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## COMMON RAVEN NESTS IN NORTH DAKOTA AFTER 100-YEAR HIATUS

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**COMMON RAVEN NESTS IN NORTH DAKOTA AFTER 100-YEAR HIATUS** -- The common raven (*Corvus corax*) has a holarctic distribution, commonly occurring in open, mountainous or coastal areas (Goodwin 1976). Despite its wide-spread distribution, the common raven is a rare breeding species in the Great Plains and currently is absent from the Central Plains (Salt and Salt 1976, Johnsgard 1979). Houston (1977) reported that the common raven was present during the breeding season across Canadian prairie provinces and into the Dakotas prior to 1875, but its occurrence declined in conjunction with dramatic reductions in size and extent of free-ranging American bison (*Bison bison*) herds. In North Dakota, the common raven was recorded breeding throughout the 1800's, with nesting activity noted along the Missouri River and in Pembina County in the northeastern corner of the state (Stewart 1975). The common raven likely was extirpated from North Dakota during the late 1800's, as a result of widespread poisoning and trapping of the gray wolf (*Canis lupus*) and other large predators; the common raven was observed rarely in the breeding season during the early 1900's (Stewart 1975). Most recently, the common raven was listed as a rare winter visitor to north central North Dakota (Berkey and Martin 1993).

In 1996, we extensively searched quaking aspen (*Populus tremuloides*) woodlands of J. Clark Salyer National Wildlife Refuge (in north central North Dakota) to locate nests of Cooper's hawk (*Accipiter cooperii*) and other raptors; we also noted location of American crow (*Corvus brachyrhynchos*) nests (Nenneman et al. 2003). We found no evidence of the common raven nesting at J. Clark Salyer National Wildlife Refuge during these nest searches. On 24 May 1998, while we were revisiting Cooper's hawk nesting territories, we observed a common raven at a large stick nest placed in an aspen tree. The nest contained two large, fully-feathered nestlings estimated to be about 4 to 5 weeks old (estimate based on a nestling period of 5 to 6 weeks [Baicich and Harrison 1997]). We observed only one adult during two visits to the nest site.

On 23 May 1999, we found a common raven nest in an aspen tree about 850 m from the 1998 nest site. The nest contained two large, fully-feathered nestlings estimated to be 5 weeks old. On 30 May 1999, five individuals were observed flying near the nest site. On 14 May 2000, Robert Murphy revisited the 1999 nest site and observed two large, nearly fledged (ca. 5 weeks old) young at the same nest used in 1999. A pair was again observed in 2001, this time with three young. Because common raven pairs occupy the same territory from year to year, and frequently return to the same nest site in subsequent breeding seasons (Ehrlich et al. 1988), these nests possibly represent a single pair of birds.

In 1998 and 1999, we measured habitat characteristics at the common raven nest sites (see Nenneman et al 2003 for methods). For comparison, we

also present data from random plots measured at J. Clark Salyer National Wildlife Refuge in 1996 during a study of Cooper's hawk nest-habitat selection (Nenneman et al. 2003). Qualitatively, the raven nest sites had greater tree densities (2800 and 2550 trees/ha), basal areas (34.9 and 39.6 m<sup>2</sup>/ha), and canopy covers (85 and 85%, measurements at 1998 and 1999 nest, respectively), but lower shrub densities (750 and 500 stems/ha) when compared to random plots (tree density 1042.5 trees/ha, basal area 20.9 m<sup>2</sup>/ha, canopy cover 50.6%, shrub density 2510.3 stems/ha). The common raven placed its nests among the largest trees within the stand, as the nest tree diameter at breast height (DBH, 18.4 and 20.3 cm) was larger than the mean stand DBH (17.5 cm). These two nest sites are generally similar to common raven nest sites measured in northwestern Wyoming, where nests usually were located in isolated stands of trees or near the edge of larger stands, and in stands with greater canopy cover and basal area than randomly available (Dunk et al. 1997).

During 2006 and 2007, the common raven was observed in Pierce County, North Dakota, Burke County, North Dakota, Bottineau County, North Dakota, and elsewhere in McHenry County, North Dakota during the breeding season. In early June 2006, an adult with a recently fledged young was observed in the Turtle Mountains, Bottineau County. In 2007, a nest was located in a pine plantation near headquarters on J. Clark Salyer National Wildlife Refuge.

Our observations represent the first documented nesting by the common raven in North Dakota since the late 1800's. Houston (1977) suggested that the expansion of the American crow onto the Canadian prairies was limited by the scarcity of trees for nest sites, which also might have limited the extent of the common raven. Aspen woodland has increased substantially in and around J. Clark Salyer National Wildlife Refuge since European settlement, due primarily to fire suppression and extirpation of large herbivores (Grant and Murphy 2005). Thus, plausibly these increases in woodland habitat might be providing nest sites necessary for the common raven to recolonize the region. Conversely, the common raven is currently a year-round resident in northern McHenry County, in the Turtle Mountains (Bottineau and Rolette counties), and in the Pembina Hills (Pembina and Cavalier counties), areas which represented extensive natural woodland areas prior to settlement of the region. Common raven numbers have increased during the second half of the twentieth century, and the common raven has returned to parts of its previous range (Boarman and Heinrich 1999). Indeed, analysis of Breeding Bird Survey routes from 1966 through 2003 indicates an increasing population trend for the common raven across most of its range in North America. An increase of greater than 1.5% change per year is indicated for neighboring northwestern Minnesota, southern Manitoba, and southeastern Saskatchewan (Sauer et al. 2008). Possibly, these opportunistic Corvids are adapting to and expanding into previously unoccupied habitats.

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