

# WINTER FOOD HABITS AND ROOST SITE CHARACTERISTICS OF THE LONG-EARED OWL IN THE CRESTON VALLEY, BRITISH COLUMBIA

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## **Abstract**

The winter diet of the Long-eared Owl (*Asio otus*) was determined from 1,294 prey items extracted from 1,150 pellets retrieved from four roost sites in 1998, 2004, 2005 and 2006, in the Creston valley, British Columbia. Small mammals, principally rodents, were the main prey accounting for 99.6% of the diet. The Meadow Vole (*Microtus pennsylvanicus*) was the primary prey accounting for 96.9 % of the owl's diet. The predominance of *Microtus spp.* in the diet of the Long-eared Owl is consistent with numerous studies that have been conducted throughout North America. Collectively mammals accounted for 99.8% of prey biomass.

Vegetation characteristics are described for four roost sites used in the four winters.

## **Introduction**

In British Columbia, the Long-eared Owl (*Asio otus*), (Figure 1) occurs primarily throughout the southern interior where it is considered an uncommon, but local resident, in the Okanagan, Thompson, and Nicola valleys. Elsewhere in the province it is considered rare to very rare including the east and west Kootenays, Peace River region, the south mainland coast, and the east coast of Vancouver Island. There is a single record for the Queen Charlotte Islands (Campbell et al. 1990; Cannings et al. 1987). In the Creston valley, the Long-eared Owl is a rare resident (Butler et al. 1986; Van Damme 2002).

Most studies of the Long-eared Owl in North America have focused on its diet and nesting ecology but the species, like many other owls, also depends on other habitats that provide roosting sites (Marks et al. 1994) (Figure 2). Nesting, feeding, and roosting habitats are often different.

The only quantitative study on the diet of the



**Figure 1.** The occurrence of the Long-eared Owl in the Creston valley varies between years but when prey populations are high the species is present throughout the year. Kootenay River, 3 April 1996 (Linda M. Van Damme). BC Photo 3533.



**Figure 2.** A Long-eared Owl at a winter roost site in a black cottonwood tree along the Kootenay River, Creston, BC. 25 December 2006 (Marcia Long). BC Photo 3534.

Long-eared Owl in British Columbia was conducted during the breeding season from 1981 through to 1984 at nest sites in the southern Okanagan valley (Hooper and Nyhof 1986). In this study, small mammals comprised 97% of all prey and 98.3% of total prey biomass. Voles (*Microtus* spp.) contributed 51.8% to the total diet and 51.1% to the total prey biomass. The Meadow Vole (*M. pennsylvanicus*) was the most important component in the diet. In total, 10 species of mammals and five species of birds were identified.

Since seasonal information on the foods of the Long-eared Owl is lacking for the Creston valley a diet profile, and nonbreeding habitat requirements, cannot be developed for management and conservation of the species.

### **Study Area**

The Creston valley is located in southeastern British Columbia and is bounded by the international border to the south, Kootenay Lake to the north, Selkirk Mountains to the west, and Purcell Mountains to the east (Butler et al. 1986). It is a wide, flat valley that consists mainly of marshland, cultivated land, and river terraces. Riparian woodlands, especially black cottonwood (*Populus trichocarpa*), and shrublands of mainly willow (*Salix* spp.) and red-osier dogwood (*Cornus stolonifera*), are extensive. The Long-eared Owl roosts in riparian thickets which are abundant and in mixed coniferous-deciduous and pure coniferous forests which are less common at lower elevation.

### **Methods**

Long-eared Owl populations are known to fluctuate with three to four-year cycles of their prey (Marks et al. 1994; Holt 1997) and no winter roost sites were located in the Creston valley from 1999 through 2003.

Regurgitated pellets, and prey remains, were collected from the ground beneath four winter roost sites (Figure 3) in 1998, 2004, 2005, and 2006 from November through to March.

Standard methods were used to identify prey items as suggested by Marti (1987). This usually involved soaking pellets in warm water and teasing them apart to retain skulls of mammals, and skulls,



**Figure 3.** Small collection of Long-eared Owl pellets and “whitewash”, at a Kootenay River winter roost site in the Creston valley, BC. 4 February 2006 (Linda M. Van Damme). BC Photo 3535.

feet and feathers of birds.

Vegetative features were generally described for each roost site.

## **Results**

### **Prey Remains**

A total of 1,150 pellets were gathered from four roost sites during the winters of 1998, 2004, 2005, and 2006. These yielded 1,294 prey items. Small birds and mammals were identified as prey representing 11 species. As expected mammals dominated the diet (Table 1). The Meadow Vole was the primary prey accounting for 92.9% of the total diet and 96.9% of prey biomass. The Deer Mouse, at 3.4%, was the only other significant prey item.

Mammals also accounted for most of the prey biomass (99.8%) of which the Meadow Vole (96.9%) had the significant proportion (Table 1). Prey items ranged in weight from about 5.3 g (*e.g.*, Vagrant Shrew) to 43.7 g (*e.g.*, Long-tailed Vole).

### **Characteristics of Roost Sites**

Four roost sites were located in three distinct habitats in the Creston valley bottomlands.

The winter roost site discovered in 1998 has an elevation of 539 m and is located in riparian habitat along the Kootenay River. A small stand of black cottonwoods 15-21 m tall formed the upper structure of this habitat, but immediately adjacent was a dense stand of twisted and irregularly limbed cascara trees (*Rhamus purshiana*) up to 9 m in height with a maximum diameter at breast height (dbh) of 22 cm (Figure 4). The understory was comprised of common snowberry (*Symphoricarpos albus*) shrubs 1-2 m, and rose (*Rosa* spp.) bushes from 2-3 m. Blue clematis (*Clematis occidentalis*) climbing vines trailed over cascara limbs giving the appearance of an impenetrable thicket. One cascara tree branch, less than a metre from the ground was heavily coated in excrement indicating the Long-eared Owl had a favorite perch. The majority of the pellets were collected from beneath this perch. Large cattle pastures are located to the north of this roost. The site was active for one season and although the habitat remains intact, the site has subsequently become a popular roost for the Great Horned Owl (*Bubo virginianus*).

In 2004, a different roost site was discovered in riparian habitat along the Kootenay River at the

**Table 1.** Winter Diet of the Long-eared Owl in the Creston valley, British Columbia, 1998, 2004, 2005 and 2006.

Prey (n = 1,150 pellets)	No. individuals	% individuals	% biomass
<b>Birds</b>	<b>(5)</b>	<b>(tr.)<sup>1</sup></b>	<b>(0.2)</b>
Marsh Wren ( <i>Cistothorus palustris</i> )	1	tr.	tr.
Song Sparrow ( <i>Melospiza melodia</i> )	1	tr.	tr.
Dark-eyed Junco ( <i>Junco hyemalis</i> )	1	tr.	tr.
Pine Siskin ( <i>Carduelis pinus</i> )	1	tr.	tr.
House Sparrow ( <i>Passer domesticus</i> )	1	tr.	tr.
<b>Mammals</b>	<b>(1,289)</b>	<b>(99.6)</b>	<b>(99.8)</b>
Dusky Shrew ( <i>Sorex monticolus</i> )	11	0.8	0.2
Vagrant Shrew ( <i>S. vagrans</i> )	28	2.2	0.3
Southern Red-backed Vole ( <i>Clethrionomys gapperi</i> ).	1	tr.	tr.
Long-tailed Vole ( <i>Microtus longicaudus</i> )	3	0.1	tr.
Meadow Vole ( <i>M. pennsylvanicus</i> )	1,202	92.9	96.9
Deer Mouse ( <i>Peromyscus maniculatus</i> )	44	3.4	2.2
<b>Totals</b>	<b>1,294</b>	<b>100.0</b>	<b>100.0</b>

<sup>1</sup>tr. = trace (less than 0.05%)

same elevation as the 1998 site. This roost site was in a stand of black cottonwoods 12-20 m tall with an understory of willow 5-6 m, red-osier dogwood 1.5-2.5 m, black hawthorn (*Crataegus douglasii*) 7.6 m, mountain alder (*Alnus incana*) 6-9 m, rose 1.8-2.4 m, and common snowberry 1-2 m (Figure 5). Although there appeared to be a favorite perch for the Long-eared Owl judging by the “whitewash” on one tree trunk, pellets were scattered over a broad area. Extensive agricultural fields and cattle pastures lie to the north and south where the owls probably

hunt their preferred prey of voles. This site was very active in 2004 through 2006 but few pellets were found in 2007 and were not included in the analysis. The habitat structure at this site is unchanged.

A roost site, found in 2005, had an elevation of 548 m and was located in a mixed coniferous forest. The immediate habitat was in a mature, second growth forest of western redcedar (*Thula plicata*), western hemlock (*Tsuga heterophylla*), interior Douglas-fir (*Pseudotsuga menziesii* var. *glauca*), and western larch (*Larix occidentalis*), ranging in height





**Figure 4.** Along the Kootenay River, a small stand of cottonwoods with a dense understory of cascara trees and shrubs provided an ideal winter roost site. Creston, BC. 3 April 1998 (Linda M. Van Damme). BC Photo 3536.



**Figure 5.** The Long-eared Owl used a number of perches in this open cottonwood stand with a dense understory of shrubs along the Kootenay River, Creston, BC. 26 December 2006 (Linda M. Van Damme). BC Photo 3537.

from 24-30 m. The forest understory was open and easy to navigate over the many fallen rotted logs and small rivulets. The coniferous forest had an outside margin of black cottonwoods 21-33 m and paper birch (*Betula papyrifera*) 18-22 m which bordered a large hayfield (Figure 6). Pellets were mainly found under cedar trees. This roost site was active for one season and the habitat has subsequently been altered by land clearing for rural development.

Another roost site discovered in 2005 has an elevation of 536 m and is located in an open young



**Figure 6.** The coniferous forest provided a good canopy of cover for the Long-eared Owl at this winter roost site in west Creston, BC. 10 June 2006 (Linda M. Van Damme). BC Photo 3538.

stand of lodgepole pine (*Pinus contorta* var. *latifolia*), ranging in height from 2-11 m (Figure 7). The ground surface was covered in grass. The surrounding area was comprised of a mixed deciduous-coniferous forest. One tree appeared to be a favorite roosting perch as indicated by the amount of excrement adhered to the trunk and by the abundance of pellets below the tree. This roost site was in close proximity to a small cattail marsh and was active in 2005 and 2006. There have been no changes to this habitat.



**Figure 7.** In this open stand of young lodgepole pine trees, the Long-eared Owl roosted primarily in one tree, west Creston, BC. 3 September 2006 (Marcia Long). BC Photo 3539.

## Discussion

The diet of the Long-eared Owl in this study, with a predominance of *Microtus spp.*, is consistent with numerous other food habits studies. In 16 North American studies reporting greater than 1000 prey items (34,837 total items), mammals comprised 93.5 to 99.9% of diet (Marks et al. 1994). *Microtus* and *Peromyscus* were the most common prey. Of 21 non-breeding season studies representing 45,671 prey items, 17 studies reported a *Microtus* vole as dominating the Long-eared Owl diet (Holt 1997). These findings all support Marti's (1976) extensive review of the feeding ecology of Long-eared Owls on the continent.

The Creston valley provides year-round habitat for Long-eared Owls when microtine populations are high and at other times the agricultural landscape attracts small numbers of individuals during the nonbreeding seasons. The open farm fields (Figure 8), mixed open forests, and riparian shrub wetlands support small rodents and dense tangles of trees and shrubs provide a sanctuary for roosting owls. The important attributes for winter roosts appears to be dense vegetation for concealment and possibly thermal cover (Marks et al. 1994).



**Figure 8.** Long-eared Owl winter hunting habitat along fencerows and agricultural fields in the Creston valley, BC. 1 February 2006 (Linda M. Van Damme). BC Photo 3540.

All of the bird, and most of the mammal prey, captured in this study inhabit open spaces, such as agricultural fields, or edges of forests, shrublands,

and wetlands where they are vulnerable to predation. Three species, the Dusky Shrew, Deer Mouse, and Southern Red-backed Vole are forest-dwelling species and were restricted to the open mixed coniferous-deciduous woodlands.

The Meadow Vole is the predominant prey species for the Long-eared Owl, Barn Owl (Van Damme and Nyhof 2004), and Great Horned Owl, as well as a wide array of other birds and mammals that utilize the vole as a primary or secondary food source in the Creston valley (Van Damme 2006).

## Acknowledgements

A special thank you to Wayne Campbell who assisted with the identification of prey items. Marcia Long gladly helped with the collection of pellets and generously provided photos. I am also grateful to an anonymous reviewer for helpful comments.

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#### ***About the Author***

Linda has held a fascination for owls since early childhood when she bravely climbed high into the rafters of an old barn coming face to face with a Barn Owl. Over the last decade she has been collecting pellets on different species of owls to learn about their diet in the Creston valley landscape. She has kept field notes since 1980 on occurrence, distribution, and breeding behaviour of birds in the valley and finds there is always something new to learn!

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