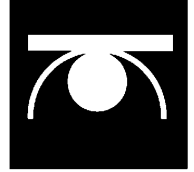


# Black-crowned Night-Herons of the Lake Calumet Region, Chicago, Illinois



## Article 3

Nesting Ecology of Black-crowned  
Night-Herons at Lake Calumet Wetlands  
Jeffrey M. Levensgood, Walter J. Marcisz,  
Allison M. Klement, and Margaret A. Kurcz

## Article 4

Population Trends in a Black-crowned  
Night-Heron Colony at Lake Calumet  
Wetlands

Walter J. Marcisz, Jeffrey M. Levensgood,  
Allison M. Klement, and Margaret A. Kurcz

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Citations:

Levengood, J.M., W.J. Marcisz, A.M. Klement, and M.A. Kurcz. 2005. Nesting ecology of Black-crowned Night-Herons at Lake Calumet Wetlands. Illinois Natural History Survey Bulletin 37(3):95–108.

Marcisz, W.J., J.M. Levengood, A.M. Klement, and M.A. Kurcz. 2005. Population trends in a Black-crowned Night-Heron colony at Lake Calumet Wetlands. Illinois Natural History Survey Bulletin 37(4):109–118.

Editor: Charles Warwick

Photos on frontis: Michael Jeffords and Maggie Kurcz, Illinois Natural History Survey and Marv Piwoni, Illinois Waste Management Research Center

US ISSN 0073-4918

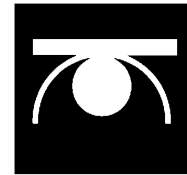
Printed by authority of the State of Illinois  
P0076599—.75M—08-05

Printed with soy ink on recycled and recyclable paper.

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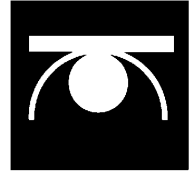
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## Article 4

### Population Trends in a Black-crowned Night-Heron Colony at Lake Calumet Wetlands

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## ABSTRACT

The number of active Black-crowned Night-Heron (*Nycticorax nycticorax*) nesting colonies in Illinois has declined significantly over the past century. Habitat loss/degradation and other factors such as exposure to environmental contaminants and competition for nest sites at established colonies may have contributed to this decline. In this study, we examined recent trends in population levels of Black-crowned Night-Herons nesting at wetlands associated with Lake Calumet in southeastern Chicago, Illinois. The number of Black-crowned Night-Herons nesting annually at these wetlands has fluctuated widely over the last two decades. Immigration of herons from riverine colonies may have driven population increases during the mid-1980s and early 1990s. However, this population has remained relatively stable at between 300 and 400 pairs during 1997–2003.

## INTRODUCTION

The decline of the colonial-nesting Black-crowned Night-Heron (*Nycticorax nycticorax*) (BCNH) as a breeding species in the state of Illinois has been documented by a number of authors. According to Bohlen (1989:16), "The Black-crowned, like other heron species, is declining in numbers and has been for the past half-century." Mlodinow (1984:76) reported that, in the Chicago area, "[BCNH] Nesting colonies are steadily becoming smaller and fewer..." And Graber, et al. (1978:54) indicated that their Illinois data suggested "a serious decline in the BCNH population in the past half-century." Results of the Illinois Colonial Waterbird Survey indicated that there were an estimated 1,900 nesting pairs in 1987 (Kleen 1987), compared with 400+ in 1999 (Kleen 1999).

Young-of-the-year BCNH were reported in the Calumet marshes as early as 1874 (Nelson 1876–1877). Although there are no accurate figures for the extent of these wetlands during presettlement times, historic maps suggest that marshland formations totaled at least 22,000 acres on the Illinois side of the state line. Due to the impacts of industry, railroads, waste disposal, urbanization, and hydrologic changes during the 20th century, only approximately 500 acres of wetlands remained at Lake Calumet (LCW) in recent

years (Landing 1986), much of it in an impaired state. Despite these habitat losses and degradation, BCNH have maintained a tradition of nesting at wetlands associated with LCW in southeastern Chicago (Fig.1). The common reed (*Phragmites australis*) has been of primary importance as nesting cover for this colony since 1984; cottonwood trees (*Populus deltoides*) were of secondary importance in some years.

We present the results of weekly population censuses conducted during spring of 2002 and 2003 of BCNH nesting at LCW, along with a compilation of the results of censuses of nests and/or breeding BCNH conducted since 1984.

## METHODS

**Population Levels**—BCNH are largely crepuscular/nocturnal foragers that disperse from their daytime roosts/nesting areas at dusk. During the 2002 and 2003 breeding seasons, BCNH population censuses were conducted at dusk at the northern portion of Indian Ridge Marsh on a weekly basis from the arrival of the BCNH in late March through late May (the final census in 2003 was conducted on June 1). Censuses were conducted under conditions of no precipitation and winds < 15 mph by two observers beginning one hour before sunset and continuing until the rate of departure was < 2 herons/5 minute period. As days lengthened the herons became active earlier and as of May 1 censuses were initiated two hours before sunset.

Although no BCNH were noted at nearby Heron Pond on March 24 and 30, 2002, a number of herons were observed at this site on April 6, 2002. After mid-April 2002 it became apparent that some herons were nesting at Heron Pond and censuses were subsequently conducted on April 26 and May 12, 2002 at that site. Early in the spring of 2003, a wildfire at Heron Pond destroyed essentially all of the emergent vegetation at that site, eliminating the BCNH's nesting substrate for the season. No BCNH nesting occurred at Heron Pond that year.

**Peak Numbers**—Peak numbers of BCNH were based on evening censuses of BCNH leaving nesting colonies to forage, conducted during 1992–2003. Data for 1992–2001

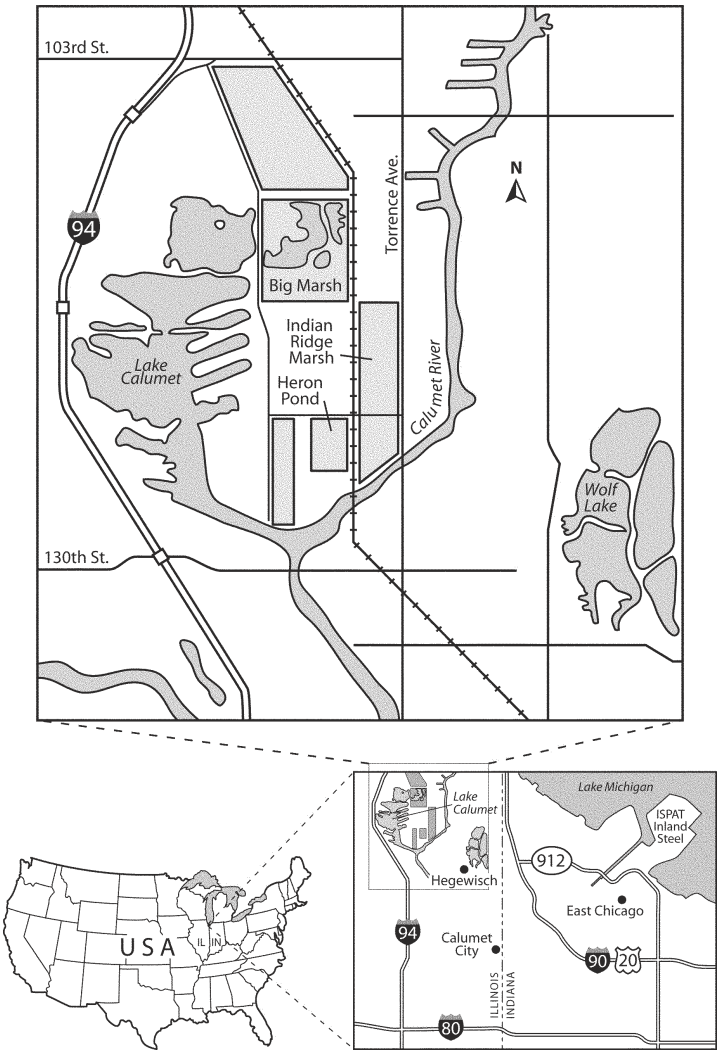


Figure. 1. Map of southeastern Chicago, Illinois, and northwestern Indiana, showing locations used by nesting Black-crowned Night-Herons.



represented an average of 2 to 3 counts conducted during late-April/early-May of each year; the 2002 data represented the maximum of 11 counts conducted March 24 to May 26; the 2003 data represented the maximum of 11 counts conducted from March 23 to June 1. These were combined with counts of occupied tree nests (multiplied by 2 BCNH) conducted during 1987–89 and 1991–95.

**Number of Nests**—The number of nests for each year were calculated from actual nest counts conducted during 1984–91, combined with estimates of nesting pairs for the years 1992–2003. We compiled the results of annual nest counts conducted at Big Marsh during mid- to late-May of 1984–91 (no data for 1990). These counts consisted of a line of five to seven observers walking transects through the *Phragmites* stands and counting nests seen to one side of each person. A portion of the colony was not surveyed in 1986 and 1987; it was estimated that <15% of the nesting colony was missed, thus we added 15% to the nest counts in those years. Direct counts of tree nests located at Indian Ridge Marsh during 1987–91 were added to these counts. The number of nests present during 1992–2003 were estimated by dividing peak counts of BCNH by two to represent a pair for each nest. We feel that this provides a reasonably accurate approximation of breeding pairs (nests) as: 1) our data suggests that prior to incubation the vast majority of BCNH are counted during evening censuses, 2) 99.3% of known-aged herons observed during our evening population censuses were >1 year old, and 3) there are numerous accounts of nesting by one-year-old BCNH (Gross 1923, Nobel and Wurm 1942, Custer and Davis 1982). In 1994 the herons began nesting at nearby Big Marsh (in addition to the *Phragmites* and cottonwoods at Indian Ridge Marsh) late in the season. Thus, a complete count was not conducted at that location. Consequently, the 1994 estimate of 410 nests represents a minimum and was not included in Figure 4.

## RESULTS

In 2002, BCNH were first noted at LCW on March 17; numbers gradually increased from the start of the evening population censuses on March 24 through May 12, when they peaked

at 750 herons (Fig. 2). The number of BCNH observed during evening censuses declined dramatically between May 12 and May 26; counts were discontinued after that time. This decline in BCNH leaving Indian Ridge Marsh during evening hours was undoubtedly due to the increasing numbers of herons remaining at nests to incubate eggs or brood young. Also, counting became more difficult as foraging trips became shorter in duration as BCNH returned to the colony to feed young or allow their mates to recess. No BCNH were observed at Heron Pond on March 24 or 30; however, 33 BCNH were counted there on April 6. Population censuses conducted on evenings of April 29 and May 10 indicated that a substantial number of BCNH were nesting there (142 counted on May 10).

BCNH were first noted at LCW on March 22 of 2003; with the exception of a leveling off of numbers between the weeks of March 30 and April 11, numbers gradually increased from the start of the evening population censuses on March 23 through May 10, when they peaked at 641 herons (Fig. 2). The number of BCNH observed during evening censuses declined dramatically between May 10 and June 1; evening censuses were discontinued after that time. As in 2002, this decline in BCNH observed was undoubtedly due to increasing numbers of uncounted incubating/brooding herons coupled with shorter, more frequent foraging trips by observed herons. Thus, the 2003 peak count of 641 BCNH was down 15% from the 2002 peak count of 750, but the estimated number of nests ( $641 \text{ total BCNH} / 2 \text{ BCNH/nest} = 320 \text{ nests}$ ) was within “normal” limits for the period 1997–2002 (303 to 404 nests).

The peak BCNH population at LCW varied considerably during 1992–97, from a high of nearly 1,600 in 1992 to less than 600 in 2000 (Fig. 3). The quadratic trend was significant and described a relatively large proportion of the variation in peak numbers. Although there was a declining population trend during much of the 1990s, numbers have more or less stabilized at 600–800 herons in recent years.

The number of nests varied considerably during 1984–97, from a low of 266 in 1984 to a high of 871 in 1992 (Fig. 4). The cubic trend was significant and described a relatively large portion of the variation in number of nests. The number of BCNH nests increased dramati-

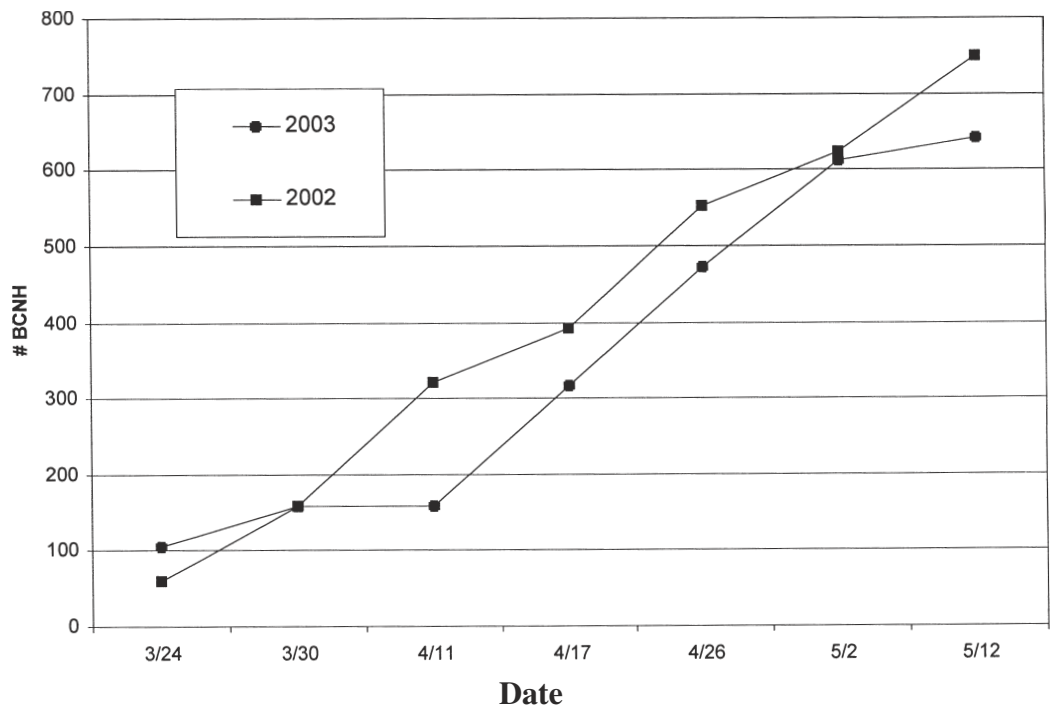


Figure 2. Results of counts of Black-crowned Night-Herons leaving nesting locations to forage during 2002 and 2003.

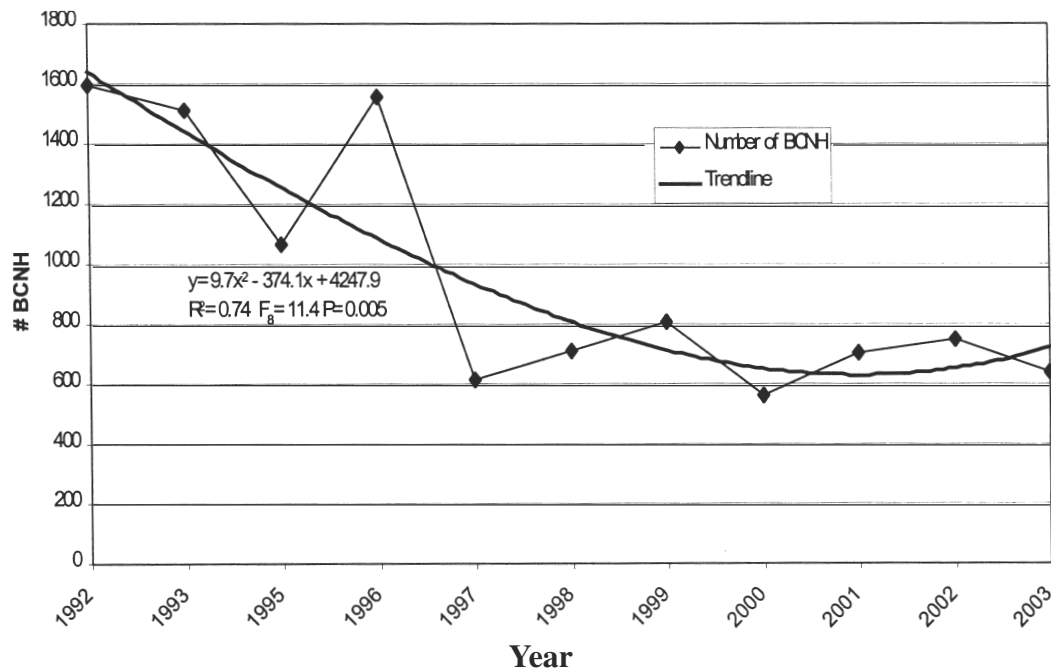


Figure 3. Peak numbers of Black-crowned Night-Herons at Lake Calumet wetlands, 1992–2003.

cally during the latter half of the 1980s and remained relatively high into the mid-1990s. Numbers of BCNH nests at LCW declined throughout much of the 1990s before essentially leveling off at 300–400 nests during the late 1990s and early 2000s (Fig. 4).

## DISCUSSION

Many factors have been suggested as causes for recent declines in BCNH populations, including vandalism, disturbance at breeding colonies, drainage of wetlands, and land development for homes and recreation (Davis 1993). A relationship has been demonstrated between chlorinated hydrocarbon pesticide pollution and egg-shell thinning in herons (Faber et al. 1972). Pre-1947 (pre-DDT) and post-1947 (DDT-era) BCNH eggshell thickness measurements taken in 15 U.S. states demonstrate significantly thinner eggshells in post-1947 clutches (Ohlendorf and Marois 1990, Ohlendorf et al. 1978, Ohlendorf et al. 1977), but convincing documentation that DDT (DDE) and other pesticides have caused local BCNH population declines before DDT was banned in 1972 is lacking (Davis 1993).

High-water levels, resulting in flooded nests, have forced BCNH to relocate within LCW on numerous occasions over the past two decades. In virtually all of these cases, the BCNH completed a successful breeding season. In the Illinois River Valley of central Illinois, flooding has had an impact on heron colonies in recent years, with high water appearing to disadvantage BCNH in particular (Bjorklund and Holm 1997). The frequent and rapid flood peaks along the Illinois River have occurred as a result of floodplain constriction by levees, channelization of tributary streams, and other human activities (Bjorklund and Holm 1997).

Bjorklund and Holm (1997) found that prolonged elevated water levels at Illinois River sites during the period of nestling development (June through August) had a negative impact on the size of heron nesting populations during the following year's breeding season. Periods of major flooding along the Illinois River occurred during 1993–96, with corresponding decreases in nesting BCNH populations during that period (Bjorklund and Holm 1997). A spike in BCNH peak numbers/nests at LCW during the early

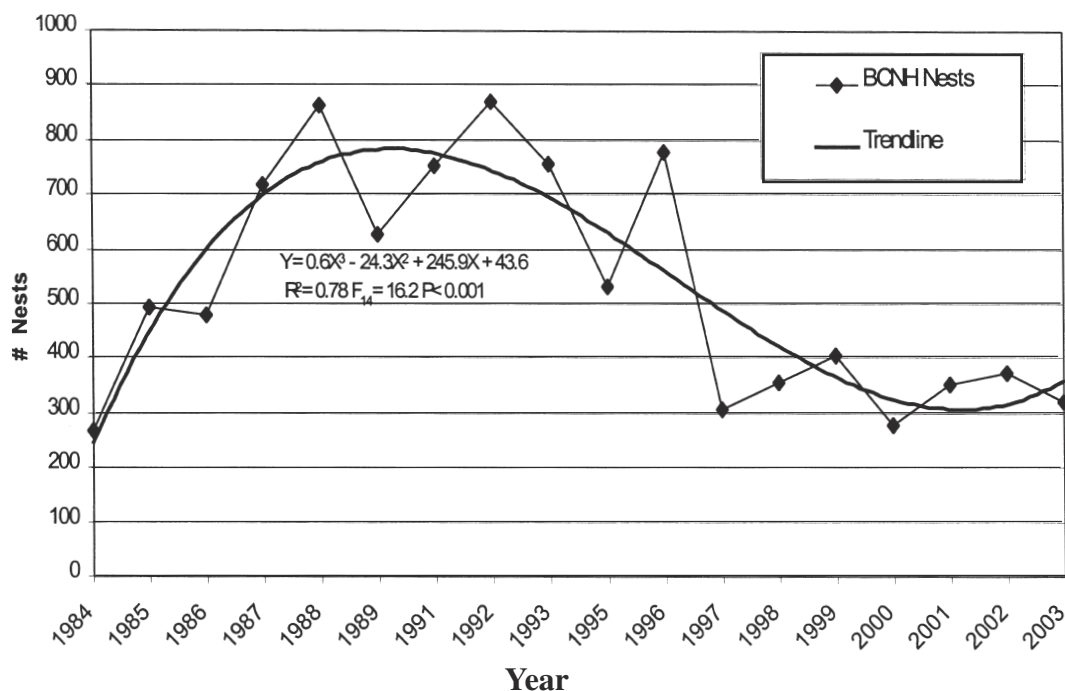


Figure 4. Number of Black-crowned Night-Heron nests at Lake Calumet wetlands, 1985–2003.

1990s corresponded to the severe flooding of the Illinois River floodplain (and resultant desertion of colonies by BCNH) during the same period, suggesting that emigration of BCNH from Illinois River colonies to LCW may have occurred during that time. The Breeding Bird Survey Trend Map (1966–1996) for BCNH also shows decreases ( $< -1.5\%$ ) in Illinois River BCNH populations, and corresponding increases ( $> +1.5\%$ ) in LCW BCNH populations during that period.

Interspecific competition for nest sites may have affected BCNH populations at various Illinois colonies. At Lake Renwick (Plainfield, Will Co., IL) Double-crested Cormorants (*Phalacrocorax auritus*) appear to have displaced Great Blue Herons (*Ardea herodias*), Great Egrets (*Ardea alba*), and BCNH from their traditional nest sites. As Double-crested Cormorant numbers increased, the BCNH population at Lake Renwick declined from 273 nests in 1983 to 57 nests in 1990 (Milosevich 1990). Numbers of Double-crested Cormorants have also increased at the Baker's Lake colony in northwestern Cook Co., while the BCNH population there declined from 220 nests in 1989 to 11 nests in 1992. It is plausible that BCNH emigrating from Lake Renwick, Baker's Lake, and other declining Illinois BCNH colonies contributed to the BCNH population increases at LCW during the late 1980s to early 1990s. The decline in the breeding population during the 1990s and relatively stable number of breeding pairs since that time suggests that LCW were ultimately unable to support a higher breeding population resulting from the emigration of BCNH from Illinois River and other colonies.

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## ACKNOWLEDGMENTS

Funding for this study was provided by the Illinois Waste Management and Research Center of the Illinois Department of Natural Resources, the City of Chicago Department of Environment, and the Illinois Wildlife Preservation Fund. We thank Sue Elston, USEPA, for providing information on nest surveys conducted 1984–91, and Loren Kirkwood, INHS, for creating the map used in Figure 1. Publication costs were partially funded by the Illinois Natural History Survey.

NOTES