

DIET OF THE GREAT HORNED OWL IN THE CRESTON VALLEY, BRITISH COLUMBIA, 1998 - 2005

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Abstract

The diet of the Great Horned Owl (*Bubo virginianus*) was determined from 2,491 prey items extracted from 1,748 pellets or found as prey remains, at roost and nest sites over eight years, from 1998 to 2005, in the Creston valley, British Columbia. The diet included 98.0% mammals by number and 87.0% by mass. The meadow vole (*Microtus pennsylvanicus*) accounted for 93.3% of the total diet. This small mammal is considered a keystone species in the Creston valley.

Introduction

The Great Horned Owl (*Bubo virginianus*) (Figure 1) is British Columbia's most common and widespread owl species and is considered an uncommon resident throughout most of the province (Campbell et al. 1990). It is only absent from the Queen Charlotte Islands. There are no quantitative studies of the diet of this predator in British Columbia and most of our knowledge comes from incidental observations published in various articles and books. Some of these include Barrow's Goldeneye (*Bucephala islandica*) (Munro 1929a), Domestic Chicken (*Gallus gallus*) (Brooks 1930), Gray Partridge (*Perdix perdix*), American Coot (*Fulica americana*), Northern Flicker (*Colaptes auratus*), and deer mouse (*Peromyscus maniculatus*) (Munro 1929b), Sharp-tailed Grouse (*Tympanuchus phasianellus*) (Ritcey 1995), and Ring-necked Pheasant (*Phasianus colchicus*), grouse species, Wood Duck (*Aix sponsa*), Northern Pintail (*Anas acuta*), Great Blue Heron (*Ardea herodias*), Sora (*Porzana carolina*), Barn Owl (*Tyto alba*), and varying (snowshoe) hare (*Lepus americanus*) (Cannings et al. 1987).

Of 12 species of owl known to occur in the Creston valley (Van Damme 2002), the Great Horned Owl is the one most encountered (Butler et al. 1986).



Figure 1. Great Horned Owl roosting in a black cottonwood, Creston valley, BC. 22 October 1995 (Linda M. Van Damme).

Despite its resident status, little is known about its natural history and especially its role as a predator in the valley.

Diet information is lacking for the Creston valley except for anecdotal accounts of prey identified at roost and nest sites. Although regional diets are reported elsewhere in North America (e.g., Marti and Rochert 1996) the variation has not been reported within British Columbia.

Study Area

The Creston valley is located in southeastern British Columbia and is bound by the Canada-U.S. 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, mainly willow (*Salix* spp.) and red-osier

dogwood (*Cornus stolonifera*), are extensive. The Great Horned Owl roosts and nests in all of these habitats.

Methods

Regurgitated pellets and prey remains were collected at seven roost and nesting territories between 1998 and 2005. These territories were located in the main habitats of the Creston valley, which include marshland, agricultural lands, riparian mixed coniferous deciduous forests, and shrub-covered dykes. I used standard methods to identify prey items as suggested by Marti (1987). This involved soaking pellets in warm water and teasing them apart to obtain skulls of mammals, skulls, feet and feathers of birds, and otoliths of fishes.

In addition, carcasses of animals and other prey remains found at roost and nest sites were collected and later identified. My study also incorporated prey items reported to me during the study period. Incidental prey items in historical notebooks and literature were not included in the analysis.

Results

Pellets (1,748) and prey remains (28) collected from seven nest and roost sites over eight years yielded 2,491 prey items. Four animal groups were represented in the prey items, although mammals dominated the diet (Table 1). The meadow vole (*Microtus pennsylvanicus*) (Figure 2) was the primary prey accounting for 93.3 % of the total diet. The deer mouse, at 3.7 %, was the only other significant prey item. Fishes and reptiles were almost negligible in the diet while birds (1.5 %) may be utilized during periods of low microtine cycles or inclement weather. In total, 26 animal species were represented in the diet.

Mammals accounted for most of the prey biomass (87.6 %) of which the meadow vole (84.4 %) had the greatest proportion (Table 1). Although this vole is small, its contribution to the overall diet is much larger than reported elsewhere (C.S. Houston pers. comm.; Marti and Kochert 1996). Prey items ranged in weight from about five grams (e.g., shrew) to over 2,000 grams (e.g., Great Blue Heron) but it is not known how larger prey were acquired and utilized. The Great Horned Owl opportunistically utilizes other prey, including fishes (Figure 3).

In the Creston valley the Great Horned Owl hunts from perches bordering open habitats such as agricultural lands, marshes, sloughs, and dykes along slow-moving rivers. All species listed in Table 1 are directly associated with open upland habitats, except Barred Owl (*Strix varia*) which may hunt meadow voles in farm fields and shrublands.

Local residents and visiting naturalists in the Creston valley have also observed the predatory behaviour of Great Horned Owl. Anecdotal prey items not included in my analysis include: Common Garter Snake (*Thamnophis sirtalis*), Canada Goose gosling (*Branta canadensis*), Wood Duck, American Wigeon (*Anas americana*), Muscovy Duck (*Cairina moschata*), Ring-necked Pheasant, Ruffed Grouse (*Bonasa umbellus*), California Quail (*Callipepla californica*), Domestic Chicken, American Bittern (*Botaurus lentiginosus*), American Kestrel (*Falco sparverius*), domestic rabbit (*Oryctolagus cuniculus*), red squirrel (*Tamiasciurus hudsonicus*), striped skunk (*Mephitis mephitis*), and domestic cat (*Felis domesticus*). On one occasion F. Ryckman (pers. comm.) was surprised to watch a Great Horned Owl swooping at a coyote (*Canis latrans*) and tearing out clumps of fur (Figure 4).

Discussion

Bent (1938) best describes the Great Horned Owl's diet as "anything that walks, swims, flies or crawls" and Voous (1988) suggests it has the most diverse prey profile of all North American raptors. Furthermore, Errington et al. (1940) suggests this



Figure 2. The meadow vole was the single most important prey for Great Horned Owl in the Creston valley between 1998 and 2005. Creston valley, BC. 7 March 1999 (Linda M. Van Damme).

owl is the most opportunistic of all avian predators.

Despite its reputation the Great Horned Owl preys primarily on mammals the species of which vary seasonally and geographically throughout North America. For example, in Alaska and the Yukon Territory, snowshoe hares are the main prey (Houston et al. 1998). In the Creston valley, the owl's diet was less diverse than reported elsewhere. In Idaho, just south of the Creston valley, Marti and Kochert (1996) found 16 species of mammals of which kangaroo rats (*Dipodomys ordii*) and montane voles (*Microtus montanus*) accounted for over 42 % of prey items.

In eastern Washington 12 species of mammals accounted for over 91% of the diet of the Great Horned Owl of which the Great Basin pocket mouse (*Perognathus parvus*), deer mouse, and montane vole



Figure 3. During periods of heavy snowfall, when meadow voles are less accessible, the Great Horned Owl diversifies its diet by feeding on fishes. Creston valley, BC. 11 December 2004 (Linda M. Van Damme).

Table 1. Diet of the Great Horned Owl in the Creston valley, British Columbia, 1998 - 2005.

Prey	No. individuals	Individuals (%)	Biomass (%)
PELLETS (n = 1,748)			
Fishes	(11)	(0.4)	(0.3)
Unidentified fish	11	0.4	0.3
Reptiles	(1)	(tr.)	(0.2)
Unidentified snake (<i>Thamnophis</i> sp.)	1	tr.	0.2
Birds	(9)	(0.4)	(1.6)
Mallard (<i>Anas platyrhynchos</i>)	1	tr.	1.2
Mourning Dove (<i>Zenaida macroura</i>)	2	0.1	0.2
American Robin (<i>Turdus migratorius</i>)	1	tr.	0.1
Savannah Sparrow (<i>Passerculus sandwichensis</i>)	1	tr.	tr.
Song Sparrow (<i>Melospiza melodia</i>)	1	tr.	tr.
House Sparrow (<i>Passer domesticus</i>)	3	0.1	0.1
Mammals	(2442)	(98.0)	(87.0)
Vagrant Shrew (<i>Sorex vagrans</i>)	11	0.4	0.1
Long-tailed Vole (<i>Microtus longicaudus</i>)	4	0.2	0.2
Meadow Vole (<i>M. pennsylvanicus</i>)	2327	93.3	84.4
Deer Mouse (<i>Peromyscus maniculatus</i>)	92	3.7	1.9
Northern Pocket Gopher (<i>Thomomys talpoides</i>)	2	0.1	0.2
House Mouse (<i>Mus musculus</i>)	4	0.2	0.1
Ermine (<i>Mustela erminea</i>)	2	0.1	0.1
PREY REMAINS (n = 28)			
Birds	(27)	(1.1)	(10.2)
Mallard (<i>A. platyrhynchos</i>)	2	0.1	2.5
Northern Pintail (<i>A. acuta</i>)	1	tr.	0.7
Great Blue Heron (<i>Ardea herodias</i>)	1	tr.	1.8
American Coot (<i>Fulica americana</i>)	2	0.1	1.1
Rock Pigeon (<i>Columba livia</i>)	2	0.1	0.6
Mourning Dove (<i>Z. macroura</i>)	8	0.3	0.9
Barn Owl (<i>Tyto alba</i>)	3	0.1	1.5
Barred Owl (<i>Strix varia</i>)	1	tr.	0.6
Short-eared Owl (<i>Asio flammeus</i>)	1	tr.	0.3
Northern Flicker (<i>Colaptes auratus</i>)	2	0.1	tr.
Swainson's Thrush (<i>Catharus ustulatus</i>)	1	tr.	tr.
European Starling (<i>Sturnus vulgaris</i>)	3	0.1	0.1
Mammals	(1)	(tr.)	(0.6)
Muskrat (<i>Ondatra zibethicus</i>)	1	tr.	0.6
Totals	2491	100.0	100.0

tr. = trace (<0.05%)



Figure 4. Artist's rendition of Great Horned Owl swooping at coyote (Ron Granger).

were the most significant prey items (Knight and Jackman 1984). Although Great Horned Owls can take larger prey, and there is a diversity of habitats available for hunting, they appear to concentrate their food gathering in agricultural lands distributed throughout the Creston valley.

Other native animals in the Creston valley utilizing the meadow vole as a primary or secondary food source include Great Blue Heron, Cattle Egret (*Bubulucus ibis*), Turkey Vulture (*Cathartes aura*), Osprey (*Pandion haliaetus*), Bald Eagle (*Haliaeetus leucocephalus*), Northern Harrier (*Circus cyaneus*), Swainson's Hawk (*Buteo swainsoni*), Red-tailed Hawk (*Buteo jamaicensis*), Ferruginous Hawk (*Buteo regalis*), Rough-legged Hawk (*Buteo lagopus*), American Kestrel (*Falco sparverius*), Merlin (*Falco columbarius*), Prairie Falcon (*Falco mexicanus*), Ring-billed Gull (*Larus delawarensis*), Herring Gull (*Larus argentatus*), Barn Owl (Van Damme and Nyhof 2004), Western Screech-Owl (*Magascops kennicottii*), Northern Hawk Owl (*Surnia ulula*), Northern Pygmy-Owl (*Glaucidium gnoma*), Barred Owl, Long-eared Owl (*Asio otus*), Short-eared Owl, Northern Saw-whet Owl (*Aegolius acadicus*), Loggerhead Shrike (*Lanius ludovicianus*), Northern Shrike (*Lanius excubitor*), Black-billed Magpie (*Pica pica*), American Crow (*Corvus brachyrhynchos*), Common Raven (*Corvus corax*), coyote, Canada lynx (*Lynx canadensis*), and bobcat (*Lynx rufus*).

Munro (1950) found few specimens of the meadow vole while conducting field work in the Creston valley in the late 1940s. Since the modernization of the dyking infrastructure following the 1948 flooding, the meadow vole has successfully colonized grasslands adjacent to marshes and agricultural lands (Munro 1958). At the peak of a three to four year cycle, voles cause significant damage to agricultural crops resulting in financial losses to farmers (C. Colonel pers. comm.). The Great Horned Owl, along with the species listed above, are a great benefit to the farmer in helping to control vole populations.

The meadow vole, a "keystone species", helps support the entire ecosystem of the Creston valley by providing a significant source of food year-round.

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About the Author

As an avid naturalist, Linda initiates new research projects in her quest for knowledge. And with her new digital camera she will be able to record those events.

“A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise.”

Aldo Leopold, *The Ecological Conscience*
