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INTRODUCTION

A most unusual avian migratory event takes place each spring in the Platte River basin of Nebraska between 98 and 102 degrees longitude (Fig. 1). In suitable habitats throughout this area large concentrations of Sandhill Cranes, *Grus canadensis,* and White-fronted Geese, *Anser albifrons,* develop and achieve peak populations in mid to late March. This phenomenon is traditional to the migratory habits of specific populations and occurs during the spring movement from wintering grounds in Texas, New Mexico, and Mexico to breeding grounds far to the north in Canada and Alaska. In both species groups of individuals drift in from wintering grounds and numbers increase until as much as 80 percent of that migratory population is concentrated within the basin. Whereas several weeks are required to develop peak numbers, the second lag of the journey northward is a mass movement, taking several days, leaving but a few stragglers behind (Buller and Boeker, 1965; Buller, 1967; Norm Dey, Nebraska Game and Parks, personal communication).

Such a migratory "staging" event is a rare phenomenon. That this staging area is not on a direct route from the wintering grounds to breeding areas is equally interesting. Furthermore, that portion of the Platte River utilized for migratory staging is similar in geomorphology, vegetation, and hydrology to the non-utilized portions of the river upstream and downstream. Finally, this staging phenomenon has occurred throughout recorded history, and there is no reason to believe that this tradition has not occurred for centuries prior to settlement. In this chapter the author speculates on the origins of the migratory staging habit for Sandhills Cranes and White-fronted Geese in the Platte River basin.

MIGRATORY POPULATIONS AND THEIR CURRENT DISTRIBUTION

White-fronted Goose

That population of the White-front which migrates through Nebraska is referred to by the U.S. Fish and Wildlife Service as the "Mid-continent" population. Virtually all of this population belongs to the race *A. albifrons gambelli.* The *gambelli* population breeds in the subarctic and low arctic in open areas in the forest zone northward into scrub-covered tundra (Fig. 1). Its wintering area includes the gulf coast of Louisiana, Texas, and Mexico, with scattered concentrations in the interior of Mexico. A small number overwinter in the Central Valley of California (Palmer, 1976). In the Platte River staging area flocks may rest on the low sandbars when not feeding during the day and most frequently roost on these sandbars at night. Feeding areas include plots of winter wheat and rye and corn stubble. Flocks may range many miles from the river in search of food. High concentrations of White-fronts may also be found in water-filled basins to the south of the river.

Sandhill Crane

The Sandhill Crane is one of the oldest known contemporary avian species, fossil specimens having been found in Pliocene deposits; three subspecies are currently recognized (American Ornithologists' Union, 1957). Nearly all of the individuals that migrate through Nebraska are of the subspecies *G. canadensis canadensis;* however, a few individuals of the race *tabida* also pass through the state. Walkinshaw (1973) prefers to divide *canadensis* into a morphologically

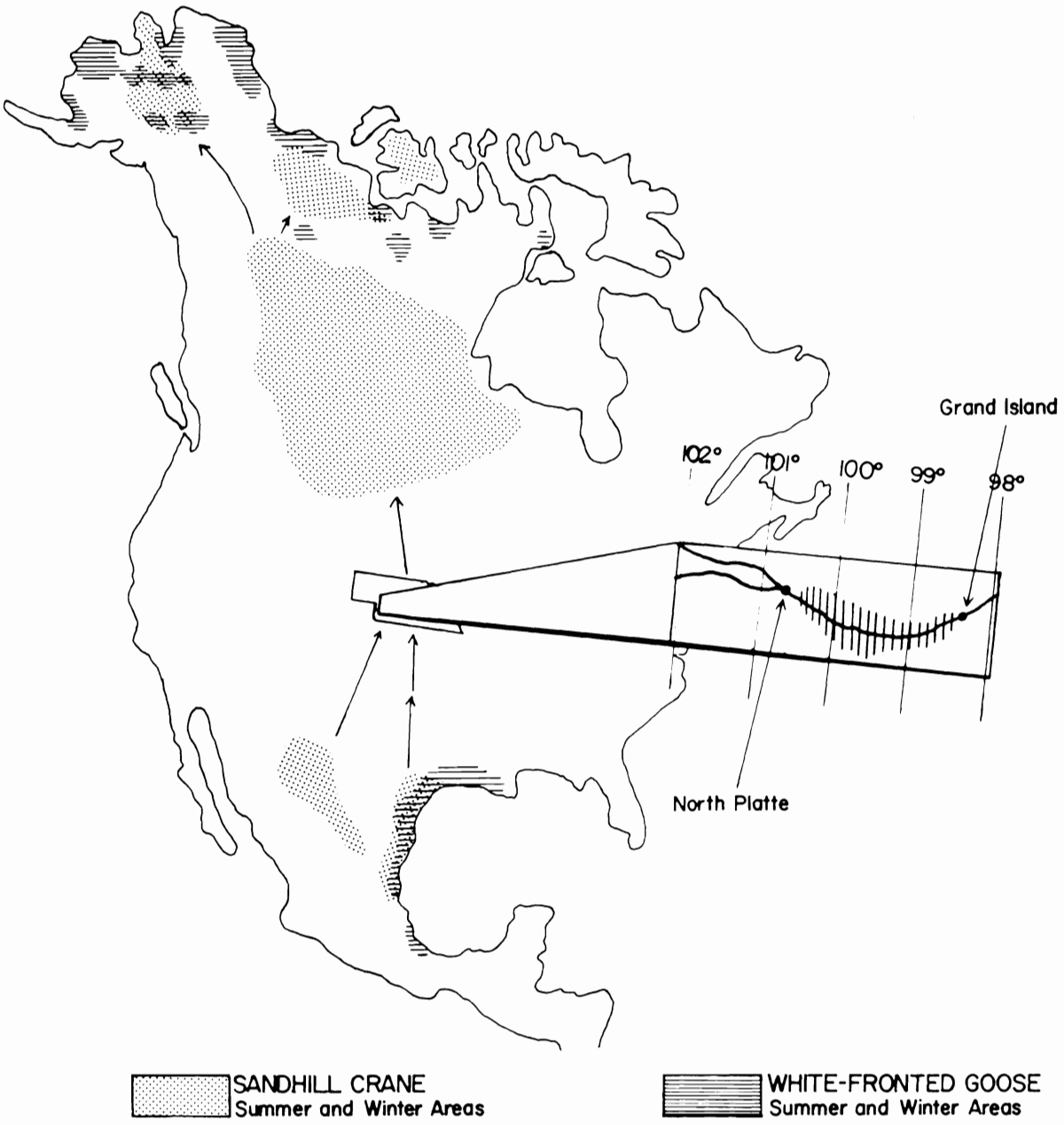

Figure 1. Wintering grounds, breeding grounds, migratory routes and spring staging area for Sandhill Cranes, *Grus canadensis canadensis,* and White-fronted Geese, *Anser albifrons gambelli.*

smaller, more northerly-breeding population *(canadensis)* and a larger, more southerly-breeding population *(rowani).* For the purposes of this paper I shall consider only the race *canadensis* as per the American Ornithologist's Union designation, recognizing that a size difference does exist between individuals in the northern and southern extremes of the *canadensis* breeding range.

The *canadensis* population nests in central and western Canada (northern Saskatchewan and Alberta), north to the Arctic Ocean, and westward into Alaska and extreme northeastern Siberia. In the northern portion of the summer range the habitat consists of treeless or scrub tundra. In the southern portion of the range individuals nest in typical muskeg openings in the taiga (Walkinshaw, 1973).

This population of Sandhill Cranes overwinters in eastern New Mexico and western Texas and in scattered locations along the Texas coast (Walkinshaw, 1973).

Sandhill Cranes utilize the Platte River primarily as a roosting sight. Each evening thousands of cranes travel varying

distances from foraging areas in grasslands and cultivated fields to roost on exposed or partially submerged sandbars. Few roost elsewhere. Some limited numbers of cranes may forage in rainwater depressions.

ORIGIN OF THE STAGING HABIT

Sandhill Cranes and White-fronted Geese make little use of the Platte River east of Grand Island during their spring migration, and yet the biological and physical environment of the river and the adjacent floodplain are similar to that portion utilized. Similarly, west of the 102 meridian, few birds are found. What then are the properties of the staging area that attract these birds each spring?

I believe that two hypotheses best explain spring staging in this portion of the Platte River basin. The first is that the utilized portion of the Platte River is in a unique geographic location along the migratory route to serve as a resting place. The second hypothesis is that migratory staging is an artifact, reflecting an ancient tradition passed-on from generation to generation.

The first hypothesis I believe to be only partially correct. The Platte River basin is on a direct migratory route for those birds overwintering in eastern Texas and western Louisiana. However, the distance traveled from those overwintering areas is only some 1,000 miles. The second leg of the journey is no less than another 1,000 miles for southerly-breeding cranes to as much as 2,700 miles for cranes breeding in Alaska and northeastern Siberia. White-fronted Geese must travel at least 1,000 miles to their nearest breeding grounds in the Arctic. Furthermore, at least half of the mid-continent Sandhill Crane population overwinters in western Texas and eastern New Mexico (Boeker, et al., 1962). These individuals must first travel *northeastward* across Colorado, Oklahoma, and Kansas to the staging area. A more direct route (requiring less energy) would be for the western population to travel northward along the high plains to stopover sites along the South and North Platte Rivers in Colorado and Wyoming.

The short distance traveled in the first leg of the journey and the northeastward movement of the western population lend support to the second hypothesis. It is my speculation that migratory staging is a tradition that developed in Holocene or earlier times and that it relates to breeding distribution during peak glaciation. Events during and after Wisconsin glaciation may have influenced the development of this behavior.

At or near peak Wisconsin glaciation, some 14,000 years ago, the glacial boundary extended to the edge of northeastern Nebraska (Prest, 1969). Along the glacial margin the vegetation was a mosaic of tundra and spruce forest, some of which may have resembled contemporary taiga (Wright, 1971; Whitehead, 1973). Furthermore, peat deposits found underlying some Nebraska sand dunes are of Wisconsin origin, indicating a muskeg environment (James Swinehart, unpublished master's thesis). Assuming that Sandhill Cranes and White-fronted Geese responded to their habitat distributional changes during early Wisconsin glacial advance, these species were breeding directly to the north of the Platte River along the face of the glacier. Although the distribution of breeding habitat during Wisconsin and Holocene times changed considerably with glacial advance and retreat, winter range was less altered (Martin and Mehringer, 1965; Wells, 1966).

There is little question that the portion of the Platte River basin in question existed in pre-Wisconsin times. However, some speculation exists that the river east of the Grand Island area is of more recent origin than the upstream portion and that the ancient river cut southeastward across current-day Adams County and continued into Kansas (Ray Bentall, personal communication). Coincidentally, note that Sandhill Cranes and White-fronted Geese infrequently utilize the river below Grand Island. Bentall furthermore speculates that the Platte River at some earlier time was considerably wider than it is today.

During maximum glaciation, the Platte River basin may well have been a congregation site for early spring migrants. Whereas warm southerly spring winds may have quickly tempered weather conditions along the Platte, conditions in the immediate glacial face may have changed much more slowly. Exposed sandbars, adjacent marshes in the wide floodplain, and roosting areas within the broad river may have been the only refuge amidst a forest of mixed pine and spruce (Ross, 1970) when snow-cover on the breeding grounds persisted.

In relatively early post-glacial times (10,000 years B.P.), an unglaciated corridor was established in western Canada extending northward across Alberta and Saskatchewan to the Arctic Ocean in the Northwest Territories. An arm of the corridor extended westward across southern Alaska and the Aleutian Islands (Prest, 1969). Interestingly, the major concentrations of Sandhill Cranes of the subspecies *G. c. canadensis* either breed or migrate along this ancient corridor. Crane populations that breed in extreme northeast Siberia migrate along the Aleutian chain (Walkinshaw, 1973). By 8,000 years nearly all of the contemporary breeding ranges of cranes and geese were unglaciated. Today, neither population breeds east of the western edge of Hudson's Bay except for a tiny population of White-fronted Geese which breeds on the western edge of Greenland and is apparently of the *gambelli* population. Wisconsin glaciation, therefore, may have been a deciding variable in influencing not only the spring migratory staging habit in the Sandhill Crane and White-fronted Goose, but also in determining the current breeding distribution for these species.

SUMMARY

It is speculated that spring migratory staging along the Platte River in central Nebraska by White-fronted Geese, *Anser albifrons gambelli,* and Sandhill Cranes, *Grus canadensis canadensis,* is a tradition developed during Wisconsin glaciation. At this time tundra and taiga breeding habitat was displaced far to the south in response to the advancing glacier. At peak glaciation breeding habitat existed immediately to the north of the Platte River staging area. It is felt that the Platte River basin served as a temporary refuge to early migrants when winter conditions persisted on the breeding area at the face of the glacier. The congregating habit persisted as a learned tradition after subsequent glacial and breeding habitat retreat.

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