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This report documents a pack of 22–23 Wolves (*Canis lupus*) in central Minnesota. This is larger than the largest pack previously observed on the mainland in the midwestern U.S. during 650 wolf pack-years. Because this record-large pack preyed on White-tailed Deer (*Odocoileus virginianus*), one of the Wolf's smaller prey, it is evidence that pack size and prey size are not tightly related. It also indicates the size that Wolf packs can attain in the area if fully protected from human persecution.

Key Words: Wolf, *Canis lupus*, pack size, prey, White-tailed Deer, *Odocoileus virginianus*, Moose, *Alces alces*, Minnesota.

Wolf (*Canis lupus*) pack sizes are of interest for several reasons. One is because of the possible relationship between pack size and prey size; packs preying on Moose (*Alces alces*), for example, are often much larger than those feeding primarily on White-tailed Deer (*Odocoileus virginianus*) (Mech 1970). Second, documenting extremes is useful to a full understanding of a species' basic life history. Third, as Wolf populations, which have been legally protected since 1974 in the contiguous 48 states, recover in new areas inhabited by humans, the potential sizes of their packs is of importance to resource managers seeking to minimize conflicts with humans. Wolves in Minnesota feed mostly on deer, and average pack sizes are relatively small (Mech and Frenzel 1971; Van Ballenberghe et al. 1975; Fritts and Mech 1981; Mech 1986; Fuller 1989). This note documents a record-sized pack.

Results

A pack of 23 Wolves was observed on 19 September 1998 by Jack E. Stewart of Ogilvie, Minnesota, in Pine County 8 km WNW of the town of Rutledge (46° 18′N; 92° 58′W). Some 7 km northwest of Stewart's observation, Ms. Shirley Kwapick of Minneapolis, Minnesota counted a pack of 22 Wolves crossing the driveway of her summer camp about 25 November 1998. Stewart (1999) recounted

his observation in a general way in a popular article. I interviewed Stewart and Kwapick to document the details of their observations and to record them here for the scientific community, along with a discussion of their significance. I also confirmed the presence of an active Wolf den the following year within 1.6 km of the Stewart observation.

Discussion

Of 410 Wolf pack years recorded for Minnesota, the largest pack documented in the state contained 17 members (Stenlund 1955; Van Ballenberghe et al. 1975; Fritts and Mech 1981; Mech 1986 and unpublished; Fuller 1989). The largest pack in adjoining Wisconsin (240 pack years) was 10 (Wisconsin Department of Natural Resources 1999). Olson (1938) claimed that Minnesota Wolf packs contained up to 30 wolves but gave no evidence, and he cited trappers who told him they had seen packs of 18 and 20.

Thus this observation of 22–23 Wolves represents a significant divergence from most mainland Midwestern Wolf packs, even those living where the primary prey is Moose (*Alces alces*). The area where these observations were made is many km from the nearest Moose range. Deer constitute the only large ungulate in the area other than livestock. Only seldom have Wolves killed livestock in the area. Thus this large Wolf pack had to be living primarily on deer.

The sizes of most Wolf packs are assessed in winter when they can be aerially observed. Because of mortality and dispersal over winter, the largest pack sizes are usually seen in December (Mech 1986). Thus a November observation, such as reported here is not a completely fair comparison to previous records. On the other hand, the observation of 22 was made only 1 week before December, so it is reasonably comparable with others and tends to confirm the 23 seen in September.

The fact that this record-large Wolf pack inhabited an area of deer rather than of larger prey is at least some evidence that any relationship between prey size and pack size (Mech 1970; Nudds 1978) is not tight. In addition, such a large pack indicates the potential size of packs that Wolves in a recovering population can reach when protected from human persecution.

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