Habitat protection and nesting colonies

What's the life span of a heronry?

by John P. Kelly

Some heronries seem to be permanent features of coastal or wetland landscapes. As centers of intensive nesting activity, such sites become conspicuous reminders that our environment is fundamentally natural, driven by ecological processes that continue year after year. But nature is always changing, and the long-term persistence of colony sites is rare.

In fact, heronries are often deserted after only a few years, as new colonies are routinely established in alternative locations. This process is an important aspect of heron and egret nesting biology, allowing the birds to respond adaptively to nest disturbance, shifts in wetland hydrology, and changes in the quality of nearby feeding areas. The extent to which these birds depend on existing colony sites can be difficult to measure. Some clues can be found in the persistence patterns of heronries monitored for many years.

The nesting colony at Audubon Canyon Ranch's Picher Canyon near Bolinas Lagoon has persisted far longer than most other colony sites in our region. Helen Pratt (1983) determined that the heronry has probably been active since at least the early 20th century and could have been active as far back as the late 1800s, but its actual age is unknown. Although the abundances of nesting herons and egrets in the San Francisco Bay region are stable or increasing (Kelly et. al 2006), the sizes of particular colonies such as the one at ACR's Picher Canyon can be impressively dynamic, as nesting birds move among colony sites between years (Figure 1). New colonies are often initiated with a few nests and grow, either gradually or abruptly, into larger colonies in subsequent years.

The number of consecutive years that heronries remain active is closely related to the number of nests in the colony and the species that nest there. The relationship between colony size and persistence is evident in the regional dynamics of colony sites. In 1991–2005, an average of 73 active colony sites supported approximately 62 Great Blue Heron colonies, 25 Great Egret colonies, 13 Black-crowned Night-Heron colonies, and 12 Snowy Egret colonies each year. Based on observations from these sites, almost all active heronries in any year are likely to have been active during previous years, but smaller colonies of less than five nests tend to become inactive within five years unless they reach higher levels of nest abundance associated with increasing persistence (Figure 2).

Great Blue Heron colonies generally become inactive within five years if they remain smaller than six nests, but they tend to persist, on average, for 12 or more years if they grow to more than 20 nests (Figure 3). The persistence of Great Egret, Black-crowned Night-Heron, and Snowy Egret colonies increases substantially only after reaching an abundance of 20–30 nests per species. Colony sites with less than ten nests of all species combined tend to remain active, on average, for approximately eight years (Figure 3). These general patterns probably underestimate the average persistence of heronries, because some sites were active prior to discovery or will remain active beyond the 15-year monitoring period. However, the results show clearly that the number of years a colony site is occupied is closely related to maximum colony size.

In general, the regional persistence patterns of heronries suggest that conservation efforts should prioritize the protection of colony sites with 20 or more active nests and that long-term protection is most appropriate for colony sites with more than 100 nests. However, the protection of smaller colonies should not be ignored, because they may be more sensitive to disturbance or prone to abandonment than larger colonies. The importance of protecting mixed-species heronries is enhanced by the presence of additional nesting species, and values

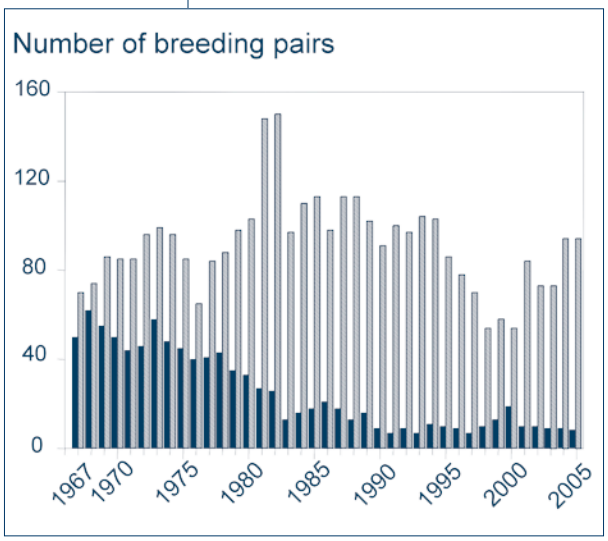

Figure 1. Annual number of nesting Great Blue Herons (solid bars) and Great Egrets (hatched bars) at ACR's Bolinas Lagoon Preserve.

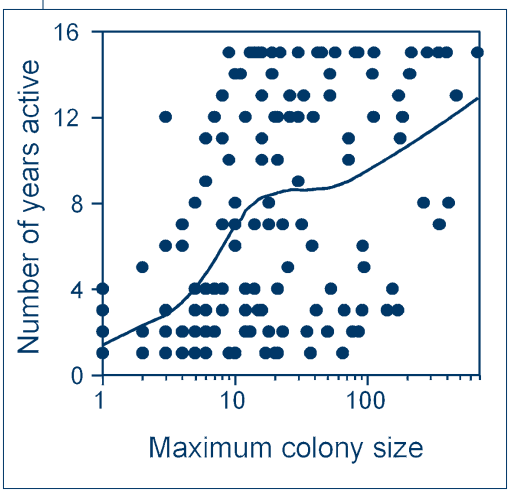

Figure 2. Relationship between the maximum size of heronries (all species) and the number of consecutive years occupied, in the San Francisco Bay area, 1991-2005. (Note that maximum colony size is plotted on a $\log_{10}$ scale; trend lines represent Cleveland's robust locally weighted regression algorithm, LOWESS, f = 0.6; Cleveland 1979).

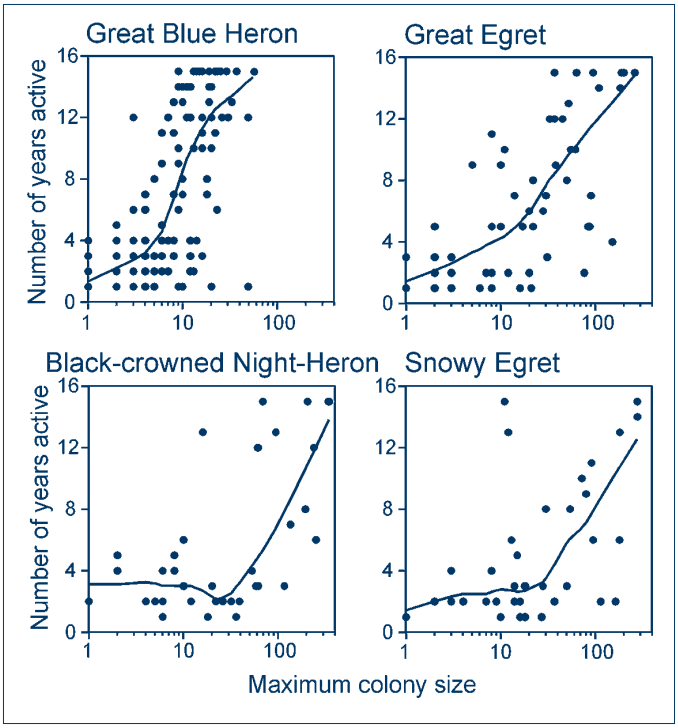

Figure 3. Relationships between the maximum size of heronries and the number of consecutive years occupied, in the San Francisco Bay area, 1991-2005. (Note that maximum colony size is plotted on a $\log_{10}$ scale; trend lines represent Cleveland's robust locally weighted regression algorithm, LOWESS, f = 0.6; Cleveland 1979).

associated with the expected longevity of any heronry grow rapidly as nest abundance increases above six Great Blue Heron nests, 20 Great Egret nests, or 30 Snowy Egret or Black-crowned Night-Heron nests (Figure 3).

Nesting habitat values

Shifts in the distribution of nesting herons and egrets reflect their behavioral responses to rapid changes in habitat value. Such responses reveal not only the resilience of herons and egrets to wetland loss or degradation, but also their ability to benefit from localized habitat restoration efforts. For example, increases in the number of herons and egrets nesting in San Pablo Bay marshes since the late 1990s coincided with increases in the extent of restored tidal marshes (Kelly et al. 2006).

We have also noticed that new colony sites are often initiated within a few kilometers of heronries that were disturbed by nest predators or humans. A mixed colony of Snowy Egrets, Black-crowned Night-Herons, and Cattle Egrets has apparently persisted for many years in the vicinity of Santa Rosa Creek in Sonoma County, by repeatedly moving to new sites—at least four times since 1990—after abandoning sites subjected to various forms of human disturbance. The birds' capacity to tolerate continuing disturbance in order to nest in this area is unknown. In some areas, a scarcity of alternative colony sites in suitable locations might limit the resilience of herons and egrets to the loss of nesting habitat or, alternatively, prevent them from taking full advantage of restored wetlands. Therefore, the conservation of alternative colony sites may be an important part of regional habitat protection for herons and egrets.

The abandonment of heronries is usually associated with disturbance by humans or predators. Sometimes, heronries are recolonized after a few years of inactivity, but this apparently occurs only rarely. Normally, herons and egrets seem to avoid previously abandoned sites. For example, in the early 1990s as many as 29 pairs of Great Blue Herons nested in the dense oak canopy of an isolated island in Stafford Lake near Novato. The site was abandoned in 1993, when a temporary drop in water level resulted in a land bridge that allowed one or more raccoons to raid the nests. Lake managers have since kept water levels high enough to prevent land predators from gaining access to the island, but the site has not been recolonized. Apparently, the value of nesting habitat is influenced by its history.

Ecosystem effects of colony site protection

During the nesting season, herons and egrets tend to forage within a few to several kilometers of their colony sites (e.g., Custer and Osborne 1978, Kelly et al. 2005). Some investigators have suggested that a scarcity of suitable colony sites combined with a tendency to forage near nesting areas could limit or reduce heron or egret use of an entire wetland area or subregion (Gibbs et al. 1987, Fasola and Alieri 1992). Although most wetland landscapes in California seem to provide plenty of suitable nesting habitat, colony site preferences are very difficult to predict, and changes in the number of locally nesting pairs can be considerable.

For example, from 1991 to 2002 Tomales Bay supported, on average, 47 ± 4 (SE) pairs of Great Egrets per year, but in 2003–2005, after two of the three colony sites in the area were abandoned, the number of pairs declined to 18 ± 2 pairs. If the loss of local heronries leads to a substantial decline in foraging activity by these top predators, the abundance or behavior of prey species or competing predators might be affected. Such effects might, in turn, alter other ecosystem processes.

The loss of a local heron or egret colony may also alter ecological processes in other areas. Such effects were suggested in 1994, when the virtual abandonment of the Snowy Egret colony on the Marin Islands, near San Rafael, apparently resulted in a dramatic influx of approximately 100 nesting pairs of Snowies at a colony site in Napa County.

Many people share a sense that everything in nature is somehow connected and that local events can affect (or be affected by) events or processes in other areas. Nesting herons and egrets are good examples of animals that depend strongly on local resources while responding adaptively to opportunities across large regional landscapes. Over time, the regional management of wetland habitats may benefit not only from protecting local heronries, but also by responding to the shifting distributions of nesting herons and egrets.

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