



## Monitoring Great Horned Owls Nesting on an Artificial Platform in the Creston Valley, British Columbia, 1997–2013

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### Abstract

A Great Horned Owl (*Bubo virginianus*) nest site in a rural open hayshed in the Creston valley, British Columbia, was monitored for occupancy and success between 1997 and 2013. During the 17-year period, owls nested 13 years (76%), including 12 years on an artificial nesting platform and once in a nest built by Common Raven (*Corvus corax*). Seventeen young Great Horned Owls left the nest.

### Introduction

Great Horned Owl (*Bubo virginianus*) is a common year-round resident in the Creston valley, British Columbia (Butler et al. 1986, Campbell et al. 1990, Van Damme 2012), where it nests in a variety of natural sites, mainly in pure and mixed deciduous or coniferous woodlands. Most breeding Great Horned Owls use old or abandoned nests of Red-tailed Hawk (*Buteo jamaicensis*), or natural cavities in mature trees. Some may also select nests constructed by other birds such as Great Blue Heron (*Ardea herodias*), Bald Eagle (*Haliaeetus leucocephalus*), Common Raven (*Corvus corax*), and American Crow (*Corvus brachyrhynchos*) (Campbell et al. 1990). Great Horned Owl occasionally uses artificial nest structures elsewhere in North America (Houston et al. 1998) but such use has not been reported previously in British Columbia (Campbell et al. 1990).

The Creston valley is located in southeastern British Columbia and is bounded by the Canada-United States border in the south, Kootenay Lake in the north, the Selkirk Mountains on the west, and the Purcell Mountains on the east (Butler et al.

1986). It is a wide, flat valley that consists mainly of cultivated lands, marshlands, and river terraces (Figure 1). Riparian woodlands, especially large black cottonwood (*Populus trichocarpa*) and shrub lands are extensive, consisting of mainly willow (*Salix* spp.) and red-osier dogwood (*Cornus stolonifera*). Coniferous forests interface with farmlands and wetlands in parts of the valley bottom but are more extensive throughout the upland plateaus. Great Horned Owl hunts, roosts and nests in all of these habitats (Van Damme 2005).



**Figure 1.** The Creston valley, a wide fertile valley in the West Kootenay region of British Columbia, supports significant numbers of nesting raptors, including Great Horned Owl. Photo by Cyril Colonel, 13 August 2005.

In this paper I discuss the activity at a nesting site for Great Horned Owls in the Creston valley from 1997 through 2013, including anecdotal information as it was observed. Although mated pairs of Great Horned Owls occupy territories year-round and long term (Houston et al. 1998), it is not known how many individual owls occupied the territory under observation. Houston et al. (1998) suggested that pairs mate for at least five years and perhaps for life.

In 1996, Cyril Colonel, working manager of Piper Farms, discovered an un-occupied Common Raven nest among the rafters of an open hayshed. The stick nest was subsequently replaced with an artificial nesting platform, which has been *in situ* since 1998 and was monitored annually for an additional 16 consecutive years. I considered a nest to be successful if young had left the nest and were either roosting or making short flights about the hayshed. The hayshed is a wooden structure, open on three sides with a peaked metal roof, and is usually filled with hay and frequently used to store farm vehicles and machinery (Figure 2). It measures about 39 m (128 ft) long, 23 m (75 ft) wide, and 14 m (45 ft) high. The support rafters for the roof, about 10 m (32 ft) from the ground, are spaced to allow planks and platforms to be laid for walking.



**Figure 2.** Great Horned Owls were monitored between 1997 and 2013 at this hayshed. The open sides and one end provided easy access to the nesting platform on the rafters inside. *Photo by Linda M. Van Damme, Creston, BC, 10 May 1998.*

### ***Annual Nest Checks, 1997 - 2013***

An overview of Great Horned Owl nesting activity, brood size, and nest departure is summarized below by year in chronological order. Noteworthy additional notes are also included for each year. Nest checks were incidental to other birding and survey activities.

#### **1997**

In early spring of 1997, a Common Raven nest that had been built among the rafters in the hayshed was occupied by a Great Horned Owl (Figure 3) despite daily farming activity below the site. It was well into April before two downy owl chicks were observed moving about the nest. Upon leaving the nest, the young owls clambered about the wooden rafters, which fascinated the farm workers. One young owl perched on a low wooden crossbeam where it dozed all day and was quite approachable. The adults and young remained around the farmstead for two months before leaving the area. During the stacking of hay bales in late summer, the stick nest was inadvertently dislodged and consideration was given to providing an alternate nesting substrate.



**Figure 3.** Great Horned Owl at a nest built the previous year by Common Ravens on the rafters of a hayshed. *Photo by Linda M. Van Damme, Creston, BC, 5 May 1997.*

## 1998

In mid-January, I encouraged Cyril to build a nesting platform where the raven's nest had been situated the previous year. He nailed a piece of plywood framed with 2 x 4s to the rafters, approximately 10 m (32 ft) from the ground. Filling a gunny sack with sticks he fashioned a nest then lined it with hay. On 2 February, I received a phone call from him stating: *You can officially write down in your field notebook that the nest is complete and my mouth is sure sore from carrying all those sticks up there.* He added: *From the rear rafters of the hayshed those owls kept a watchful eye as the construction of their new nest took place.* The owls immediately adopted the new nest. Cyril and I decided to monitor this platform nesting with visual nest checks from egg laying to nest departure and beyond. It was the first such site in the valley.

On 4 March, Cyril phoned to say: *I can see a tail sticking out of the nest.* After another three weeks passed, I was vaulted through the air on a hay bale raised by a forklift operated by Cyril (Figure 4). Three glossy white eggs were nestled in the lining of hay (Figure 5). On 5 April, three white, downy chicks were observed in the nest (Figure 6), which was stockpiled with Meadow Voles (*Microtus pennsylvanicus*), the main prey item in the diet of Great Horned Owl in the Creston valley (Van Damme 2005). The nestlings grew quickly and by 19 April wing and tail feathers were developing but the head and body were still covered with down (Figure 7) and on 4 May the young were close to leaving the nest (Figure 8).

Over time, the ground below the nest became littered with bones, regurgitated pellets, and feathers of Mallard (*Anas platyrhynchos*) and Barn Owl (*Tyto alba*) were identified. Don Stace-Smith, the on-site mechanic, looked up from his work one day in time to see a Great Horned Owl flying across the field towards the hayshed with a Common Muskrat (*Ondatra zibethicus*) in its talons.

Once the young were navigating away from the nest I decided to spend a night with them, sitting under my truck canopy to watch the theatrics. I was startled by a young owl when it jauntily walked over to explore my truck. It was comical to watch one young owl attempting to walk up a smooth pipe, from which it kept sliding to the ground and even with flapping

wings and fast-moving feet it could not join the adult perched at the other end. With dusk approaching, I listened to the young owls begging loudly for food. In turn, each youngster received a vole, exchanged from bill to bill. Once fed, the noisy young settled for the night and I fell asleep to a chorus of crickets.



**Figure 4.** Cyril Colonel used a forklift to raise Linda Van Damme to a Great Horned Owl nest to determine its contents. *Photo by Carol Potasynek, Creston, BC, 15 May 1998.*



**Figure 5.** It is uncommon to find a Great Horned Owl nest with three eggs in British Columbia as the usual clutch size is two eggs. *Photo by Linda M. Van Damme, Creston, BC, 22 March 1998.*



**Figure 6.** Great Horned Owl nestlings, just over a week old, vary in size as the eggs hatch asynchronously. Note the Meadow Vole carcasses stockpiled in the nest. *Photo by Linda M. Van Damme, Creston, BC, 8 April 1998.*



**Figure 7.** The smallest of the three Great Horned Owl nestlings is hiding between its larger siblings. The wing, back, and tail feathers are developing. *Photo by Linda M. Van Damme, Creston, BC, 19 April 1998.*



**Figure 8.** Even though the Great Horned Owl chicks are close to leaving the nest they remained in the vicinity of the hayshed and farm for an additional 16 weeks. *Photo by Linda M. Van Damme, Creston, BC, 4 May 1998.*

A few days later, I received an alarming phone call from Cyril, informing me that the young owls were gone. I tried to reassure him that they were likely hiding somewhere in the hayfield but he insisted the men had looked everywhere and they feared predators had taken them. It wasn't until I returned from my annual vacation six weeks later that I learned the owls had been taken by predators, the two-legged kind! Apparently, a couple of young lads working on the farm with their father were equally fascinated with the young owls and despite getting scratched by sharp talons, they captured the trio and stowed them in a wooden box in the pickup truck. The father made the discovery on returning home but the sons begged to be allowed to keep the owls overnight in an empty chicken pen. The boys eagerly caught many mice for the young owls. Surreptitiously, the young Great Horned Owls were returned to the hayshed the following day. A week passed before the father inquired whether the owlets were still around. Cyril commented that they went missing for a day but then showed up and the parents resumed feeding them. By September, the young owls had left the area and the adults were seen intermittently roosting in the hayshed.

### 1999

On 7 February, Cyril refurbished the nest by climbing an extension ladder with a sack of new sticks and hay (Figure 9). Ten days later, a Great Horned Owl was sitting in the nest and on 3 March an adult was incubating three eggs. By 31 March, three recently hatched nestlings were present and on 9 April, three chicks were covered with thick white down. On 30 April, two surviving young were developing feathers. The larger of the two chicks was out of the nest on 9 May and by 15 May both chicks were found perched on a rafter. By 27 May, both young were observed flying short distances in the vicinity of the hayshed.

Unlike nestings in 1997 and 1998, when voles were found in the nest, prey remains found around the nest were more varied. In addition to Meadow Voles, feathers of Mallard, Northern Pintail (*Anas acuta*), Great Blue Heron, Rock Pigeon (*Columba livia*; formerly Rock Dove), Swainson's Thrush (*Catharus ustulatus*), Northern Flicker (*Colaptes auratus*), and Barn Owl were also present. I also discovered

European Starling (*Sturnus vulgaris*) skulls in some pellets. When I mentioned starlings to two of the farm workers one day, they exchanged smiles. It turns out that a starling nest was found in one of the intake pipes on a tractor and once the equipment was fired up the nestlings would perish so the workers pulled out the feathered young and tossed them onto a hay bale where they were quickly retrieved by a Great Horned Owl. The workers watched as the owl tore the starlings into small pieces to feed their noisy and hungry chicks.



**Figure 9.** In 1999, Cyril Colonel refurbished the Great Horned Owl nest with new sticks and a lining of fresh hay. Photo by Linda M. Van Damme, Creston, BC, 7 February 1999.

### 2000

Although Great Horned Owls used the hayshed for roosting throughout the year, there was no evidence of nesting.

### 2001

A pair of Great Horned Owls was present throughout the winter and used the hayshed for roosting but again there was no evidence of nesting.

### 2002

Great Horned Owls roosted in the hayshed and adjoining equipment shed during February and March. Although an adult was sitting low in the nest on 30 April there was no further evidence of nesting.

### 2003

No Great Horned Owls were found roosting in the hayshed during the winter and there was no evidence of nesting. On 16 March, an emaciated Great Horned Owl was found dead in another hayshed about half a kilometre away.

### 2004

On 10 February, Cyril refurbished the nest with new sticks and hay. On 28 February, one Great Horned Owl was roosting in the hayshed and by 8 March, two adults were observed, but not at the nest site. By 10 April, the nest remained unoccupied and the season ended with adults present but not nesting.

### 2005

On 20 February, Cyril observed a Great Horned Owl step into the nest and settle low in it. Visits on 7 and 26 March found the adult sitting in the nest with its mate roosting nearby. On 7 April, an adult flew from the nest but no young were observed. On 4 May, the adult was perched on a rafter in the hayshed and still no young were obvious. On 21 May, the nest was examined with a mirror attached to the end of a long handled pole. The nest contained three eggs, possibly infertile.

### 2006

Two long ear tufts were visible at the nest on 14 February and the Great Horned Owl's mate was roosting nearby in the hayshed. On 10 March, the adult was still in an incubating position. On 16 April, both adults were perched at the back of the hayshed and no nestlings were observed. On 2 May, there was still no sign of young but adults were present. On 7 June, a check with a pole mirror found the nest was empty.

### 2007

On 1 March, a Great Horned Owl was perched near the nest. On 18 March an adult was sitting in the nest and was still present on 8 April. Two adults were perched at the back of the hayshed on 6 May, away from the nest, suggesting that nesting might be unsuccessful. An examination of the nest by a pole mirror showed it contained one stained but intact egg. The nesting attempt proved unsuccessful this season.

### 2008

A pair of Great Horned Owls roosted all winter in the hayshed and an adult was observed by Cyril on the nesting platform on 19 March. The downy head of a Great Horned Owl nestling was barely visible as it peered over the wooden frame of the nesting platform on 9 May and by 20 May, it was flying short distances around the hayshed. Both adults were also present.

### 2009

A Great Horned Owl was crouched on the nesting platform on 11 March (Figure 10) and by mid-April it had settled on the nest, suggesting nesting activity. A visit on 24 April found the adult sitting high in the nest, apparently brooding young. A single chick was observed on 10 May with well-developed wing and tail feathers. According to farm workers, it left the nest later in the month.



**Figure 10.** An intent-looking Great Horned Owl was partially settled on its nest on the first visit in mid-March 2009. *Photo by Linda M. Van Damme, Creston, BC, 11 March 2009.*

### 2010

A Great Horned Owl was first observed sitting in the nest on 7 March. By 5 April, two downy heads were showing above the rim of the 2 x 4 inch enclosing framework but it was sometimes difficult to determine how many Great Horned Owl nestlings are in a nest when all that can be seen was a mass of downy bodies. Later, the larger chick, still with down, stood up while the adult remained close to the nest on a nearby beam. Two downy young were observed on 20 April and wing feathers were developing. No young were observed on 11 May although one adult was present in the hayshed. On 21 May, Cyril observed one young flying in the hayshed.

### 2011

A Great Horned Owl was first observed sitting on the nesting platform on 10 February. A downy nestling was briefly seen on 9 April. Two chicks were moving about the nest on 14 April (Ray Johnson, pers. comm.). On 19 April, two downy young, with feathers emerging on the back and wing tips, were quite visible. The adult was observed hunting in the hayshed where it caught a Deer Mouse (*Peromyscus maniculatus*) (Figure 11) and fed it to a nestling. By 17 May, one young was flying in the hayshed with two adults perched in the rafters. There was no sign of the second chick.



**Figure 11.** A Great Horned Owl observed holding a Deer Mouse caught inside the hayshed before flying to the nest to feed its young. Photo by Linda M. Van Damme, Creston, BC, 19 April 2011.

### 2012

A Great Horned Owl was first observed sitting on the nesting platform on 21 February. By 9 April, the heads of two downy, white chicks could be seen in the nest with the adult perched nearby. Cyril visited the site on 3 May and observed three large downy chicks with wing feathers developing. On 8 May, three owlets were loudly begging while perched low on the rafters of the hayshed (Figure 12). A Coyote (*Canis latrans*) was slinking around on the north side of the shed, perhaps lured by all the vocalizing. On 19 May, one of the young owls flew out into the hayfield, whereas another flew to the back of the hayshed and the third remained perched on a low rafter. The adults were not present.

### 2013

On 23 February, a Great Horned Owl was observed near the nest and its mate was roosting at the back of the hayshed. On 2 March, the female was sitting in the nest. By 23 April, two downy nestlings were visible with feathers developing on the back and wings. An adult was perched near the nest. One young left the nest by 8 May and was observed at the back of hayshed only 1 m (3 ft) from the ground but its sibling was still in the nest. Both adults were roosting in the hayshed and it was assumed that the young had left the nest.



**Figure 12.** This is the second family of Great Horned Owl triplets that left the nest in the hayshed during 17 years of continuous monitoring of the nest site. *Photo by Linda M. Van Damme, Creston, BC, 8 May 2012.*

### **Discussion**

In British Columbia, Great Horned Owls nest primarily in natural sites (98%;  $n = 97$ ), including old nests of raptors, cavities, crevices, and broken tops of mature trees, hollows in banks and cliffs, but occasionally on support beams under bridges (Campbell et al. 1990). Between 1997 and 2013, a pair of Great Horned Owls but not necessarily the same individuals roosted and/or nested in an open, wooden hayshed in the Creston valley that was used by farmers year-round. This provided a unique opportunity to monitor the use of an artificial structure for nesting, an unreported nest site for the province.

Although Great Horned Owls roosted in the hayshed most years, initiation of nesting attempts occurred in 13 of the 17 years (76%) of monitoring (Table 1). There was a five-year consecutive period between 2000 and 2004 when the owls did not nest but in 2002 a female was observed sitting low in the

nest (Table 1). Of the 13 nesting attempts, four nests (31%) failed and from nine nests (69%) at least one young left and apparently fledged (Table 1). This is almost 20% higher than reported for success using artificial nest platforms elsewhere in North America despite frequent activity by farmers using the hayshed in Creston (Bohm 1980).

Various authors use different criteria when considering a nest to be successful. Bohm (1980) considered success if a nestling survived to four weeks of age. Others considered premature and initial departure from the nest as an indication of success (Errington 1932, Orians and Kuhlman 1956). In the Creston valley, 13 successful nestings produced 1.9 young per nest, which is slightly higher than the productivity other studies reported at natural nest sites in New York and Montana (Hagar 1957, Seidensticker and Reynolds 1971). In Saskatchewan, Houston (1975) noted that the number of young fledged per success-



**Table 1.** Roosting and nesting activity of Great Horned Owls in a hayshed in the Creston valley, BC, during the breeding period (February to June) from 1997 to 2013.

Year	Roosting <sup>1</sup>	Failed Nesting <sup>2</sup>	Successful Nesting <sup>3</sup>
1997	-	-	2Y
1998	-	-	3Y
1999	-	-	3Y; 2Y fledged
2000	2	-	-
2001	2	-	-
2002	2	♀ sitting low in nest	-
2003	-	-	-
2004	2	-	-
2005	-	3E; 0Y	-
2006	2	♀ sitting low in nest	-
2007	2	1E; 0Y	-
2008	-	-	1Y
2009	-	-	1Y
2010	-	-	2Y
2011	-	-	2Y; 1Y fledged
2012	-	-	3Y
2013	-	-	2Y

<sup>1</sup>Number of Great Horned Owls roosting in hayshed during part, or all, of the breeding season but did not initiate or complete nesting activities.

<sup>2</sup>Behaviour that suggests nesting as well as nests containing eggs that did not hatch. E refers to egg(s).

<sup>3</sup>Number of young that left the nest; Y refers to young.

ful nest ( $n = 385$ ) between 1970 and 1975, in both natural and artificial sites, ranged between 1.7 and 2.5 young.

During the eight-year period between 2000 and 2007 there was either no nesting or unsuccessful attempts at nesting (Table 1). Houston et al. (1998) mentioned that individual females skip breeding about every third year in temperate zones but that a relatively constant proportion of females may initiate clutches each year. In Saskatchewan, where intensive studies of nesting Great Horned Owls have been conducted, brood sizes were largest and eggs were laid the earliest during years of high prey abundance, and incidence of nonbreeding likewise varied reciprocally with prey abundance (Houston 1998).

It appears that the use of an artificial nest

structure does not encourage earlier nesting as first egg and nestling dates determined during the 17-year monitoring period fell within what is already documented for British Columbia. Incubating owls have been reported as early as 5 February (pers. obs.) and nestlings on 23 March (Campbell et al. 1990, 2007).

Over the long-term, Great Horned Owls using artificial platforms for nesting may have an advantage over those using natural sites. Stick nests, especially in trees, must annually endure the effects of wind and storms, the weight of accumulated snow, natural decay of support limbs, degeneration of nest material, logging, and land-clearing. Nest success on sheltered artificial platforms may be enhanced due to protection from extreme temperatures, heavy rain, and

unseasonable storms.

Finding a pair of Great Horned Owls nesting one year, and returning to the site in subsequent years and finding owls present does not necessarily confirm breeding (Table 1). Such sites should be checked thoroughly each year. ♪

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### **About the Author**

Linda continues to monitor the nesting activity of raptors throughout the Creston valley. In March 2013, she completed a 20-year personal project of roadside raptor surveys.