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EFFECTS OF AN EARLY SPRING BURN ON GREATER SANDHILL CRANE NESTING SUCCESS AT MALHEUR NATIONAL WILDLIFE REFUGE, OREGON

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Abstract: A 2430 ha prescribed burn was conducted on Malheur National Wildlife Refuge, Harney County, Oregon in March 1985. About 35 days later, 11 greater sandhill crane (Grus canadensis tabida) pairs nested within the burned area; 9 of these hatched. The remaining 2 clutches were destroyed by coyotes (Canis latrans). Crane hatching success was significantly higher (P = 0.01) on the burned area (81.8%) than elsewhere (38.5%). Two factors were likely responsible for the higher success rate in the burn; nests were placed in deeper water and the small mammal prey base was temporarily reduced or eliminated resulting in reduced predator activity during incubation. Although hatching success was high for the burned area, no young fledged, probably because of increased predator pressure by late May.

Key words: greater sandhill crane, Grus canadensis tabida, Malheur National Wildlife Refuge, nest success, Oregon, prescribed burn.

STUDY AREA AND METHODS

The burned area's northern boundary was about 20 km south-southeast of Malheur NWR headquarters (51 km SSE of Burns, Harney County, Oregon, 43°35'N, 118°57'W) and extended south for 6.5 km. The width of the burn varied from 2 km on the south to 4.8 km on the north. The West Canal and Donner und Blitzen River delineated the western and eastern burn boundaries, respectively. Within the area, meadows vegetated with various grass and sedge (Carex spp.) species dominated, whereas coarse emergents composed mostly of hardstem bulrush (Scirpus acutus), broad-fruited burreed (Sparganium eurycarpum), and common cattail (Typha latifolia) grew in depressions, ponds, sloughs, and channels. Interspersed among the wetland complex were extensive uplands vegetated with either big sagebrush (Artemisia tridentata), rabbitbrush (Chrysothamnus spp.), and/or greasewood. Irrigation by flooding began in April, and wetlands remained flooded through most of July. Grasses and sedges were burned within 1 to 8 cm of the soil substrate. A few scattered residual bulrush stands (usually <3 m diam.) remained intact unburned in the area.

The area was searched for crane nests on the ground during 6 May–6 June 1985. All nests were marked with laths at distances from 29–67 m. When a nest was found, incubation stage was determined by flotation (Westerskov 1950), and concealment category (Littlefield 1995a), vegetative type, water depth, and clutch size were recorded. Nests were revisited to assess clutch fates after expected hatching dates.
The traditional method, or apparent estimator (ratio of number of clutches that hatched to number found) was used for determining nest success, as both terminated and active nests had an equally high probability of being located (John-

RESULTS

Seventeen known crane nesting territories were in the area that burned. Of these, 11 (64.7%) pairs built nests within the burn area even though nesting cover was severely limited. Four nests were in the southwest, 6 in the west-

DISCUSSION

Two factors may have been responsible for higher crane nest success within the burn: (1) nest placement was in deeper water, and (2) the small mammal prey base was temporarily reduced or eliminated. The cause for pairs nesting in deeper water was attributed to standing residual vegetation; many of the deeper marshes were moist at the time of the burn, resulting in a few small emergent patches surviving the fire. Coyotes in particular have a tendency to avoid crane nests in deep water on Malheur NWR (Littlefield 1995a). However, this would not account for the lack of predation by the other 2 important egg consumers, common raven and raccoon. Therefore, we assume that a reduction of small mammal prey caused predators to temporarily leave. Small mammals, especially montane voles (Microtus montanus), are an important food source for coyotes at Malheur NWR, particularly before avian species start to nest (unpublished data).

Coyotes had returned to the burn by late May and no young cranes were known to fledge. On 23 May 1985, a crane chick called from a dense new growth Baltic rush (Juncus balticus) stand in the burn area. Upon leaving the site, one of us (Littlefield) nearly collided with 2 coyotes as they rapidly approached the calling chick over a dike. Nearby, another coyote was close to a crane pair with 2 chicks. The pair began to perform distraction displays (feigning), at which time the coyote initiated hunting behavior. Littlefield’s presence, however, resulted in the 3 coyotes quickly leaving. A survey on 27 May revealed no crane pairs or chicks, indicating all chicks had been lost, apparently to predation.

Vogl (1980 unpublished) suggested that little was known about the affects of fire on western alkaline marshes because of (1) the limited burning in the region and (2) the minimal effort by marsh managers to study, record, and publish results from their prescribed burns. However, studies on the effects of fire on small mammal populations was documented at Malheur NWR by Comely et al. (1983), but generally there has been little documentation on the relationships of fire and other Great Basin wetland species. The purpose of this study was to report the impacts of a large prescribed wetland burn and its effects on crane reproductive success in a region known for high predation rates and excessive predator populations (Littlefield 1976, 1995a,b). We found that large prescribed burns may perhaps be a useful vegetation management strategy, at least for wetlands inhabited by breeding greater sandhill cranes. Although we recorded higher nesting success, it did not contribute to successful fledging during the same year as the burn. Comparisons with success in succeeding years was not feasible, as an intensive predator control program initiated in 1986 would have made comparisons biologically meaningless.
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