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## High Abundance of Nesting Long-Eared Owls in North Dakota

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**HIGH ABUNDANCE OF NESTING LONG-EARED OWLS IN NORTH DAKOTA** -- The long-eared owl (*Asio otus*) is a secretive, poorly understood species in the Great Plains of the United States and Canada. In North Dakota the long-eared owl has been considered a species of special concern (Petersen 1991), due mainly to lack of information on its occurrence and nesting status. We discovered 39 long-eared owl nests while searching for Cooper's hawk (*Accipiter cooperii*) nests in northwestern and north central North Dakota during April and May 2000. Long-eared owl nests mainly were observed at J. Clark Salyer and Des Lacs National Wildlife Refuges (NWRs) in the Souris River basin (for study area descriptions see Nenneman et al. 2002) and at Lostwood NWR on the Missouri Coteau landform (Murphy 1993). These 39 nests exceed the total of all state breeding records for the long-eared owl through the early 1970's (Stewart 1975:159). During 1994 to 1999 we annually found 2 to 12 long-eared owl nests while searching for Cooper's hawk nests in approximately the same area of North Dakota.

We found 18 of the 39 long-eared owl nests at J. Clark Salyer NWR; two were in white spruce (*Picea glauca*) in shelterbelts at the refuge headquarters. The remaining 16 nests at J. Clark Salyer NWR were in quaking aspen (*Populus tremuloides*), in parkland-like sandhills woodland that characterized the southeastern portion of the refuge (Nenneman et al. 2003). At Des Lacs NWR, we found 12 long-eared owl nests in green ash (*Fraxinus pennsylvanica*) within long, narrow stands of green ash-American elm (*Ulmus americana*) woodland (Nenneman et al. 2003). We found another nest at Des Lacs NWR in 3-m northern hawthorn (*Crataegus rotundifolia*), atop an old black-billed magpie (*Pica hudsonia*) nest. Based on intensive search area boundaries described in Nenneman et al. (2002), minimum densities of long-eared owl nests in the sandhills woodland at J. Clark Salyer NWR (5263 ha) and the green ash-American elm woodland at Des Lacs NWR (3951 ha) were 1/329 ha and 1/304 ha, respectively. However, we likely overlooked long-eared owl nests in each area because we did not search completely all potential nesting habitat in 2000.

Three of four long-eared owl nests discovered at Lostwood NWR were in aspen woodland, and the fourth nest was in a green ash in a tree shelterbelt at refuge headquarters. Per our search for Cooper's hawk nests we examined only the most wooded areas on the 10,890-ha refuge, which chiefly is mixed-grass prairie. Thus, because our search effort was limited, we reasonably could not estimate densities of long-eared owl nests. However, up to one long-eared owl nest/314 ha was found on Lostwood NWR in a previous study (based on random, 2.6-km<sup>2</sup> plots searched, 1982 data in Murphy 1993:94).

We found four other long-eared owl nests in farmstead shelterbelts near the NWRs. With the exception of the nest in northern hawthorn at Des Lacs and another in an old black-billed magpie nest in a farmstead shelterbelt, long-eared owl

nested in what were known to be or what appeared to be old American crow (*Corvus brachyrhynchos*) or Cooper's hawk nests, about 4 to 11 m above ground and 5 to 31 m from woodland edges. Most such nests appeared to be in the densest tree canopies available, in woodland patches within landscapes dominated by grassland and other open habitat (Nenneman et al. 2003). Our observations of long-eared owl nesting in relatively open and edge-dominated landscapes in North Dakota support the idea that this owl mainly is an open habitat or edge species (Holt 1997). Nesting opportunities for the long-eared owl probably have increased substantially in parts of the northern Great Plains in recent decades, due to growing availability of appropriate nest substrates as a consequence of increases in nesting Cooper's hawk (Nenneman et al. 2003) and American crow (Sargeant et al. 1993).

High abundance of nesting long-eared owl in northwestern and north central North Dakota in 2000 apparently was associated with relatively high abundance of voles (*Microtus* spp.), common prey in the diet of the long-eared owl (Marks et al. 1994, Holt 1997, Backlund and Olson 1999). Moderate to high peaks in vole abundance were recorded in 1999 and 2000 at J. Clark Salyer NWR (T. Grant, U.S. Fish and Wildlife Service, Upham, North Dakota, unpublished data) and in 2000 at Lostwood NWR (R. Murphy, U.S. Fish and Wildlife Service, Kenmare, North Dakota, unpublished data). High abundance of nesting long-eared owl in North Dakota during 2000 coincided with high nesting abundance by the species during the same year in parts of Saskatchewan (Stoffel 2001), which suggested regional synchrony in abundance of breeding long-eared owl and its vole prey, a phenomenon also exhibited by the congeneric short-eared owl (*A. flammeus*; Holt and Leasure 1993). Indeed, short-eared owl nests also were discovered frequently during nesting studies at J. Clark Salyer NWR in 1999 and 2000 (T. Grant, U.S. Fish and Wildlife Service, Upham, North Dakota, unpublished data) and in northwestern North Dakota in 2000 (S. Stephens, Ducks Unlimited, Bismarck, North Dakota, unpublished data). During a 1981 to 1989 study at Lostwood NWR, abundances of nesting long-eared owl and short-eared owl peaked in the same year (Murphy 1993:94). During a 40-year period in nearby southern Saskatchewan, years of peak numbers of nesting long-eared owl and short-eared owl also coincided and seemed associated with high population levels of voles (Houston 1997). The apparent, dramatic rise in abundance of nesting long-eared owl that we observed in 2000 supports Houston's (1997) speculation that the long-eared owl is strongly nomadic in the northern Great Plains.

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