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## Proximity of White-tailed Deer, *Odocoileus virginianus*, Ranges to Wolf, *Canis lupus*, Pack Homesites

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Seven adult female White-tailed Deer (*Odocoileus virginianus*) in northeastern Minnesota lived within 1.8 km of Wolf pack (*Canis lupus*) homesites without vacating their home ranges. Six of these deer and at least three of their fawns survived through the Wolf homesite period.

**Key Words:** White-tailed Deer, *Odocoileus virginianus*, Wolf, *Canis lupus*, predator-prey relations, predation, Wolf homesite, deer home ranges, Minnesota.

Adult white-tailed Deer (*Odocoileus virginianus*) chased by Wolves (*Canis lupus*) in the dense forests of northeastern Minnesota escape most of the time when chased during winter (Nelson and Mech 1993), and adult does are rarely killed during summer when dispersed on individual summer home ranges (Nelson and Mech 1986). Because Wolf pack territories (Mech 1973) are orders of magnitude larger than an individual deer's home range (Nelson 1979), most deer may encounter Wolves infrequently.

However, deer chased by Wolves often stop running to view their backtrail and only continue fleeing if the Wolves catch up to them (Mech 1970; Nelson and Mech 1993). Furthermore, nearby deer not being chased do not immediately leave the area, and we have even observed fresh deer tracks at 1-day-old kill sites. These observations suggest that deer might not vacate their home ranges when Wolves headquarter near them even though one might expect them to do so to minimize their exposure to Wolves. Nevertheless, it is unknown how deer respond in such situations.

The opportunity to gain insight into this subject arose when a pack of 15 Wolves (three wearing radio-collars) in 1987 established a late summer homesite adjacent to four radio-collared adult does, and another pack of five Wolves (including the radio-collared breeding female) in 1996 denned near three other radio-collared does in northeastern Minnesota, 48°N 92°W (Nelson and Mech 1981, 1987). We located the four does from the ground daily during fawning in late May and early June and one to two times/week by small aircraft July - September. We similarly located the three does weekly during April-May, daily during 1-14 June, twice daily during 15 June - July, and once/week thereafter. Ground and aerial observations of Wolves and aerial radio-tracking one to two times/week provided the Wolf homesite data. Ground (hand-held antenna) and aerial radio-tracking error was < 2 ha

and 50 m respectively (Hoskinson 1976; Nelson 1979).

Both groups of our radioed does in 1987 and 1996 remained in their summer ranges after wolves established a den or rendezvous site within 0.8-1.8 km of them (Table 1). We observed single fawns with three of the four 1987 deer in August and September. On 25 August we found the chewed collar of one of the deer, a 7-year-old doe, cached in the Wolf homesite. The doe had used an area 0.5 km south of the homesite, and it is uncertain how she died, whether she had moved closer to the homesite, or if Wolves had carried her collar there. This doe had increased her movements during July - August, nearly tripling her range size, suggesting that she had lost her fawn(s) sometime in June (Nelson and Mech 1981). Our three radioed does in 1996 survived throughout the wolf denning period, but we have no information about whether they had fawns during that time.

These findings indicate that forest deer do not necessarily vacate their home ranges when Wolves headquarter within 0.8-1.8 km of them. Our sample of seven deer is too small to analyze survival probabilities, but their proximity to Wolves would suggest some added risk of predation, and perhaps that was a factor in the death of one of them. However, the noteworthy unequivocal observation is that seven does remained on their traditional home ranges despite proximity to Wolf homesites and did not attempt to minimize exposure to the Wolves by moving away.

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TABLE 1. Spatial relationships between radioed deer and Wolves in Superior National Forest.

Year	No. Deer	Number of Locations Per Doe	Dates		Number of Wolves	Distance From Deer (km)
			Deer in Home Range	Wolves in Homesite		
1987	4 Does, $\geq 3$ Fawns	45	$\leq 11$ May - $> 30$ September	$\sim 18$ August - $\geq 9$ September	$\geq 6$ Adults 6 Pups <sup>1</sup>	1.0-1.8
1996	3 Does, ? Fawns	53-69	1 April - $\geq 28$ July	15 April - 26 July	5 Adults $\geq 2$ Pups	0.8-1.5

<sup>1</sup>At least 15 Wolves based on an observation on 17 December.

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