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EFFECTS OF CHANGES IN AGRICULTURE AND ABUNDANCE OF SNOW GEESE ON CARRYING CAPACITY OF SANDHILL CRANES DURING SPRING

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Abstract: The Central Platte River Valley (CPRV) in Nebraska is a key spring staging area for approximately 80% of the mid-continent population of sandhill cranes (*Grus canadensis*). Evidence that cranes currently are acquiring fat less efficiently than in the past along with a large increase in use of the CPRV by snow geese (*Chen caerulescens*) led us to evaluate waste-corn availability and index spatial and temporal variation in abundance of sandhill cranes and waterfowl using the CPRV. We also developed a predictive model to assess impact of changes in availability of corn under past, present, and potential future conditions. Predicted energy demand of cranes and waterfowl increased 69% from the late 1970s compared to 1998-2007. Availability of waste corn before crane arrival was 20%, and 68% less during 1998 and 1999 compared to spring 1979, resulting in cornfield area required to meet energetic demand to increase from 13,838 ha during 1979 to 28,500 ha during 1998 and 80,246 ha during 1999. Future decreases in carrying capacity and resulting increases in distance of daily foraging flights likely would result in reduced crane use of the CPRV and a marked reduction in ability of cranes to store fat reserves. Options to increase carrying capacity in the CPRV for sandhill cranes include restoring degraded roosting habitat for cranes, expanding suitable roosting habitat for snow geese in the neighboring Rainwater Basin, and promoting land use practices in the CPRV that maximize availability of waste corn.

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Key words: agriculture, carrying capacity, Central Platte River Valley, *Chen caerulescens*, *Grus canadensis*, sandhill crane, snow goose.
