

THESIS ABSTRACT

RAPTOR USE OF THE IDAHO NATIONAL ENGINEERING LABORATORY

Raptors are high-trophic-level predators, and thus sensitive to environmental change. I conducted a basic ecological study of raptors using the Idaho National Environmental Laboratory (INEL), in southeastern Idaho, between 1991 and 1993 to assess effects of human activity on the site. Results were compared to previous raptor studies conducted on the INEL from 1974–76 and in 1982, as well as with studies of rough-legged hawks (*Buteo lagopus*), long-eared owls (*Asio otus*), and burrowing owls (*Speotyto cunicularia*) conducted during the late 1970s and early 1980s.

Roadside raptor surveys were conducted from January through May in 1992 and 1993. Principal species recorded were rough-legged hawks, red-tailed hawks (*Buteo jamaicensis*), ferruginous hawks (*Buteo regalis*), golden eagles (*Aquila chrysaetos*), prairie falcons (*Falco mexicanus*), and great horned owls (*Bubo virginianus*). Most raptors were perched on power poles when I observed them. Site facilities did not appear to affect wintering raptor distribution. A high occurrence of raptors within 10 km of site facilities was probably a result of power pole distribution, because power poles were usually close to facilities. Raptor populations were comparable to those noted during the 1970s, but lower than raptor numbers in 1982.

I conducted short-eared owl (*Asio flammeus*) counts during the spring 1992 and 1993. Counts were accomplished by walking 5 transects (2 km long). No owls were flushed; however, owls were observed during other phases of this study. Ten kilometers of transect is probably insufficient to monitor short-eared owl populations on the INEL.

To establish species occurrence and distribution of owls on the INEL, I conducted nocturnal calling surveys. At regular stops along five routes, I played owl calls and recorded all responses. Eight species were recorded during these surveys: great horned owl, long-eared owl, short-eared, burrowing owl, boreal owl (*Aegolius funereus*), northern saw-whet owl (*Aegolius acadicus*), western screech-owl (*Otus kennicottii*), and flammulated owl (*Otus flammeolus*). Most owls were detected in April and May in the juniper forests around the Lemhi foothills and Twin Buttes.

I monitored raptor nesting from March through August, concentrating on medium- to large-sized species. Long-eared owls and great horned owls nested in limited numbers during this study. Owl nesting success was comparable to other studies in the Great Basin. Red-tailed hawks, ferruginous hawks, and Swainson's hawks (*Buteo swainsoni*) were common nesters on the INEL. Red-tailed hawk numbers have increased since the 1970s, while Swainson's and ferruginous hawk numbers have remained relatively stable. Reproductive success was comparable to earlier studies. Nest distribution of ferruginous and Swainson's hawks was fairly random, with some avoidance of human development in the case of ferruginous hawks. Ferruginous hawks, a category 2 species under consideration for threatened and endangered species status, experienced higher nest failure when exposed to increased human activity on site. Red-tailed hawk nests were clustered along the Big Lost River. Food habits comparisons showed dietary overlap between Swainson's hawks, red-tailed hawks, and great horned owls. Ferruginous hawks and long-eared owls had little overlap with other species. Continued monitoring of raptors on the INEL through prey fluctuations would provide insight into relationships between raptors, as well as with their prey base and habitats.—**Richard W. Hansen. 1994. Department of Wildlife and Fisheries Sciences, South Dakota State University, Brookings, SD 57007-1696 U.S.A.**