Status, Size, and Breeding Chronology of an Urban Great Blue Heron Nesting Colony at Vernon, British Columbia, 1986-2008

Chris Siddle

6131 Silver Star Road, Vernon, BC V1B 3P3

Abstract

In 1986 three pairs of Great Blue Heron (*Ardea herodias*) established a small breeding colony in Vernon, British Columbia. The colony, situated in a grove of black cottonwoods (*Populus balsamifera* ssp. *trichocarpa*) in an industrial region of the city, has slowly increased over 23 years to 45 active nests in 2008.

Adult herons usually return to the colony in early March and quickly establish pair bonds. Copulation may occur as early as 11 March and nests are refurbished, or built anew, throughout the remainder of the month. Incubation is evident from late March through April and chicks hatch from late April to mid-May. Most nestlings fledge during July although in some years nestlings have been observed in mid-August. In 1993 and 1994, 3.3 and 4.0 young fledged per nest respectively.

Breeding herons react negatively to human disturbance below the colony, low over-flights of aircraft, hot air balloons, construction activities, and visits by Bald Eagles (*Haliaeetus leucocephalus*).

Introduction

In British Columbia, Great Blue Heron (*Ardea herodias*) (Figure 1) is primarily a colonial-nesting species but small numbers also nest singly in isolated locations (Campbell et al. 1990). Colonies located within large cities are unusual in the province. All of these are located in forested parks with mature trees and include Stanley Park (Vancouver), University of British Columbia Endowment Lands (Point Grey), and Beacon Hill Park (Victoria) (see Campbell et al. 1990, Otter 1991).

As the human population continues to grow, and breeding habitat becomes more fragmented, there is a growing concern from biologists and conservationists

Figure 1. Great Blue Heron, one of the most familiar birds in British Columbia, is especially vulnerable as a species because it nests in dense colonies in trees that often are in conflict with human developments and activities. Victoria, BC. 10 August 2003 (R. Wayne Campbell).

regarding the future of the breeding population in British Columbia. Unlike other urban-nesting sites the Vernon colony is truly urban in nature. It is located on 24th Street, one block north of 48th Avenue, in a small grove of mature black cottonwoods (*Populus balsamifera* ssp. *trichocarpa*) that is fenced and flanked on three sides by encroaching light industrial (Figure 2), retail, and residential developments.

The Great Blue Heron colony in Vernon is a source of great interest and pride to many residents (Siddle 1993), and because of general concern about the species the site has received national attention (Whelan 1993, 1994). Also, each spring, the "return of the herons" is announced in the newspaper and an increasing number of people visit the site to enjoy the spectacle.

Because of the location of the nesting colony, conflicts have developed between local "greens", naturalists, conservationists, birdwatchers, wildlife officials, business people, real estate developers, and residents of nearby housing estates (Giblak 1993).

The purpose of this paper is to provide information on the history and chronology of the colony so that human-induced disturbance can be minimized near the colony during the critical nesting period.

Information Sources and Survey Methods

All historical information was obtained from the personal field notes and library of R.W. Campbell and from personal communications with a few Vernon residents.

Commencing in 1989, I regularly observed the colony from a parking lot along 24th Street immediately west of the centre of the colony using 8x binoculars and a 20-60x spotting scope. When leaves emerged I shifted my position to take advantage of gaps in the canopy (Figure 3). However, virtually all observations were made from the west side of the colony.

Observation periods ranged between 0625 and 2045 hrs with 55% beginning before 1000 hrs and

Figure 2. The Great Blue Heron colony situated in the city of Vernon is one of the few urban-nesting sites in British Columbia. 26 March 2004 (R. Wayne Campbell).

Figure 3. Censusing a heronry has to be completed in the early stages of occupancy before emerging leaves obscure many nests from direct observation. Vernon, BC. 11 May 1997 (R. Wayne Campbell).

45% after 1700 hrs. In 1993 and 1994 a total of 82 observation periods were made (47 in 1993 and 35 in 1994). These ranged from 5 to 75 minutes in duration. The average duration for 37 periods was just over 47 minutes. All observations (n=82) were made from March through August as follows: March (14 visits), April (17 visits), May (15 visits), June (19 visits), July (13 visits), and August (4 visits).

History and Size

During the early 1980s one or two adult "pioneering" Great Blue Herons were infrequently observed in April and May perched in tall cottonwoods at the present colony site but nesting was not evident (R.W. Campbell pers. comm.). It appears that the colony became established in 1986 when three pairs nested successfully (R.W. Campbell pers. comm., J. Bos pers. comm.). The following year nine pairs were nesting and in 1988 the small colony had increased to 13 nesting pairs.

When I moved to Vernon in July 1989, the colony was well-established and was generally known to many residents. The colony continued to slowly increase and by 1993 and 1996 had 27 and 28 nesting pairs respectively. During the 2000s the nesting population grew from 32 pairs in 2000 to 45 pairs in 2008 (Table 1). It presently appears that the size of the cottonwood stand and lack of available nest sites cannot support many more nesting pairs of herons.

The origin of the Vernon birds is unknown. A small colony of 20-25 pairs of Great Blue Heron existed along the forested eastern side of Otter Lake, about 15 km northwest of Vernon, from about 1962 until the mid-1980s. The herons abandoned the colony for unknown reasons during the mid-1980s. (Cannings et al.1987), and it was assumed that the birds re-located to the Vernon site. Unfortunately however, there is limited evidence to support this idea.

The original urban woodlot of mature black cottonwood that now supports the nesting herons was much larger. It extended at least one block farther to the north but in early 1993 the northern half was cleared. The present size of the grove now encompasses about one city block. The eastern side of the colony is fronted by an empty grass field that is posted against trespassing and restricts direct access to the colony. This buffer may have been set aside by the developer of a residential complex that was built in 1994.

The nesting habitat has been afforded some protection. Jan Bos, a retired school teacher and present businessman, and owner of the cottonwood woodlot, willingly placed legal restrictions on the site (Figure 4). The trees cannot be cut down until at least one year after the herons have ceased to breed at the colony. Furthermore, Mr. Bos became fascinated by the herons' activities and has developed a personal intimacy with the annual event.

Figure 4. Jan Bos, a retired Vernon school teacher and local businessman, donated land to protect nesting Great Blue Herons and personally posted the sign to restrict human access and disturbance. 6 June 1998 (R. Wayne Campbell).

Annual Chronology

Spring Arrival

During 14 years of observation between 1986 and 2008, arrival dates ranged from 2 to 17 March (average 8 March) (Table 1). Usually one or two herons are present on these dates but on one occasion 17 adults were counted. The earliest-arriving birds may only stay at the colony for an hour or two each

Table 1. Nest totals, first spring arrival dates, and earliest fledging dates for Great Blue Heron for select years at Vernon, British Columbia, 1986 to 2008.

Year	Total Nests	Earliest Arrival	Earliest Fledging
1986	3		
1987	9	10 March	15 July
1988	13	8 March	14 July
1989			
1990			
1991	24	12 March	10 July
1992			
1993	27	17 March	3 July
1994		3 March	9 July
1995		3 March	
1996	28	7 March	8 July
1997		16 March	
1998			
1999		8 March	
2000	32		
2001		9 March	4 July
2002			
2003		2 March	
2004	37		
2005		5 March	6 July
2006	39	3 March	
2007			
2008	45	9 March	

[1]Total nests include maximum number recorded in spring, summer, or winter for the year.
[2]Earliest date that one or more adult herons were observed at the colony.
[3]Earliest date that a known nest containing young was empty.

day, but within a few days more birds appear and pairs are performing courtship displays.

The origin of nesting herons returning to breed each year is not known. Small numbers of Great Blue Herons winter throughout the Okanagan valley each year (Cannings et al. 1987), and this may be part of the source. Few herons remain in the Vernon area in winter and those that do eke out a living feeding on Meadow Voles (*Microtus pennsylvanicus*) in fields or waiting at fishing holes in lake ice cut by fishermen. In unusually cold winters the Great Blue Heron population disappears entirely from the northern Okanagan valley.

There is some evidence of a late winter build-up in numbers in the Vernon area prior to herons arriving at the colony. During January 2006, a single Great Blue Heron could be found in the vicinity of Vernon. By early February up to six could be tallied and five days later 10 or so could be found. This build-up continues, from unknown sources, prior to herons moving to the colony in early March (Figure 5).

Figure 5. In 1996, Great Blue Herons first returned to the nesting colony on 7 March and for the next week established pair bonds, courted, and began nest-building or refurbishing old nests. Vernon, BC. 10 March 1996 (R. Wayne Campbell).

Figure 6. In 2006, some paired adult Great Blue Herons were still carrying out courtship activities on their nests in late April. Vernon, BC. 21 April 2006 (R. Wayne Campbell).

Courtship

Soon after arrival in March herons claim old nests and begin courting. These activities are not synchronous as some pairs do not begin nest-building until later in the spring. The first birds at the nest are presumably males (Butler 1992). Typically, a female perches near the nest and examines the attendant male and approaches him in a tentative manner as a pair-bond is formed. This can happen very quickly. For example, on 4 March 1994, one day after spring arrival, three pairs of herons were seen standing together on nests (Figure 6).

This is an intense but brief period at the colony and the commotion is enjoyed by many Vernon residents. As Butler (1992) mentions, courtship includes stretch displays, snap displays, circle flights, crest raising, fluffed neck displays, upright displays, forward displays, bill duels, and bill clappering between paired birds.

The earliest copulations for the colony were noted on 11 March (1994) and 27 March (1993).

Nest-building

Unclaimed nests from the previous season are often dismantled by "stick-stealing" herons refurbishing their own nests. One nest (#93-15) was initially taken by a displaying heron on 25 March and on 10 April it was unoccupied and was

being rifled by a heron from a nest at the back of the colony. When a heron is not disturbed by others during its pilfering, it can work for an hour or longer pulling sticks from a nest. After a day or two of such activity, the rifled nest falls apart. Stick gathering is also a common sight around the colony at this time as herons search cottonwoods in the main colony or search neighbourhood trees such as isolated weeping willows.

Males can continue to present sticks to their mates throughout the incubation period.

One nest under observation (#93-14) took nine days to complete. It was begun on 28 March and by 31 March the nest was comprised of 20 - 30 sticks. It was wide and strong enough a platform to support one member of the attendant pair sitting in its centre, possibly laying the first egg. By 5 April the completed nest contained an incubating adult.

In a few cases nest construction occurred much later. Nest #94-5 was begun about 15 May and was complete on 23 May 1994 and later successfully fledged young.

All nests ranged from 8 - 22 m above the ground.

Incubation

Because the contents of individual nests could not be seen, the onset of incubation had to be inferred from the birds' behaviour. When an adult heron sat low in the nest for lengthy periods of time early in the breeding season, I assumed that it was incubating. Great Blue Herons are known to incubate their eggs for about 27 days (Butler 1992). Incubation at the Vernon colony appeared to begin as early as late March for a few pairs in 1994 and in early April 1993. The latest onset of incubation occurred at nest #94-5 where eggs weren't laid until about 23 May in 1994.

Hatching

Tiny chicks were very difficult to see because of the low angle at which I stood compared to the edges of the nests. Therefore, dates of hatching are only approximate and are probably late by a few days since I needed to see movement before I could be sure I was seeing a nestling.

The first chicks, detected by chattering sounds, were on 10 May (1994) and 11 May (1993). The chicks seen on 10 May were well developed with feather shafts on their wings and could stand, indicating that they had hatched at least 2 - 3 weeks earlier for a hatching date of 19 April.

It is clear that clutches are laid asynchronously and hatch at different times. In 1993 two nests (#93-11 and #93-6) contained much older young than some nearby nests. These chicks were estimated to be 2 - 2.5 weeks old on 16 May, suggesting they hatched in very late April. In contrast, on 18 May 1993, chicks in nest #93-14 were still tiny and covered with natal down, suggesting they hatched around 11 May.

Brood Size

In 1993 the brood size for ten monitored nests ranged from 2 - 4 young with a mean of 3.3 young per nest (Table 2). The following year the average brood size also ranged from 2 - 4 nestlings, but the average number of young was greater at 4.0 per nest (Table 2). The spring period was earlier and warmer in 1994 and egg-laying probably commenced as early as mid-April.

Fledging

As heron chicks grow they obviously become more visible in a nest and the colony becomes an exciting place to visit. The young herons begin to react with the outside world by pulling at branches in the nest or snapping at hovering flies. Chicks grow juvenile plumage, flap their wings, spar with each other, and come to recognize their parents flying toward the colony with food. The sight of chicks desperately seizing a parent's bill in an attempt to get a large share of regurgitated food is memorable. The large nestlings soon start to walk along the branches that support the nest, flap their wings vigorously while standing in place (Figure 7), lift off, and eventually take short flights around the colony. Thus, hatching to fledgling is a gradual process filled with uncertainties. This can be a challenging time to survey a colony as young from one nest can appear on or near a neighbouring nest, making counts difficult.

In 1993 wing flapping of large nestlings was first noted on 23 May, and on 26 May young in one nest stood on their nest rim for the first time.

In most years young usually fledge in July, but

Table 2. Brood sizes for 10 Great Blue Heron nests at Vernon, British Columbia, in 1993 and 1994.

Nest Number (Year-Nest)	Brood Size	Observation Dates	Nest Number (Year-Nest)	Brood Size	Observation Dates
93-4	4	14-18 July	94-1	4	28 June
93-5	2	2-30 June	94-2	2	24 June
93-6	4	6 June-6 July	94-4	4	28 June
93-7	2	9-14 July	94-6	5	24 June
93-8	3	30 June-8 July	94-8	3	19 June
93-9	4	6-8 July	94-9	4	16 June
93-11	4	3-12 July	94-10	5	28 June
93-12A	3	30 June-5 July	94-11	4	19 June
93-12B	3	30 June-3 July	94-12A	5	16 June
93-13	4	2-12 July	94-12B	4	19 June
Average	**3.3**		**Average**	**4.0**	

Figure 7. The size of individuals in a brood varies greatly throughout the breeding season. In the top nest young are large and already exercising their wings while the nest below contains nestlings that still cannot be seen over the rim of the nest. Vernon, BC. 6 June 1998 (R. Wayne Campbell).

in late years fledging may extend into mid-August. For example, on 18 August 1994 a large young was still present in one nest and nestlings could be heard begging in at least one other nest hidden by tree foliage. In 1994, the average fledging date for 10 nests was 22 June.

Natural and Human Disturbances

It is generally acknowledged that Great Blue Herons usually require nesting sites free from continual natural and human disturbance. In 1993 and 1994 a pair of Great Horned Owls successfully fledged young utilizing an abandoned heron nest. Their presence was tolerated by the nesting herons. Infrequent visits, or pass over flights, by Bald Eagles often caused adult herons to leave their nests and fly about, as observed in late March 2008. Van Damme and Colonel (2007), who studied the impact of disturbance by Bald Eagles in the Creston valley suggested that presently, *"... Bald Eagle predation is a rare but normal event in the dynamic life of Great Blue Herons"* but increasng Bald Eagle activity *"may potentially lead to an increase in predation*."

Human disturbances became a topic of concern to many Vernon residents as the nesting colony became better known. The main concern was that the herons would desert the site. It is well known that

individual herons, and colonies as a whole, respond differently to human disturbances depending on the stage of the breeding cycle (Butler 1992). For example, Great Blue Herons may become habituated to a "disturbance event" at one location, but abandon or desert nests from a similar disturbance at another location (Butler 1992).

Documented human disturbances in the vicinity of the Vernon colony include "a hot air balloon passing low over the colony", "hot air balloon launchings 1.5 blocks distant", "local business and light industry construction", "humans walking into the colony", "sudden nearby loud bang", and "low helicopter overflight". In each case adults flew from their nests, some remaining away for up to 20 minutes.

In 1993, realizing that the area surrounding the heron colony was slated for a burst of commercial and residential development (Figure 8), representatives from the British Columbia Ministry of Environment were contacted and with the co-operation of municipal governments and naturalists, asked businesses, land developers, and land owners to cease all activities within 300 metres of the colony during the sensitive portion of the heron's nesting period. Some businesses complied with the guidelines while others ignored them (Giblak 1993, Tomec 1993, Janicker 1994). It should be noted, however, that a building was constructed within 50 metres of the colony during the breeding season without the herons deserting their nests. Even the noisy erection of a metal post security fence directly below the main nest trees was tolerated, although some herons occasionally took flight.

Although herons appear to be tolerating the activities of their human neighbours they have responded to some disturbances within the colony. There was a noticeable shift of the nests, from 1995 onwards, from the west side of the cottonwood grove to the east side, adjacent to a vacant field. Kelsall (1991) reports that a heronry is never static and Werschkul et al. (1976) further mention that Great Blue Herons frequently shift nest sites within a colony away from the area of disturbance.

While the Vernon heron colony appears to be thriving in an urban environment it will be important to continue with the monitoring program. Furthermore, educating municipal officials on this unique wildlife spectacle in their city, and alerting them to their stewardship responsibilities, will help ensure the natural survival of this colony. It is also hoped that city officials and local businesses would consider protecting similar groves of mature black cottonwoods within their municipal jurisdiction.

Figure 8. Since its establishment in 1986, the Great Blue Heron colony in Vernon, BC has become surrounded by commercial and residential developments yet it has slowly increased in size and the birds appear tolerant of most human activities. 26 May 2004 (R. Wayne Campbell).

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About the Author

After graduating with a teaching degree from the University of British Columbia in Vancouver, Chris moved to Fort St. John where he taught high school English from 1975 to 1989. His lifelong passion for birds was rekindled and soon he began to unravel the habits and distribution for birds in the little known Peace River region of the province. This new information was shared, and published as a major contribution, in the four-volume set *The Birds of British Columbia*.

Chris has been an active participant in a host of provincial surveys, projects, and programs and served as regional editor for *American Birds* in the early 1990s.

He moved to Vernon in 1989 and retired from teaching in 2005. He remains active as a birder and devotes much of his volunteer time as a Director for the Biodiversity Centre for Wildlife Studies.