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HABITAT USE BY GREATER SANDHILL CRANES IN WYOMING

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Abstract- Wyoming supports approximately 20% of the Rocky Mountain population (RMP) of greater sandhill cranes (*Grus canadensis tabida*), as well as a number of whooping cranes (*Grus americana*) from the Grays Lake, Idaho flock. Cranes begin arriving on post-migration staging areas in Wyoming in mid-March and disperse to summer habitat in April or May, depending on snow cover. Fall pre-migration staging peaks around mid-September; most cranes leave the state by 1 October. Wet meadows and grain fields were the major habitat types used by cranes in Wyoming 1985-1987. Use in these types ranged from 69-100% of total observations in any given 2-week period. Important grains included barley, wheat and oats. Wet meadows were typically either seasonally flooded wetlands or flood-irrigated haylands. Alfalfa fields and cattailbulrush (*Typha* sp./*Scirpus* sp.) marshes were also important habitats for cranes.

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Wyoming contains a substantial portion of the breeding range of the Rocky Mountain population of greater sandhill cranes. An estimated 3,000-4,000 of the population's 18,000 birds summer in Wyoming; only Idaho supports more (Lockman et al. 1985a). Of special significance is the co-occurrence with Wyoming's sandhills of whooping cranes from the Grays Lake, Idaho flock. Up to one-third of the Rocky Mountain whooping cranes have summered in Wyoming in recent years.

The RMP has nearly doubled in the last 2 decades, and consequently expanded its distribution in Wyoming. Although most cranes occur in the western portion of the state, observations of migrating and breeding birds are increasing east of the Continental Divide (Lockman et al. 1985a). As crane numbers have increased, the Wyoming Game and Fish Department (WGFD) has intensified its management of cranes and developed state-wide population objectives.

A variety of habitats are used by cranes in Wyoming. This report summarizes information on habitats occupied by cranes in Wyoming from their arrival in March through their departure in September.

STUDY AREA AND METHODS

Sandhill cranes occur primarily west of the Continental Divide in Wyoming, an area totalling 41,000 km². Field efforts to locate cranes were concentrated in localities known to support larger numbers, including: 1) production areas - Upper Green River Basin, Salt River, Lower Bear River, Ham's Fork, Snake River, Wind River and Sweetwater River; and 2) staging areas - Lower Bear River, Salt River, Ocean Lake, Cora, Big Piney, Ham's Fork and Eden/Farson.

Cranes were observed throughout their residence in Wyoming, with increased field effort during fall pre-migration staging, when flock composition counts were made. Recent emphasis on crane management from the WGFD has resulted in many more observations of cranes reported by field personnel than previously. Additionally, biologist's aides were employed 1985-1987 to work full-time on cranes from April-October. Their work supplemented that of the waterfowl biologist in western Wyoming, who was also responsible for collecting data on cranes.

Observations of cranes were made from the ground and during periodic flights from both fixed-wing aircraft and helicopters. Binoculars and

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a Questar telescope were used from vehicles or on foot. All observations were recorded in the WGFD Wildlife Observation System. Each crane location was assigned to one of 16 habitat types, noting the number of cranes, age and behavior. Sightings of whooping cranes were included with those of sandhill cranes in the habitat use analysis, although whooping cranes constituted less than 1% of the total number of cranes observed.

Habitat use data were combined for the years 1985-1987 and divided into 12 biweekly periods. Percentage of cranes observed, by habitat type, was calculated for each time period. Nearly all observations were diurnal, therefore night roosting sites are not quantified in our results.

Data were not analyzed statistically due to inconsistencies in sampling intensity and the preliminary nature of the study.

RESULTS AND DISCUSSION

Crane Chronology and Numbers

The first cranes appearing in Wyoming were generally adult breeding pairs, which arrived as early as mid-March in some years. Territorial non-breeding pairs, first-year breeders, and sub-adult groups first arrived around 5 April and continued to arrive through early May. If snow cover was sparse in mountain valleys, cranes dispersed widely upon arrival. When higher elevation (2400 m) valleys were extensively snow-covered, however, large staging concentrations occurred in lower valleys around agricultural areas.

Spring migration staging peaked between 10-25 April, when 1,500-7,000 cranes used the area around Border Junction and Cokeville. The length of time cranes remained on migration staging areas in spring appeared to be regulated by weather, food availability and snow cover.

As snow melted from higher elevations, cranes dispersed to summer areas. Sub-adult groups of yearlings and 2-year-olds generally moved around markedly before settling on summer ranges, usually in late May to mid-June.

Fall pre-migration staging occurred between 15 August and 25 September. Sub-adult groups, with non-breeders, began congregating first. In most years, cranes summering at higher elevations did not move to staging areas until 5-15 September. This movement appeared to be triggered by hard frosts that reduced late summer insect populations, primarily grasshoppers. Adult pairs with chicks

remained segregated from crane concentrations until chicks were strong fliers. By 15-20 September, a representative mixture of age classes was usually present.

Migration out of Wyoming typically began after 25 September west of the Continental Divide and after 10 October east of the divide. However, in 1986 and 1987, movement began by 15 September. Fall migration is believed to be triggered by the initial strong storm fronts from the north.

Changes in numbers of cranes observed from April to September reflect staging concentrations and summer dispersal (Table 1). From an initial peak of 2,371 cranes seen 1-15 April, crane observations declined to a low of 255 by late July. At that time cranes were widely dispersed in production and brood-rearing areas, often in remote montane valleys, away from human disturbance.

In early August, however, observations nearly quadrupled as sub-adults arrived on pre-migration staging areas. From mid-August through mid-September, when concentrations peaked, over 10,000 cranes were sighted. By late September, cranes had begun leaving Wyoming, with few remaining into October.

Surveys in 1987 revealed a 20% decline in the RMP from 21,800 in March 1985 to 17,500 in September 1987 (Drewien & Lockman 1987). The reasons for this decline are not totally understood, but possible factors include 3 years of poor production, increased mortality from hunting, and recent losses due to diseases (Drewien & Lockman 1987). The population remained at 17,000 in 1988 and 1989.

Seasonal Habitat Use

Grain fields and wet meadows were most used, combining to account for 69-100% of crane observations in any given 2-week period (Table 1). Crane use of grain and wet meadows was complementary, i.e. when wet meadows increased in importance, grain fields decreased, and vice versa (Fig. 1). Cattail/bulrush, alfalfa, and rabbitbrush/sagebrush/greasewood (*Chrysothamnus* sp./*Artemisia* sp./*Sarcobatus* sp.) were also consistently used. Some habitat types were occupied very seldom, with no more than 5% of cranes observed in any one period (Table 1). Observations in these types were combined.

A wide array of wetland types was used by sandhill and whooping cranes for night roosting. On fall pre-migration staging areas, marshes, varying from shoreline zones at Ocean Lake to marsh ponds 0.25-40 ha in size, were used most often.

Shallow riverine wetlands were used for roosting along the Bear and Salt Rivers, as were flooded sedge/rush (*Carex* sp./*Juncus* sp.) meadows and shallow cattail marshes. Subadult groups, territorial pairs and family groups used flooded meadows, beaver ponds and marsh ponds as night roosts in summer.

Upon arrival in western Wyoming, cranes relied heavily on grain stubble and disced grain fields (Table 1). Alfalfa sprouts, germinating corn seed and barley and wheat seed were also eaten. Livestock feedlots, where grain hay was fed, were important when early snow cover was extensive.

Thirty-two percent of cranes observed in early April were in wet meadows, which provided timothy tubers, corms and annelids as forage. Cranes also occupied cattail and bulrush marshes at that time.

Use of grain fields subsequently declined rapidly until, by mid-May, only 15% of cranes observed were in this type (Table 1, Fig. 1). Conversely, crane sightings in wet meadows increased to 73%, reflecting dispersal to higher elevation summer habitat where extensive areas of seasonally flooded wetlands or flood-irrigated haylands interspersed with shallow (< 1 m), flooded marshes provided the most preferred sites for nesting.

Observations in wet meadows peaked at nearly 90% in early July. Crane family groups often fed in wet meadow herbaceous vegetation, if adequate cover was nearby. Grasshoppers and beetles were also consumed in shorter vegetation on drier sites, usually in close proximity to taller cover. However, cranes without chicks were observed up to 1.5 km from wetland roosts, feeding on sagebrush hills. The peak in percent use in rabbitbrush and grassland types in late June (14%, Table 1) may reflect this foraging for insects.

Cattail and bulrush wetlands, after their use in early April, were not occupied again until late August, when observations increased to 14%, and rose even higher (20%) in early September. Family groups moved into these marshes for roosting and cover after grass hay meadows were cut in early August.

Non-breeding cranes first began arriving at grain production areas (pre-migration staging) by

late July; family groups were the last to arrive. Numbers increased until nearly all (91%) cranes observed were in grain fields prior to their departure from Wyoming. Prior to maturation of grain, use of alfalfa fields increased markedly (Table 1). In August, cranes fed in alfalfa, both cut and uncut, with large numbers of insects present, primarily grasshoppers and weevils. Small grains used during fall pre-migration staging were barley and wheat; oats were occasionally eaten if other grains were unavailable. Cranes began feeding on maturing grain in the dough stage. Grain cut for hay, or early harvested grain, often attracted cranes from unharvested grain. Use in unharvested grain was primarily along field margins.

Grain fields larger than 4 ha seemed preferred over smaller fields when grain was not immediately adjacent to a roosting area. Smaller grain fields were used if field margins were open, i.e. lacking tree or tall shrub cover.

Grains are grown in western Wyoming in sufficient quantity to regularly attract cranes in only 4 areas Salt River (Afton); lower Bear River (Cokeville); lower Green River (Eden/Farson); and Wind River (Ocean Lake area). As crane numbers have increased, so has the incidence of crop depredation. Following 3 seasons of experimental hunts in 1984-1986, limited quota, or permit only, hunts have been initiated in all 4 areas. Harvest guidelines have been developed to ensure the crane population is not adversely affected. The hunts appear to be successful in dispersing concentrations of cranes from grain fields.

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Table 1. Seasonal, diurnal habitat use by greater sandhill cranes in Wyoming, 1985-1987, measured by percent occurrence.

Habitat Type	Date											
	Apr		May		Jun		Jul		Aug		Sep	
	1-15	16-30	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-31	1-15	16-30
Cattail/bulrush	9.9	0.1	5.4	1.8	1.5	1.6	1.8	2.8	4.7	13.9	19.7	0.0
Rabbitbrush/sagebrush/greasewood	0.6	0.2	1.7	1.9	4.2	6.0	4.5	3.9	2.6	0.7	0.0	0.0
Grassland	0.2	0.5	1.9	0.1	0.0	7.9	2.1	0.0	0.4	0.0	0.3	0.0
Wet meadow	31.8	58.3	73.1	81.1	68.2	65.0	89.5	75.8	53.7	23.5	24.6	8.8
Alfalfa	0.0	0.1	0.3	0.0	3.7	0.0	0.0	1.8	0.7	12.6	4.6	0.0
Small grains	55.1	37.7	14.6	12.5	16.1	14.1	0.5	12.6	33.1	45.4	50.2	91.0
Other*	2.5	3.2	3.0	2.7	4.9	5.4	1.6	3.2	4.9	4.0	0.6	0.0
Total cranes observed	2371	2146	1502	1026	887	369	381	285	1055	5102	5091	3077

*Includes ponderosa pine/Douglas fir, aspen, riparian cottonwood, Russian olive, willow and other shrubs, row crops, fallow agricultural land, roadsides, standing water, and running water.

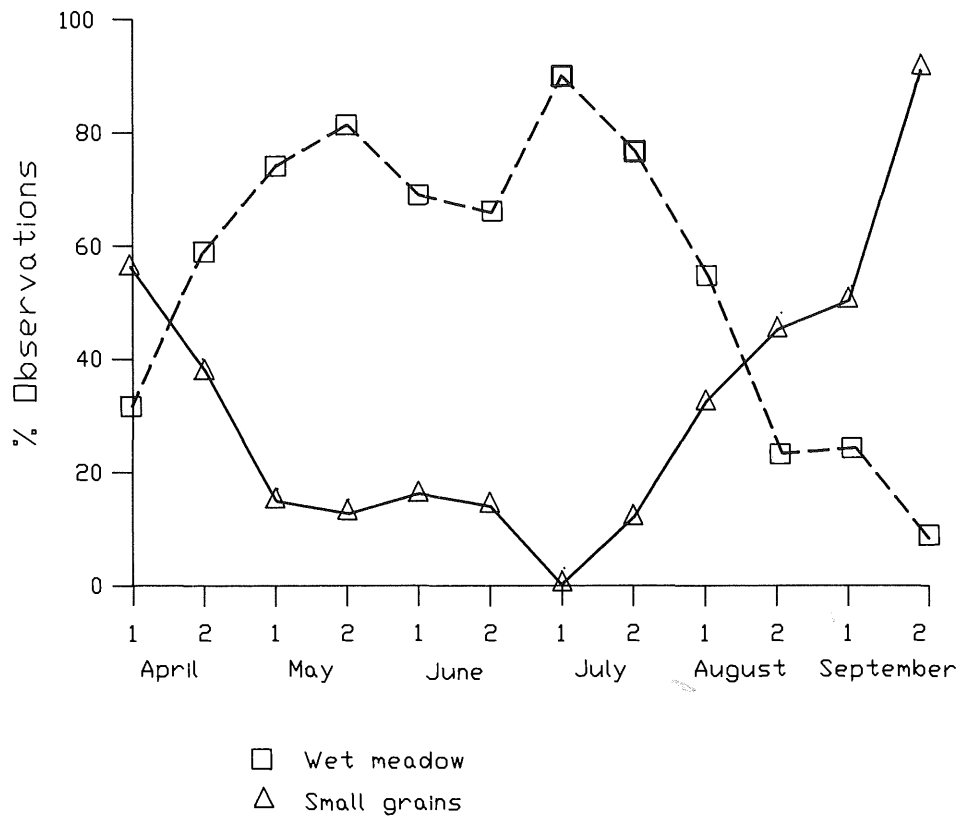


Figure 1. Seasonal, diurnal use of small grains and wet meadows by greater sandhill cranes in Wyoming, 1985-1987; observations combined for each biweekly period.

