabitants toward cranes. The fact that most people could identify cranes in rural areas represents the first step toward possible implementation of conservation efforts in wintering sites. Although the majority of respondents had a positive attitude toward cranes and did not consider they inflicted crop damage, the amount of affected farmers was substantial. This result could easily change as the sandhill crane population continues to increase and conflicts between

humans and cranes can potentially rise in the next decade. Conservation organizations and state agencies in Mexico and the United States should expect an increase in crane-human interactions and be prepared to implement management strategies and educational programs to mitigate such impacts. Perhaps a starting point as our data suggest could be for nongovernmental organizations (NGOs) and agencies to encourage farmers to harvest the fields before the arrival of the cranes. This could be possible during years when the rainy season is on time allowing farmers to plant earlier. When harvesting is late due to weather conditions, however, the use of nontoxic avian foraging repellents may be a solution. Chemical seed treatments have been tested as deterrent methods to protect crops in areas where cranes have become a problem (Blackwell, Helon, & Dolbeer, 2001). Nonetheless, an economic analysis of the costs of crop damage and potential strategies to avoid conflict would be helpful, now that the baseline information is available.

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References

- Ankney, C. D. (1996). An embarrassment of riches: Too many geese. *Journal of Wildlife Management*, 60(2), 217-223.
- Blackwell, B. F., Helon, D. A., & Dolbeer, R. A. (2001). Repelling sandhill cranes from corn: whole kernel experiments with captive birds. *Crop Protection*, 20, 65-68.
- CONABIO. (1998). La diversidad biológica de México: Estudio de País, 1998. *Comisión Nacional para el Conocimiento y Uso de la Biodiversidad*. México.
- Conover, M. R., & Decker, D. J. (1991). Wildlife damage to crops: Perceptions of agricultural and wildlife professionals in 1957 and 1987. *Wildlife Society Bulletin*, 19(1), 46-52.
- Dinerstein, E., Olson, D., Atchley, J., Loucks, C., Contreras-Balderas, S., Abell, R., & Castilleja, G. (2001). Ecoregion-Based Conservation in the Chihuahuan Desert: A Biological Assessment (pp. 117): WWF, CONABIO, TNC, PRONATURA Noreste, and ITESM.
- DOF. (1992). Ley de Aguas Nacionales. *Diario Oficial de la Federación*.
- Dolbeer, R. A. (1990). Ornithology and integrated pest management: Red-winged blackbirds and corn. *The Ibis*, 132, 309-322.
- Drewien, R. C., Brown, W.M., & Benning, D. S. (1996). Distribution and abundance of sandhill cranes in Mexico. *Journal of Wildlife Management*, 60, 270-285.
- Grimble, R., & Wellard, K. (1997). Stakeholder methodologies in natural resource management: A review of principles, contexts, experiences and opportunities. *Agricultural Systems*, 55(2), 173-193.
- Guzman-Aranda, J. C. (1995). *Landowner wildlife conservation attitudes at Laguna de Babicora, Chihuahua, Mexico*. M.S., New Mexico State University, Las Cruces, NM.
- Koehlin, T., & Larudee, M. (1992). The high cost of NAFTA. *Challenge*, 35(5), 19-26.
- Krapu, G. L., Brandt, D. A., Jones, K. L., & Johnson, D. H. (2011). Geographic distribution of the Mid-Continent Population of sandhill cranes and related management applications *Wildlife Monographs*, 175, 1-38.

- Little, P. D. (1994). The link between local participation and improved conservation: A review of issues and experiences. In D. Western, S. C. Strum & R. M. Wright (Eds.), *Natural connections: Perspectives in community-based conservation* (pp. 347-372). Washington, DC: Island Press.
- Lopes, C. S., Rodrigues, L. C., & Sichieri, R. (1996). The lack of selection bias in a snowball sampled case-control study on drug abuse. *International Journal of Epidemiology*, 25(6), 1267-1270.
- Lopez-Saut, E. G., Chavez-Ramirez, F., & Rodriguez-Estrella, R. (2011). New records of wintering grounds for sandhill cranes in Mexico. *Waterbirds*, 34(2), 239-246.
- McIvor, D. E., & Conover, M. R. (1994). Perceptions of farmers and non-farmers toward management of problem wildlife. *Wildlife Society Bulletin*, 22(2), 212-219.
- Messmer, T. A. (2000). The emergence of human-wildlife conflict management: Turning challenges into opportunities. *International Biodeterioration & Biodegradation*, 45, 97-102.
- Reinecke, K. J., & Krapu, G. L. (1986). Feeding ecology of sandhill cranes during spring migration in Nebraska. *Journal of Wildlife Management*, 50(1), 71-79.
- Sharp, D. E., & Vogel, W. O. (1991). Population status, hunting regulations, hunting activity, and harvest of mid-continent sandhill cranes. *Proceeding of the North American Crane Workshop*, 6, 24-32.
- Stoleson, S. H., Felger, R. S., Ceballos, G., Raish, C., Wilson, M. F., & Burquez, A. (2005). Recent history of natural resource use and population growth in northern Mexico. In J. E. Cartron, G. Ceballos, & R. S. Felger (Eds.), *Biodiversity, ecosystems, and conservation in northern Mexico* (pp. 52-86). New York, NY: Oxford University Press, Inc.
- Szekely, A., Martinez Morales, L. O., Spalding, M. J., & Cartron, D. (2005). Mexico's legal and institutional framework for the conservation of biodiversity and ecosystems. In J. E. Cartron, G. Ceballos & R. Stephen Felger (Eds.), *Biodiversity, ecosystems, and conservation in Northern Mexico* (pp. 87-104). New York, NY: Oxford University Press, Inc.
- Wagner, K. K., Schmidt, R. H., & Conover, M. R. (1997). Compensation programs for wildlife damage in North America. *Wildlife Society Bulletin*, 25(2), 312-319.
- White, S. B., Dolbeer, R. A., & Bookhout, T. A. (1985). Ecology, bioenergetics, and agricultural impacts of a winter-roosting population of blackbirds and starlings. *Wildlife Monographs*, 93, 3-42.
- Wywiałowski, A. P. (1996). Wildlife damage to field corn in 1993. *Wildlife Society Bulletin*, 24(2), 264-271.