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Abstract: Patterns of habitat use by greater sandhill cranes (*Grus canadensis tabida*) were examined during April–July 1991 when crop damage attributed to cranes normally occurs. We conducted surveys weekly along 37-km transects in Cache Valley, Utah, and bi-weekly in the Bear River Valley in Rich County, Utah, and Lincoln County, Wyoming. During the surveys, we sighted 1,235 cranes in 165 separate groups in pasture (55%), small grains (19%), riparian (8%), alfalfa (6%), corn (3%), and miscellaneous (9%) habitats. Cranes did not use habitats in proportion to their availability ($P < 0.0005$); they fed more in small grain fields and pasture-hay habitats. Depredations attributed to cranes have been reported in Cache Valley corn crops in spring and in Bear River Valley small grain crops in fall. Farmers with chronic depredation problems in small grains and corn may wish to cultivate crops less preferred by cranes.

Key Words: depredation, *Grus canadensis tabida*, habitat, sandhill cranes, Utah, Wyoming

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The population estimate for the Rocky Mountain greater sandhill crane is currently 17,000–20,000 (Drewien et al. 1987:27). Records of local summering populations are less complete, but in Cache County, Utah, the crane population has increased from 14 individuals in 1970 (Drewien and Bizeau 1974) to approximately 200 in 1990 (Bridgerland Audubon Society 1990).

Crop depredation complaints attributed to cranes appear to be rising concomitantly with increasing population numbers (Lockman et al. 1987). Cranes are omnivorous (Mullins and Bizeau 1978) and readily feed in agricultural lands. Iverson et al. (1987) found that about 80% of diurnal habitat use was in barley fields during spring migrations in Nebraska, Saskatchewan, and Alaska. However, Reinecke and Krapu (1986) found that the composite diet of spring migrating cranes in Nebraska was 97% corn. Diet of cranes summering at Grays Lake, Idaho, consisted of 73% plant material, by volume, and 27% insects and earthworms (Mullins and Bizeau 1978). Barley and wheat accounted for 60.4–70.7% of consumption by cranes staging in September in western Wyoming (Lockman et al. 1987). Tacha et al. (1985) found that wheat seeds constituted more than 95% of the aggregate volume of foods consumed by cranes in Saskatchewan, whereas in Nebraska corn was the major dietary component (Tacha et al. 1987).

We began an effort to determine the habitat use and foraging habits of summer resident sandhill cranes in April 1991, in part because of depredation complaints from farmers in Cache and Rich counties, Utah. We determined whether cranes used habitat in proportion to its availability, and whether cranes fed preferentially in certain habitat types.

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STUDY AREA

The study area (Fig. 1) is in Cache Valley and the Bear River Valley and includes 3 contiguous counties in northeastern Utah (Cache and Rich counties) and southwestern Wyoming (Lincoln County). The 2 valleys are geomorphologically similar; both are bordered by moderate-to-steep mountains that grade into well drained bench areas before reaching the valley floors. The Cache Valley floor lies at an elevation of 1,350 m; the Bear River Valley lies at 1,900 m. Both valleys have extensive land areas devoted to cultivated fields (alfalfa, mixed grass hay, corn, rye, oats, barley, and winter wheat) and pastures. Cranes normally occupy the region from early April through late September/early October.

METHODS

To determine patterns of field use, we established a 37-km transect in Cache Valley, and another in the Bear River Valley in Rich and Lincoln counties. Transects crossed cultivated fields, pastures, and natural habitats. Transects were surveyed weekly in Cache County and biweekly in Rich and Lincoln counties from April through July 1991.

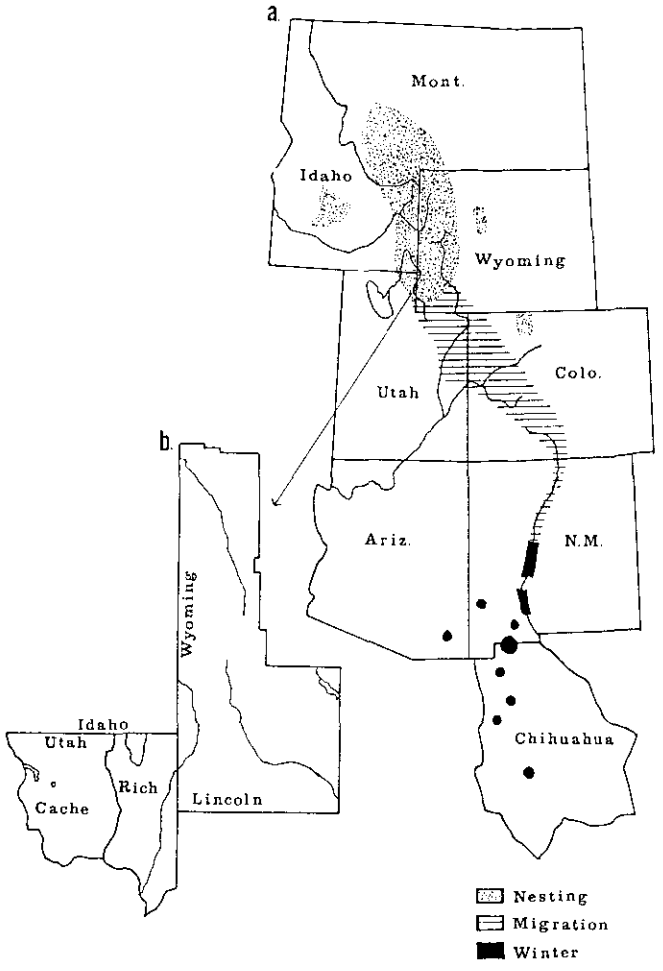

Fig. 1. (a) Winter, migration, and summer range of the Rocky Mountain population of greater sandhill cranes (from Drewien and Bizeau 1974). (b) Study area in Cache and Rich counties, Utah, and Lincoln County, Wyoming, 1991.

Surveys were initiated 2 hours after sunrise from a vehicle moving at 40 km/hour, and flock size and habitat use were recorded. Habitat was categorized by crop (alfalfa, corn, small grain, pasture, hay, or mixed use) or ground-cover type (natural-riparian, sage [*Artemisia* spp.] scrub). When 1 or more cranes were sighted, 1 individual was chosen at random and observed for 1 minute to determine feeding activity.

To examine field use, and to maintain statistical independence between observations, we gave equal weighting to each sighting. A few observations of cranes were made in mixed-use fields, recently plowed/disced fields, fallow fields, and on a rural road. For analyses, these sightings were combined under miscellaneous. Early season hay fields were difficult to distinguish from pastures, and observations were pooled.

In July, each transect was sampled with a random-point technique to determine habitat types available to cranes. One hundred and twenty-five locations along each transect were selected *a priori*, and field inspections of each of these sites characterized available habitat. To restrict the perpendicular distance to a range in which cranes might realistically be located during surveys, we drew a selection of random numbers with an upper limit defined by the distance within which 90% of all cranes had been located in early season surveys.

The expected distribution of cranes was calculated by determining the percentage of each crop/cover type available. This figure was then used as a weighting factor to calculate how cranes would have been distributed if they selected habitat randomly. Patterns of field use and feeding activity were further examined with a Chi-square goodness-of-fit test.

RESULTS

Twelve surveys were conducted in Cache County and 7 in Rich and Lincoln counties. We sighted 1,235 cranes in 165 groups. These groups were observed in pasture/hay (55%), small grains (19%), riparian (8%), alfalfa (6%), corn (3%), and miscellaneous (9%) habitats (Table 1).

Habitat availability sampling revealed that pasture/hay made up 21%, small grain crops 14%, riparian 4%, alfalfa 15%, corn 3%, and miscellaneous 9%. Sage scrub was extensive in the Bear River Valley and constituted 35% of the habitat on both transects.

Cranes were not distributed randomly among 7 available habitats (χ^2 = 169.57, df = 6, $P < 0.0005$). Data analysis that examined distribution only across agricultural lands (χ^2 = 48.66, df = 3, $P < 0.0005$) also revealed

Table 1. Crop availability and use by greater sandhill cranes in Cache and Rich counties, Utah, and Lincoln County, Wyoming, April – July 1991.

Cover type	Random availability (n = 198)	Use (n = 157)
Alfalfa	15.2	5.7
Corn	3.0	2.5
Small grain	13.6	19.1
Pasture/hay	20.7	55.4
Riparian	3.5	8.3
Sage scrub	35.4	0
Misc.	8.6	8.9

that cranes were not distributed randomly.

To examine how cranes utilized specific cover/crop types, we performed a Chi-square test for each habitat (Table 2). Distribution of cranes in fields differed significantly (df = 1, α = 0.05) from expected distributions in 4 habitat types. Cranes used alfalfa (χ^2 = 9.25, P < 0.0025) and sage scrub (χ^2 = 55.58, P < 0.0005) less than their habitat availability. Cranes congregated in pasture/hay (χ^2 = 91.39, P < 0.0005) and riparian (χ^2 = 10.23, P < 0.0025) habitats more than expected based on habitat availability. Crane use of corn (χ^2 = 0.11), small grains (χ^2 = 3.50), and miscellaneous (χ^2 = 0.02) habitats did not differ significantly from expected values.

In 72% of the observations, cranes were observed feeding. The weighting factor was used to redistribute the 109 feeding observations into expected cells (Table 3). Chi-square revealed that cranes were not feeding randomly with respect to habitat (χ^2 = 117.20, df = 6, P < 0.0005), nor were they feeding randomly within agricultural fields (χ^2 = 31.57, df = 3, P < 0.0005). Chi-square tests performed on individual cells revealed that cranes were feeding significantly less than expected in alfalfa and sage habitats, and in significantly higher numbers in small grains and pasture/hay habitats.

DISCUSSION

Crop depredations attributed to cranes are reported by farmers in both Cache and Rich counties. Problems occur in spring in Cache County primarily with newly planted corn crops. Seasonal damage to corn on single farms has been reported as high as 6.5 ha. Farmers also have reported minor damage from cranes trampling emergent small grain (winter wheat, barley, oats) and alfalfa. The growing season in Rich/Lincoln counties is too short for corn production, and crop damage occurs primarily in the fall and affects small grain crops (Lockman et al. 1987). Some trampling damage was also reported in Rich County.

Table 2. Distribution of greater sandhill cranes in various habitats in Cache and Rich counties, Utah, and Lincoln County, Wyoming, April – July 1991.

Cover type	Number of cranes		χ^2	P
	Observed	Expected		
Alfalfa	9	23.86	9.25	<0.0025
Corn	4	4.71	0.11	NS [a]
Small grains	30	21.35	3.50	NS
Pasture/hay	87	32.50	91.39	<0.0005
Riparian	13	5.50	10.23	<0.0025
Sagebrush	0	55.58	55.58	<0.0005
Misc.	14	13.50	0.02	NS

[a] P value not significant at α = 0.05.

Table 3. Distribution of actively feeding greater sandhill cranes in various habitats in Cache and Rich counties, Utah, and Lincoln County, Wyoming, April – July 1991.

Cover type	Feeding cranes		χ^2	P
	Observed	Expected		
Alfalfa	7	16.51	5.48	<0.02
Corn	3	3.30	0.03	NS [a]
Small grains	23	14.87	4.44	<0.05
Pasture/hay	61	22.57	65.43	<0.0005
Riparian	7	3.86	2.55	NS
Sagebrush	0	38.53	38.53	<0.0005
Misc.	12	9.36	0.74	NS

[a] P value not significant at α = 0.05.

During our April – July surveys, cranes did not concentrate activities in either crop type in which damage was reported. We obtained few observations of cranes using corn fields. Fields planted in corn constituted only 3% of the available habitat, and only 2.5% of the cranes used them. However, because corn seed is sown at a relatively low rate, a flock of foraging cranes can inflict significant damage in a short time period. Cranes used small grain fields throughout the survey period and approximated the expected distribution within this habitat type. Alfalfa constituted 15.2% of the habitat available but yielded only 5.7% of the crane observations.

No cranes were observed in sage scrub. Movement through sagebrush may be difficult for cranes, and this habitat offers few plant foods. In the Bear River Valley, agricultural fields tend to be insular and surrounded by vast expanses of sagebrush. This arrangement may concentrate cranes into agricultural areas. Farmers who experience chronic depredation problems may wish to consider the economic feasibility of changing to crops less susceptible to crane damage.

LITERATURE CITED

BRIDGERLAND AUDUBON SOCIETY. 1990. Resident sandhill crane populations in Cache County, Utah: numbers and distribution. Unpubl. Rep., Bridgerland Audubon Soc., Logan, Ut. 8pp.

DREWIEN, R. C., and E. G. BIZEAU. 1974. Status and distribution of greater sandhill cranes in the Rocky Mountains. J. Wildl. Manage. 38:720-742.

_____, W. M. BROWN, and J. D. VARLEY. 1987. The greater sandhill crane in Yellowstone National Park: a preliminary survey. Pages 27-38 *in* J. C. Lewis, ed. Proc. 1985 crane workshop. Platte River Whooping Crane Maintenance Trust, Grand Island, Nebr.

IVERSON, G. C., P. A. VOHS, and T. C. TACHA. 1987. Habitat use by mid-continent sandhill cranes during spring migration. J. Wildl. Manage. 51:448-458.

LOCKMAN, D. C., L. SERDIUK, and R. C. DREWIEN. 1987. An experimental greater sandhill crane and Canada goose hunt in Wyoming. Pages 47-57 *in* J. C. Lewis, ed. Proc. 1985 crane workshop. Platte River Whooping Crane Maintenance Trust, Grand Island, Nebr.

MULLINS, W. H., and E. G. BIZEAU. 1978. Summer foods of sandhill cranes in Idaho. Auk 95:175-178.

REINECKE, K. J., and G. L. KRAPU. 1986. Feeding ecology of sandhill cranes during spring migration in Nebraska. J. Wildl. Manage. 50:71-79.

TACHA, T. C., C. JORGENSON, and P. S. TAYLOR. 1985. Harvest, migration, and condition of sandhill cranes in Saskatchewan. J. Wildl. Manage. 49:476-480.

_____, P. A. VOHS, and G. C. IVERSON. 1987. Time and energy budgets of sandhill cranes from mid-continental North America. J. Wildl. Manage. 51:440-448.