



Seasonal Distribution of the Great Gray Owl (*Strix nebulosa*) in Southwestern Alberta

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Abstract.—Great Gray Owls (*Strix nebulosa*) have been banded and monitored west of Calgary in the foothills of Alberta from 1986 to 1996. Thirty-six adult owls have been banded: 16 males, 16 females and 4 of unknown sex. Great Gray Owls were captured during every month except August and October although the majority (56 percent) were banded from March-May (n=18). Four birds have been recaptured to date. A male was caught in the same location on 23 March and 9 May of 1986, a female was caught in the same location on 31 May 1987 and 18 November 1989, a female banded on 26 December 1988 was road-killed 14 km SSE on 19 September 1992, and a male banded on 17 June 1989 was recaptured 15 km NNE on 20 May 1990. Evidence of winter (non-breeding) territoriality has been observed. Seasonal change in abundance, indicative of a significant movement of birds into or out of the study area, has not been observed. Due to sub-regional variations in topography and climate, the study area encompasses a wide range of habitat types including muskeg, mature upland poplar-spruce mixed forest, old-growth riparian spruce forest and grasslands. The diversity inherent in this landscape appears to satisfy year-round habitat requirements for the Great Gray Owl, precluding a requirement for this species to exhibit large-scale seasonal migratory movements.

The Great Gray Owl (*Strix nebulosa*) breeds in northern and western Alberta south to Waterton Lakes National Park (Semenchuk 1992). In south-western Alberta the species is associated with mature coniferous and mixed forests. The Great Gray Owl exhibits irregular southward, often spectacular, invasions in many areas of its range. These irruptions are thought to be related to prey availability (Mikkola 1983, Nero 1980). Non-irruptive long-distance movements have also been documented. In Oregon, birds may move seasonally up to 43 km while in Manitoba individuals may migrate up to 700 km (Bull and Duncan 1993). In recent years major irruptions of Great Gray Owls in eastern North America occurred in 1978-1979, 1983-1984, and 1991-1992 (Bull and Duncan 1993).

Irruptions of Great Gray Owls do not appear to occur in southwestern Alberta. This area appears to harbor a breeding population that is

more or less observable dependent on winter snow thickness and prey density (pers. observ.). In this paper I offer data and provide a possible explanation why this is so.

STUDY AREA

The study area is a 55 km long by 32 km wide area along the Rocky Mountain Foothills, northwest of Calgary, from approximately latitude 51°10'N to 51°45'N and longitude 114°30'W to 115°00'W. Five natural subregions representing four of Alberta's Natural Regions occur in the study area (AEP 1994). Vegetational, climatic and elevational characteristics of these natural subregions results in a varied sub-regional landscape (table 1).

BANDING

Great Gray Owls have been banded, opportunistically, in the study area since 1986. A total of 36 adult owls have been marked through 31 December 1996 including 16 males, 16 females, and 4 of unknown sex. Owls were captured using a landing net or a bal-chatri baited with a dark-colored laboratory mouse as

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Table 1.—Characteristics of natural regions and subregions comprising Great Gray Owl habitat in southwestern Alberta.

Natural region	Natural subregion	Vegetation	Miscellaneous
Parkland	Foothills Parkland	aspen groves, closed aspen and poplar forest, grassland, willow groveland	≤ 1300 m elevation
Foothills	Lower Foothills	mixed forests of white spruce, black spruce, lodgepole pine, balsam fir, aspen, white birch and balsam poplar	winters are moderated by chinook winds
Foothills	Upper Foothills	forests dominated by lodgepole pine, white spruce, black spruce, and sub-alpine fir	greatest summer precipitation in Alberta (340 mm)
Rocky Mountain	Montane	forests of Douglas-fir and limber pine, lodgepole pine, white spruce, and aspen, grasslands	characterized by landscape pattern of open forests and grasslands, “chinook” winds cause intermittent snow-free conditions
Boreal Forest	Dry Mixed	mixed forests of aspen, poplar, white spruce, balsam poplar, and jack pine, peatlands	

a lure. Birds were banded or recaptured during every month of the year except August and October. The number of adults captured was spread evenly throughout the year, with a slight increase during May when adults are feeding nestlings; Jan (3), Feb (2), Mar (5), Apr (5), May (10), Jun (5), Jul (3), Sep (3), Nov (1), Dec (4).

Four re-encounters with banded Great Gray Owls have provided insight into their seasonal movement and distribution. A male banded on 23 March 1986 approximately 4 km southwest of Water Valley was recaptured there on 9 May. No nest was found but this bird was possibly on a breeding territory. A female was banded on 31 May 1987, also approximately 4 km southwest of Water Valley, and recaptured within 800 m of that site on 18 November 1989. This bird possibly maintained a home range during the breeding and non-breeding seasons. A female banded on 26 December 1988 approximately 15 km southwest of Bergen was found dead on a road on 19 September 1992 approximately 6 km west of

Water Valley. This bird was 14 km to the south-southeast after 4 years. A male, banded on 17 June 1989 approximately 4 km southwest of Water Valley, was recaptured on 20 May 1990 approximately 12 km north-northwest of Water Valley. This bird was 15 km to the north-northeast.

CHRISTMAS BIRD COUNTS

The Cochrane Wildlife Reserve Audubon Society Christmas Bird Count (CBC), positioned within the study area (center 51°26'N, 114°35'W), has been compiled since 1974 (23 years). Observations of Great Gray Owls from this CBC was normalized to calculate owls observed per 10 observers (fig. 1). Number of observers provides the best average correlation and the most frequent highest correlation with CBC data (Raynor 1975). The resultant bar graph shows an increasing cyclical pattern within what may be a natural range of variation. There is little suggestion of an irruption during any of the years presented.

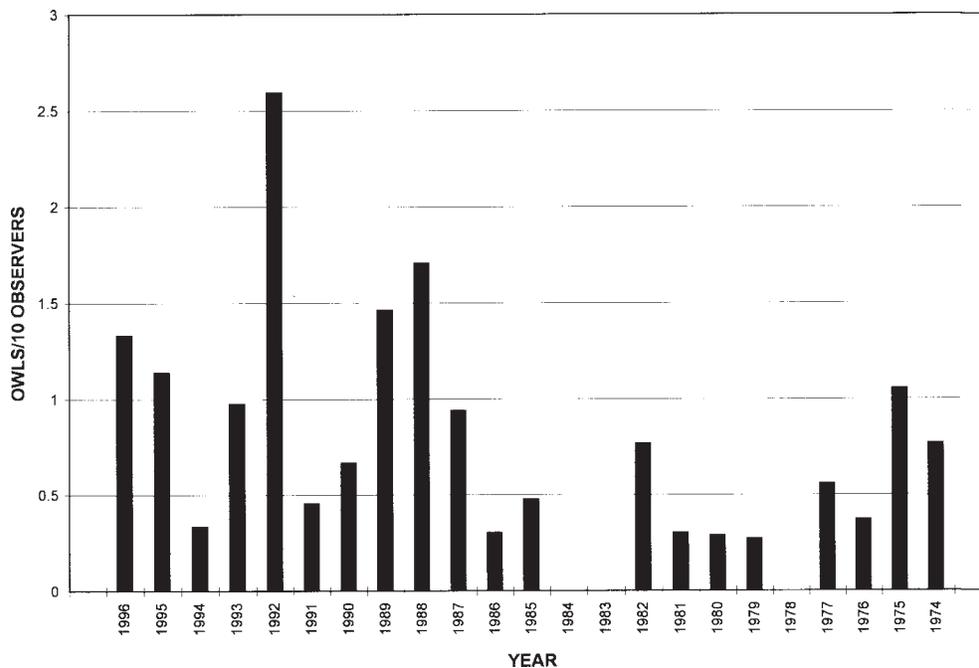


Figure 1.—Great Gray Owl occurrence on the Cochrane Wildlife Reserve based on Audubon Christmas Bird Count in southwestern Alberta, 1974-1996.

WINTER (NON-BREEDING) TERRITORIALITY

Intraspecific aggression, perhaps winter territoriality, has been observed in Ontario and Manitoba (Brunton and Pittiway 1971, Nero 1980). Although territoriality in this species requires further study (Bull and Duncan 1993), owls that do not disperse seasonally may be territorial much of the year. One incident of non-breeding intraspecific aggression, possibly territoriality, has been observed in the study area. The species is not known to defend foraging areas during the breeding season (Bull and Duncan 1993). On 26 November 1993 a Great Gray Owl was observed to fly from its hunting perch towards another Great Gray Owl hunting approximately 100 m away. The second bird retreated 150 m or so to the forest edge while the aggressor returned to its original perch where it vocalized several times.

LANDSCAPE CONSIDERATIONS

Five natural subregions representing four of Alberta's natural regions comprise the study area (AEP 1994) (table 1). Forests range from pure aspen to mixed to lodgepole pine and spruce. Petroleum exploration, forestry, and agriculture are all active industries in the Rocky Mountain Foothills and are contributing to a progressively more fragmented landscape. Great Gray Owls benefit from early stages of forest fragmentation (Bull and Duncan 1993). As a result, juxtaposition of forest, suitable for nest sites, with grasslands and openings is more frequent. Elevation in the study area can change locally 100 to 200 m in less than a kilometer. The resultant aspect and slope variation contributes to an exceptionally heterogeneous landscape.

DISCUSSION AND SUMMARY

Dramatic fluctuations of Great Gray Owl numbers in southwestern Alberta that would suggest irruptive movements were not observed in the study area. Owls were observed and captured for banding in all seasons. Recoveries of banded birds suggest that Great Gray Owls remain in the study area year-round, perhaps within a kilometer or two. Christmas Bird Count data does not suggest an irruption since 1974.

Due to its inherent landscape heterogeneity and land-use modification, the study area offers Great Gray Owls a wide selection of habitat alternatives in close proximity. Other studies in areas of topographic relief have indicated elevational rather than spatial adjustments by owls between seasons. Franklin (1987) found wintering Great Gray Owls at lower elevations than during the breeding season. It seems likely that prey availability and other ecological factors in southwestern Alberta vary widely across short distances such that long-range movement by Great Gray Owls to satisfy seasonal requirements is unnecessary.

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