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Abstract: The overall distribution of wintering sandhill cranes in Mexico has been reported and summarized in several prior documents. However, most reports are associated with counts or surveys primarily conducted for wintering waterfowl. Recent (1999-2002) reports compiled from local researchers show, that wintering sandhill cranes are distributed much more widely in northern Mexico than is currently reported in the literature. The new locations reported here are primarily in the eastern portion of the Mexican Altiplano, in the states of Coahuila and Nuevo Leon, and in the southern portions of the Chihuahuan Desert Region in Zacatecas and San Luis Potosi. Most locations are natural playas and ponds and man-made reservoirs. While cranes are clearly present in the areas reported here, the actual importance of each specific site as a wintering site or occasional stopover site requires further study.

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The overall distribution of wintering sandhill cranes (*Grus canadensis*) in Mexico has been previously reported (Tacha et al. 1992. Tacha et al. 1994, Meine and Arhcibald 1996). However, the distribution of wintering cranes defined in previous publications, are based on information gathered during the mid-winter waterfowl surveys (Buller 1982, Drewien et al. 1996). The midwinter waterfowl surveys have been conducted in Mexico by the US Fish and Wildlife Service since 1948 (Saunders and Saunders 1981). These surveys, plus other studies, have clearly identified several areas and specific sites as important wintering areas for sandhill cranes because of the significant number of cranes present during some years. Buller (1982) summarized crane counts obtained as part of wintering waterfowl surveys between 1959 and 1981. Later, Drewien et al. (1996) presented a more comprehensive summary spanning from 1959 through 1994 with more detail on numbers of cranes present in different sites in different years. The number of sites supporting cranes varies by year, as does the number of cranes present in a specific area in different years (Drewien et al. 1996). This is likely a result of many of the wetlands expanding and shrinking and even drying up completely during some winters.

While some known wintering sites for cranes are well documented and surveyed regularly, it is done so because they are important wintering sites for migratory waterfowl. This strategy by necessity eliminates areas that are not important waterfowl wintering sites but could support cranes. Even though there appears to be considerable overlap in wintering sites between waterfowl and cranes, this is not always the case, as cranes are more likely to use smaller bodies of water. In addition, many sites used by waterfowl, particularly man-made reservoirs are, not always suitable for cranes because of their depth.

Several publications (Tacha et al. 1992, Tacha et al. 1994, Meine and Archibald 1996) present the wintering distribution of sandhill cranes for northern Mexico (Fig. 1). The winter distribution, reported in comprehensive publications on cranes (Johnsgard 1983, Meine and Archibald 1996) or specifically sandhill cranes (Buller 1982, Tacha et al. 1992, Tacha et al. 1994, Drewien et al. 1996,), or birds of Mexico (Howell and Webb 1995) do not adequately reflect the current knowledge regarding presence of cranes within northern Mexico. The winter distribution maps available in the above mentioned publications show no wintering range extending into the states of Coahuila, Nuevo Leon, and San Luis Potosi (Fig. 1), despite there being regular sightings of significant numbers of cranes during winter in some wetlands in those states.

Recent reports received via personal communications suggest that sandhill cranes are distributed much more widely in northern Mexico than is currently reported in published literature. This new information, available at present, can be used to expand the known distribution maps of wintering cranes in Northern Mexico. This better delineation of the wintering distribution of sandhill cranes in Mexico may prove valuable as the country develops its national wildfowl conservation plan (A. Lafon, pers. comm.). Mexico joined the North American Waterfowl Management Plan in 1994 (USDI, 1994), however, it has not been until recently that specific country based surveys within a national wildfowl conservation framework (A. Lafon pers. comm., Perez et al. 2005), have been planned. In order for Mexico to develop appropriate management and conservation actions it is important that updated and detailed information be available for planning and setting research and conservation priorities. Here I present a compilation of reports and sighting of cranes recorded between 1997 and 2002 intended to update the known winter distribution of sandhill cranes in northern Mexico. Most information reported here is from areas and locations where cranes have not been previously reported in the literature; however, a few locations have been noted previously. Most sighting and reports were collected by local researchers and reported to me and are presented here in an effort to further refine and better characterize the wintering distribution of sand-

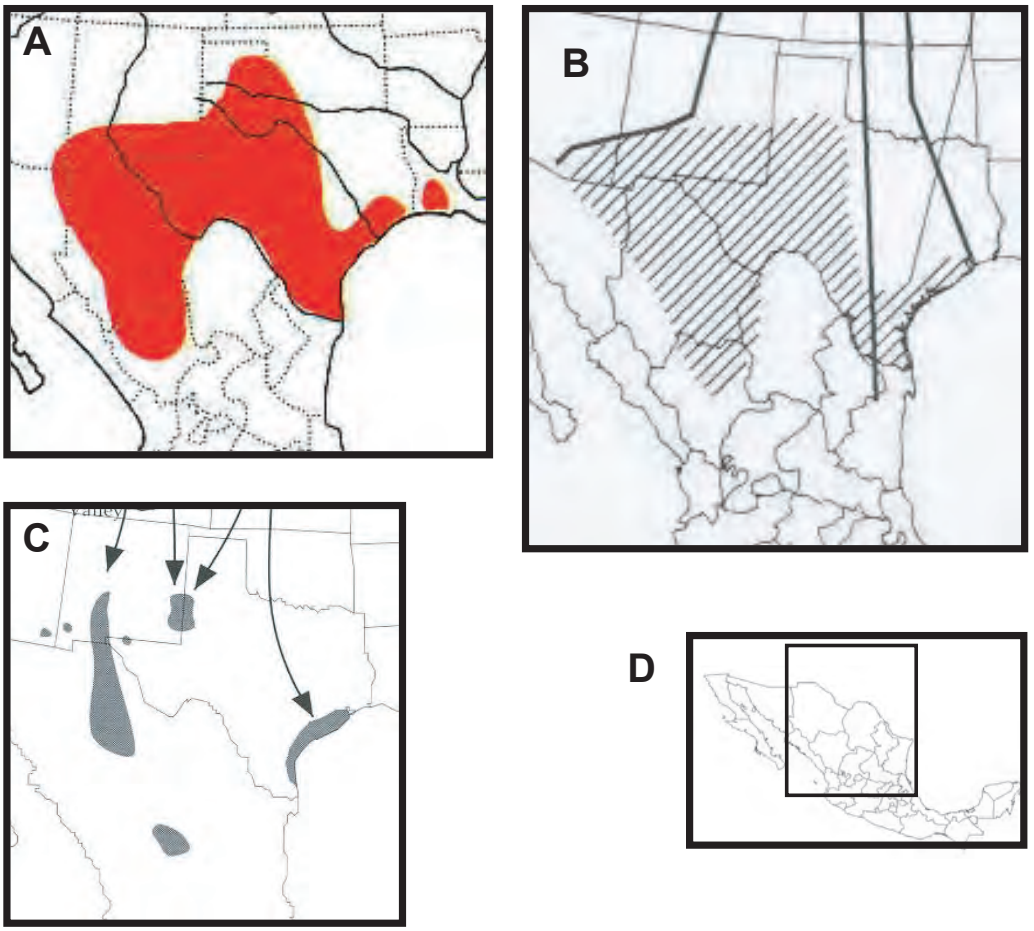

Fig. 1. Winter distribution maps of sandhill cranes showing northern Mexico range from comprehensive treatments of sandhill cranes; A) modified from Tacha et al. 1992, B) modified from Tacha et al. 1994, C) modified from Meine and Archibald 1996, D) inset shows approximate area of northern Mexico covered by three previous maps.

hill cranes in northern Mexico.

METHODS

I requested and collected information from individuals, who spend time in the field, in the states of Chihuahua, Durango, Coahuila, Nuevo Leon, Zacatecas, and San Luis Potosi. Many had sightings in their field notes from specific localities, while others promised to keep track of sightings in any upcoming trips to potential sites (wetlands). I limited the time span of observations to the years after 1997. In addition to direct field observations, I reviewed the important bird areas data base maintained by CONABIO (the Mexican National Commission for Biodiversity: www.conabio.gov.mx) and reviewed the lists of birds reported for each site. I only reviewed, and present, information for sites not well documented in the existing and available literature as wintering sites for cranes. Some sites considered important bird areas in the CONABIO data base overlapped with many sites reported directly to me by field biologists.

While there are numerous locations where cranes have been observed, the data presented here are only for those areas that met at least one of the following characteristics: a) greater than 100 cranes were present during a single sighting, and/or, b) repeated observation in the same location of at least 10 cranes within the same winter, and/or c) repeated observations of crane groups in different years. In addition, only those sites that are new and have not been previously reported or described in detail in Buller (1981) or Drewien et al. (1996) are described here. A brief description and general location is given for those sites fitting the above criteria. Specific information for each site was obtained from published literature, CONABIO's important bird areas data base and/or from the field biologists themselves and personal observations. Other observations that do not fit the above criteria where taken into consideration to better delineate the extension to the wintering distribution range map presented here.

RESULTS

Wintering Distribution in Central Northern Mexico

Based on new information from northern Mexico, the wintering distribution of sandhill cranes can be expanded east and southward (Fig. 2) from previous published maps. The distribution maps of wintering sandhill cranes reported in the literature show only the western portion of the Chihuahuan Desert (Fig. 1). The new distribution map depicted in Fig. 2 encompasses all sites, new ones reported here, and those previously reported and described in previous publications. The new sites with wintering sandhill cranes, not previously reported in the literature, are graphically represented within the range map in Fig. 2. The criteria for inclusion and the source of information for each site are summarized in Table 1. The number of cranes observed, the approximate season or time of observation(s) are included in each site description presented below. All newly identified wintering sites reported here are on the eastern and southern portions of the Chihuahuan Desert region.

Cuatro Cienegas Valley, Coahuila

Cuatro Cienegas is located in the central portion of the state of Coahuila (Fig. 2, #9). This area is an interior watershed completely surrounded by mountains covering an area of approximately 1,500 square km. The vegetation is dominated by saline grasslands and desert scrubs on the mountain slopes. The valley floor has at least 700 natural pools of water formed by springs of varying sizes. The valley floor is designated a protected area for Flora and Fauna by the Mexican government. Cuatro Cienegas is an area of high aquatic endemism of fish,

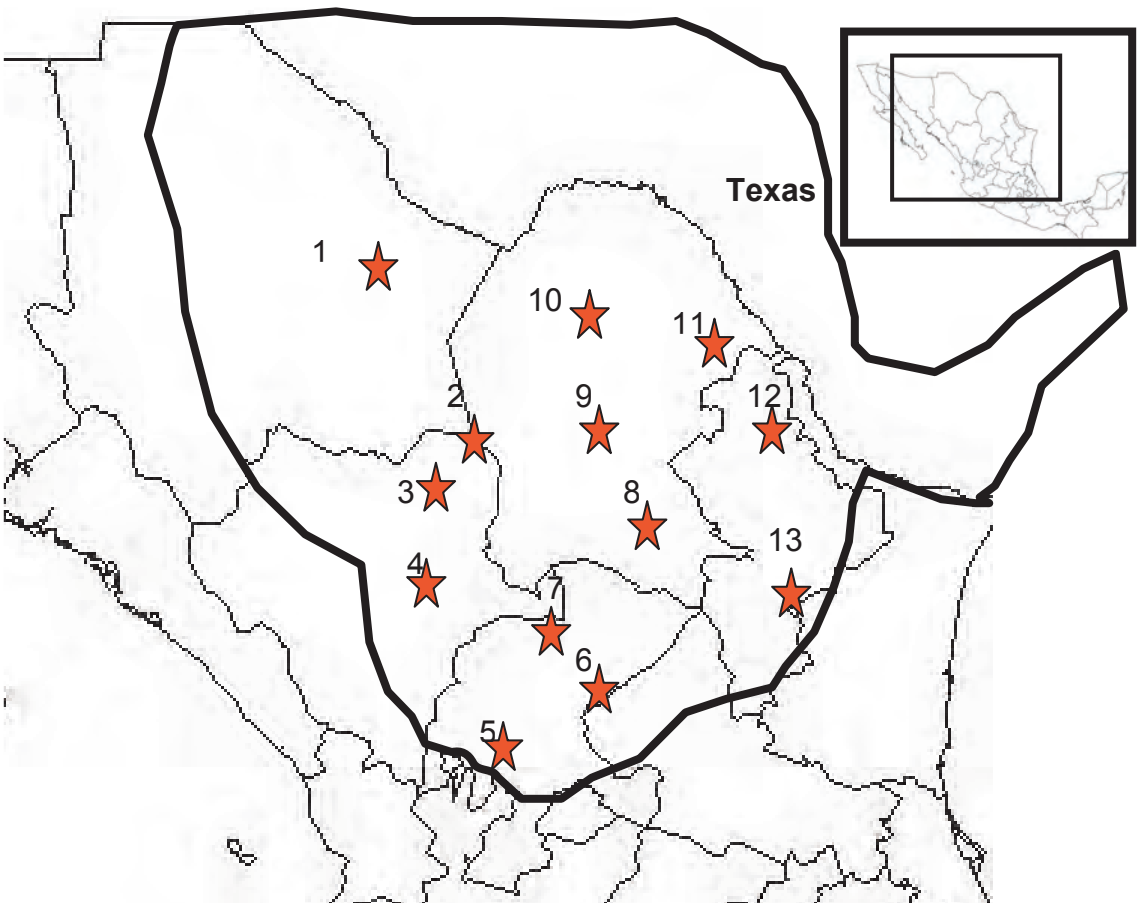

Fig. 2. New delineation of sandhill crane wintering range in central Northern Mexico (bold line) based on combination of previous and current information. Stars denote recently reported wintering areas: 1) Presa Luis de Leon, Chihuahua, 2) Bolson de Mapimi, 3) Palmito Region, Durango, 4) 28 de Mayo, Durango, 5) El Cuervo, Susticacan, Zacatecas, 6) Villa de Cos, Zacatecas, 7) Lago el Cazadero, Zacatecas, 8) Presa El Tulillo, Coahuila, 9) Cuatro Cienegas, Coahuila, 10) Valle de Columbia, Coahuila, 11) Presa Venustiano Carranza, Coahuila, 12) Corredor Monterrey-Nuevo Laredo, Nuevo Leon, 13) Presa Cerro Prieto, Nuevo Leon.

Table 1. New locations of wintering sandhill cranes in central Northern Mexico including criteria upon which it was considered a legitimate wintering site. Each site location is referenced in Fig. 2.

New Location	Map Reference In Fig. 2	Criteria for inclusion*	Source
Presa Luis de Leon, Chihuahua	1	C	M. Ramirez
Boslon de Mapimi	2	A	J. Nocedal, M. Valencia
Palmito Region, Durango	3	B	H. Castillo
28 de Mayo, Durango	4	A	F. and A. Chavez Ramirez
El Cuervo, Zacatecas	5	C	F. Hernandez
Villa de Cos, Zacatecas	6	C	A. Macias Duarte
Lago El Cazadero, Zacatecas	7	B	P. Perez
Presa El Tulillo, Coahuila	8	C	A. Contreras, I. Gonzales,
Cuatro Cienegas, Coahuila	9	A, C	A. Contreras
Valle de Columbia, Coahuila	10	B, C	A. Lozano
Presa Venustiano Carranza, Coahuila	11	B, C	M.A. Cruz, I. Gonzales
Corredor Monterrey-Nuevo Laredo, Nuevo Leon	12	B, C	L. Scott
Presa cerro Prieto, Nuevo Leon	13	B, C	M. Cotera, L. Scott

a) greater than 100 cranes were present during a single sighting, and/or,
b) repeated observation in the same location of at least 10 cranes within the same winter, and/or
c) repeated observations of crane groups in different years

freshwater mollusks, amphibians and reptiles. Some irrigation agriculture is present and in recent years consists primarily of alfalfa. The larger pools are used for recreational purposes, primarily for swimming and picnics during a large portion of the year. Sandhill cranes, up to 150 individuals (A. Contreras, pers. comm.), have been seen in alfalfa fields but the exact roosting sites are not known. Most pools are relatively deep with pronounced edges and likely unsuitable for roosting. However, there are a few wetlands with shallow water and gradual slopes which cranes might be able to utilize. More detailed evaluations of cranes in this area are warranted.

Valle de Columbia, Coahuila

This region is an inter-mountain valley located in northeast Coahuila (Fig. 2, # 10). The valley bottom is primarily dominated by short grasslands and several depressions or playas are present. Only small numbers of cranes have been sighted (A.

Lozano, pers. comm.), however, but on a regular basis. It is not clear where the cranes are roosting and or feeding. It is possible that this region is only used as cranes moved between other areas with more suitable roosting and feeding sites. More information is required for this area to determine its actual importance to wintering sandhill cranes.

Presa El Tulillo, Coahuila

Located in the southern portion of Coahuila (Fig. 2, # 8) this dam was constructed in 1880 and measures 800 by 3,000 m long and is located 63 km west of Saltillo, Coahuila. When full, this dam can form a lake covering 569 ha. This dam is surrounded be desert scrub with riparian vegetation on some of its more permanent edges. Cranes are recorded regularly here, although in smaller groups, and are believed to be primarily roosting (A. Contreras, I. Gonzales, pers. comm.). It is unknown whether they occur during the entire winter at this site or of they were observed as they moved. Activities in the surrounding area include mostly cattle ranching and forestry, while the lake and surroundings are used for recreation.

Presa Cerro Prieto, Nuevo Leon

Presa Cerro Prieto is located in the southern central portion of Nuevo Leon (Fig. 2, # 13). This is a large reservoir lake formed by a rock levee and is located southwest of the city of Linares Nuevo, Leon. Cranes have been observed here repeatedly (L. Scott and M. Cotera, pers. comm.) and are believed to be using the main water body as roosting sites. Some agriculture is present in the surrounding area but feeding or loafing sites are not known. The lake is widely used for recreational activities, such as boating, fishing, camping and pic nics. It is unclear if the amount of human activity is widespread throughout the entire area of the lake and if it is sufficient to discourage cranes from being present for extended periods of time in the area.

Bolson de Mapimi

Bolson de Mapimi is a large interior watershed located in the area where the states of Chihuahua, Coahuila, and Durango come together (Fig. 2, # 2). This is a famous area for being the location of Mexico's first biosphere reserve and covers approximately 91,400 ha. The region is a large interior watershed surrounded by mountains and portions of it are present in three states; Chihuahua, Coahuila, and Durango. Dominant vegetation in the area is desert scrub with large areas of desert short grasslands. Water accumulation generally occurs due to heavy rains in the form of large shallow lagunas (playas) but also many small artificial impoundments are present. Different internal basins each drain into a playa and form lagunas. Three main lagunas are present in the Mapimi reserve. The one called Las Palomas is the only permanent one, although it changes considerably in size from year to year. The other two, Laguna del Rey and Laguna de Puerto Rico, are intermittent and are only periodically flooded. Cranes have been recorded here during the winter months in small groups but on a regular basis (J. Nocedal, M. Valencia, pers. comm.). Most of the area is devoted to cattle grazing and only small areas of dryland agriculture are present.

Monterrey-Nuevo Laredo Corridor, Nuevo Leon

This is a an area that runs roughly northward from Monterrey towards the US-Mexico border at Nuevo Laredo, Tamaulipas (Fig. 2, # 12). Most of the sightings in this area are associated with small reservoirs formed by dirt impoundments (bordos). These are generally depressions made with a bulldozer along and perpendicular to an arroyo or intermittent creeks. The dirt scraped to form the depression is piled to form the dirt levee. Some private ranches can have several of these impoundments on their lands. Small groups of cranes have been sighted in several bordos located in the surroundings of Sabinas, Coahuila (L. Scott, pers. comm., pers. observ.).

28 de Mayo, Durango

This can be a very large ephemeral lagoon (Fig. 2, # 4). Apparently, mostly small playas are found year-round, extensive flooded areas are only present over large areas after spells of heavy rains. In 2002, very heavy rains had filled this and several other lagoons during winter making sseveral dozen square kilometers of shallow water area surrounded by grasslands available. Several flocks, numbering more than 100 individuals each were recorded here in December 2002 (pers. observ). Several hundred cranes were recorded in January 2003 (A. Chavez-Ramirez, pers. comm.). The local inhabitants are used to people visiting the area to hunt cranes when it has flooded. Agriculture in the surrounding area is limited and mostly consists of dryland agriculture patches.

Presa Venustiano Carranza or Don Martin, Coahuila

Presa Don Martin is a reservoir lake built in the 1930's covering an area of approximately 20,000 ha when full to capacity. This large lake is located southwest of Sabinas Hidalgo, Coahuila (Fig. 2, # 11). The surrounding vegetation is desert scrub and some grasslands. It is an important stop over and wintering site for geese. It is unusual for being a site with several reports of as many as 15,000 cranes (M.A. Cruz, pers. comm.) that has been noted in only one previous study (Drewien et al. 1996). Communal and private lands surround this lake, with cattle grazing and limited agriculture being the main activities. No information is available regarding feedings sites used by cranes present here or if cranes make extended use of this area.

DISCUSSION

The new sites reported here extend the wintering range of sandhill cranes in Northern Mexico eastward to encompass the eastern portions of Coahuila, and southward to include west-

ern portions of Nuevo Leon and northern areas of Durango and Zacatecas (Fig. 2). It is clear that the previous delineations of sandhill crane wintering areas have been limited to the western portion of the Mexican Altiplano of the Chihuahuan Desert Region (Buller 1981, Drewein 1996, Tacha et al.1992, 1994, Meine and Arhcibald 1996). The new distribution map presented here more completely encompasses sightings information available from throughout the region. It is possible, however, that many other sites used by wintering cranes have not been reported.

The sightings, and locations, reported here clearly demonstrate the presence of sandhill cranes in some specific sites, however, the actual importance of each location as a wintering site requires further evaluation. In addition, the composition of cranes in regards to individual subspecies in each location is not known. Most areas reported here, clearly have had cranes present on a regular basis, however, most sites do not have comprehensive data for entire winters or consistently during subsequent and different winters. Further evaluations should be conducted in the more promising areas to determine if they are regular wintering sites for cranes or just temporary stopover areas. This can only be accomplished by regular monitoring of the sites throughout the entire winter period and during several different winters. The highly dynamic nature of wetlands in northern Mexico may dictate that sandhill cranes increase and decrease in numbers at specific locations during different years in response to area of wetland present each winter. During years of significant rainfall and increased acreages of wetlands in Chihuahua and Coahuila it is possible that those wetlands and surrounding areas support a larger number of cranes. During drought years in the northern portions of the Chihuahuan Desert, cranes may move farther south and upslope in the eastern and western fringes of the region where there is generally a higher average rainfall.

While the information presented here expands the distribution range of wintering sandhill cranes considerably, much information remains unknown. For example, there are many small wetlands throughout the region for which we have no information. We do not know the relative importance of many of the new or unreported sites at the present time. Because wetlands in Mexico are suffering from continued degradation due to deforestation, overgrazing, agriculture expansion, and urban growth (Carrera Gonzalez and Fuente de Leon 2003), it is imperative that more detailed information be gathered on distribution and abundance of sandhill cranes in northern Mexico so threats and conservation priorities can be identified and plans developed.

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