

## The status of Black-crowned Night-Herons in the northern San Francisco Bay area

# Life on the Edge

by Emiko Condeso

*Some herons  
were fishing  
in the robes  
of the night...*

from "Night Herons" by Mary Oliver

The Laguna de Santa Rosa, the largest freshwater wetland complex on the Northern California coast, is vibrant and green in late spring. Each evening, as the light dims, night-herons appear in the shallows. On this bright morning, I am crunching along through thick mats of *Ludwigia* with long-time ACR volunteers and local experts Lisa Hug and Denise Cadman, searching for undocumented Black-crowned Night-Heron (*Nycticorax nycticorax*) nesting sites among the willows. We know that night-herons feed in the Laguna and that they prefer to nest close to their foraging grounds. Recent observations of night-heron movements suggest that they may have established a new colony site, hidden somewhere in the thick wetland vegetation. New colonies can form at any time, so we are compelled to investigate.

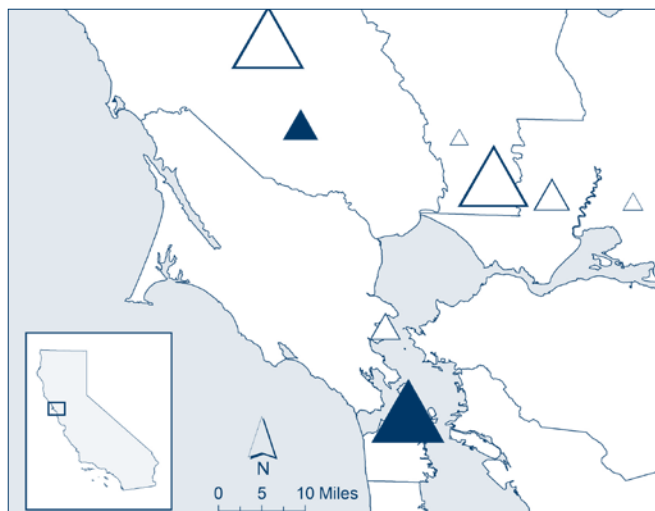
The Black-crowned Night-Heron is one of the five species of herons and egrets that are monitored annually as part of ACR's North Bay Heron and Egret Project. For the last 23 years, Audubon Canyon Ranch has been keeping tabs on all known colonially nesting herons and egrets in Marin, Sonoma, Napa, Solano, and Contra Costa counties, as well as in Central San Francisco Bay. This region is home to approximately 79% of the Bay Area's nesting Black-crowned Night-Herons (Figure 1), with the balance of nesting pairs concentrated in South San Francisco Bay (Kelly et al. 2007, *Waterbirds* 4:455–478). Black-crowned Night-Herons are one of the more challenging species to monitor, as the chicks mature quickly, requiring frequent visits to the heronry by volunteer observers. In addition, the nesting sites themselves can be difficult to detect. We do not know if we will find a new night-heron colony in the

Laguna today, but such searches are a necessary part of the Heron and Egret Project.

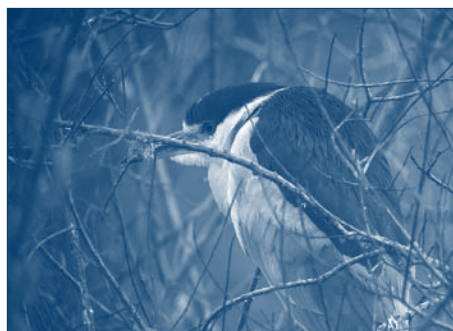
Outside of the breeding season, the habits of night-herons make them less obvious than diurnal or day-herons (Davis, W.E., Jr. 1993, *Birds of North America* No. 74). As their name implies, these birds are more active at night, normally roosting quietly during the day (Figure 2). At the tail end of the nesting season, adult night-herons are more active during the day due to the need to frequently provision large chicks. If you are in the right neighborhood, you may see Black-crowns flying toward their nesting colony for a feeding. The presence of streaky brown chicks in the area is a great tip-off that nesting is occurring nearby, as young birds tend not to stray too far from their nests (Figure 3). By the end of spring, nesting sites also tend to be fully decorated with

accumulated guano on the trees or shrubs and on the ground below. As Lisa, Denise, and I make our way through the Laguna, we are looking for any or all of the above—adults, chicks, nest structures, or white-washed trees.

One of the challenges of long-term monitoring is making sure that the study area is "covered," with observers watching



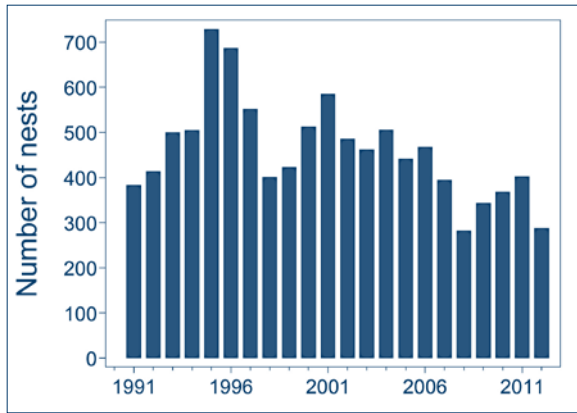
**Figure 1.** Black-crowned Night-Heron colonies in the northern San Francisco Bay area that were active in 2011. Symbol size represents the 2011 deviation of colony size from the 1991–2010 average. Colonies with open symbols were larger than their long-term average size; colonies with filled symbols were smaller than their long-term-average.



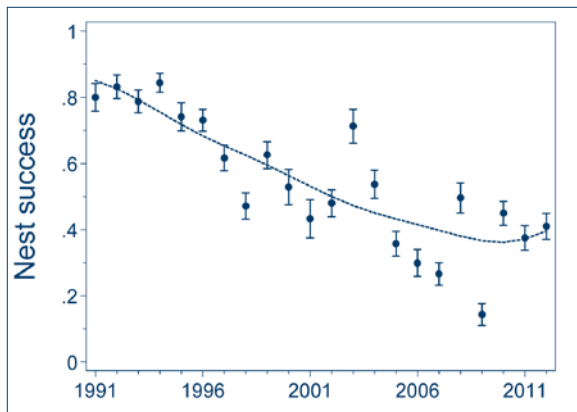
**Figure 2.** An adult Black-crowned Night-Heron. As the name suggests, night-herons are primarily active at dawn, dusk, and through the night. During the day they gather in communal roosts.



**Figure 3.** Young Black-crowned Night-Herons are brown with pale spots above and heavy streaking below.



**Figure 4.** The peak number of active Black-crowned Night-Heron nests in the northern San Francisco Bay area, 1991–2012. The trend in (log) nest abundance since 1995 suggests an average annual decline of 3.8% ( $b = -0.039$ ,  $P < 0.001$ ,  $n = 18$ ).



**Figure 5.** The estimated proportion of nests that survive each year to fledge at least one chick ( $\pm$ SE), based on samples of focal nests monitored in each colony. The dotted line represents a LOWESS (locally weighted) smoothing of the trend ( $f = 0.9$ ). The linear trend from 1991 to 2012 suggests a long-term decline in nest success, with nests approximately 3% less likely to fledge at least one young, on average, in each successive year ( $b = -0.031$ ,  $SE = 0.004$ ,  $P < 0.001$ ,  $n = 22$ ; results controlled for differences among colony sites, nesting densities, and sampling intensity). However, after 2005, it is unclear if the nest survivorship continues to decline.

every known colony, and that we are aware of all of the major nesting sites in the region. We need both of these components reflected in our monitoring data to make reliable inferences about the status of the breeding population. For example, we have strong evidence that birds move between colonies among, and even within, years (Kelly et al. 2007, *Waterbirds* 4:455–478). We have documented that a decline in numbers at one site, often related to disturbance by nest predators or human activity, frequently coincides with increases at other colonies, often within a kilometer of the original site. So it is impossible to know the importance of an increase or decrease in abundance at a particular colony site without the context

that regionwide monitoring provides.

We are increasingly aware of the potential importance of “missing” nesting sites. Our regional data have revealed a declining trend in the number of nesting pairs of Black-crowned Night-Herons in the North Bay since 1995 (Figure 4). Similarly, we have seen a regionwide downward trend in “nest success,” measured as the proportion of nests that fledge at least one young. Black-crowned Night-Heron nests in the northern San Francisco Bay area were 3% less likely, on average, to fledge at least one young in each successive year, according to our findings from 1991–2012 (Figure 5). What does this mean for future abundances of nesting night-herons in our region or the status of their wetland habitat? At this point we know very little—only enough to inspire a general concern and encourage further investigation.

We do know that the trends we see are regional—they are not limited to a single or a small subset of the nesting colonies included in our study. However, the underlying cause of these trends is unknown, and the potential explanations are many. We also know that the brood sizes in successful nests show no evidence of decline, which suggests a clue to the mystery: the food supply and foraging habitat quality seem to consistently support normal

broods, suggesting that the increasing rates of nest failure may reflect instances of complete nest loss, as expected from predation or other types of disturbance. Potential causes of disturbance could include nest predators (such as avian or mammalian predators), weather (changes in the pattern, intensity, or seasonality of wind or rain storms), and human disturbance (development, hazing, or activity near colonies). Any of these or other processes could be limiting nest survival.

We do not know whether the decline in regional nest abundance is related to the apparent decline in nest success. We must emphasize that these two trends may be unrelated—the decline in abundance may

reflect other unknown processes, such as recruitment rates (new breeders choosing to nest in the region) or emigration rates (movement of juvenile or adult birds out of the region). There may also be unknown effects on the survival of juvenile or adult birds that could ultimately impact the abundance of nesting night-herons in the North Bay. Such effects might include the impacts of weather, parasites, disease, or pollutants in the environment.

The scientific method requires all likely hypotheses to be disproven before a reasonable explanation can be supported. ACR’s long-term monitoring effort strengthens our ability to explore potential explanations for the apparent decline. However, more immediate actions may also be required. Even though we do not yet know the drivers of these trends and cannot exclude the possibility of a natural recovery of regional night-heron nesting activity, the declining status of these birds should not be ignored. We believe that land-owners and managers of areas used by night-herons should take a precautionary approach to any actions that may put further stress on the nesting birds.

Unlike the Great Egret, the Black-crowned Night-Heron is not the graceful, long-legged “poster child” that we have come to think of as a symbol for wetland conservation. However, they are amazing birds in their own right and are potentially just as powerful an indicator of wetland health. They may, in fact, be the most sensitive ardeid in the Bay Area, in terms of how readily their breeding population responds to changes in their environment.

When our morning search on the Laguna came to an end, we had not found any new Black-crowned Night-Heron nesting sites. Although the Laguna seems like an ideal place for them to nest, it is clear that we do not have a perfect understanding of how these birds perceive the world. What is it that indicates to the night-herons that a place is suitable for nesting? How do they measure their chances for success at a given location? We have much to learn about the ecological processes that influence Black-crowned Night-Heron populations. At ACR we continue to search for answers about these birds by following the volatile dynamics of their nesting activity, as they live life on the edge.

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