Recent events at the Martin Griffin Preserve heronry

Where Have All the Egrets Gone?

by Sarah Millus

Great Egrets *(Ardea alba)* have nested in Martin Griffin Preserve's (MGP) Picher Canyon for many decades (Figure 1). Anecdotal reports suggest that this colony site was occupied as far back as 1941 (Pratt 1983). In 1962, ACR established permanent protection for the canyon and surrounding lands, and nature lovers from all over the world began to visit each year, to marvel at the courtship displays and nesting activities that have been continuing here for so many years. In 2014, no herons or egrets nested in Picher Canyon. This major change for the colony was a sequel to developments that we closely observed one year prior.

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Figure 1. Great Egrets nesting in the redwood canopy of Picher Canyon.

The 2013 nesting season

In contrast to its long history as a productive site for nesting herons and egrets, the nesting cycle in Picher Canyon was very different last season. Only 32 Great Egret nests were established at the heronry in 2013, the smallest peak nest abundance recorded to date (peak nest numbers, 1967–2012: 88 ± 21.8 [SD, standard deviation]; Figure 2). Moreover, the 2013 season was the first known year that no chicks fledged from the colony (average number of fledglings per year, 1967–2012: 115 ± 47.5).

The 2013 nesting season appeared to begin normally, with the first nests initiated on 8 April. Nest abundance continued to increase at a normal rate relative to past years, reaching a peak on 2 May. Most of the egrets began incubating by mid-April and, given an average incubation time of 28 days, chicks should have started hatching around mid-May. Instead, most adults were still incubating at that time, and a steady decline in nest abundance had begun (Figure 3).

The rate of nest failure was relatively consistent throughout the season, and no single event of major nest loss occurred (Figure 2). By mid-to-late June, most of the nests had failed and were unoccupied. Around this time, approximately 20% of the nests appeared to have chicks, based on the behavior of adults. No chicks were directly observed, but it is normally difficult to see chicks during the first week after they hatch, as they are still small, depend on brooding parents for warmth, and spend most of their time low in the nest. The chicks that were presumed to hatch died shortly after hatching, for unknown reasons.

Only one pair of Great Blue Herons attempted to nest in 2013. The nest was initiated on 2 May, which is much later than average. At least one chick hatched around 11 June, and it appeared to be healthy and developing normally. On the morning of 6 July, the depredated remains of a Great Blue Heron chick were found below a telephone pole in Picher Canyon. The thick, somewhat gritty guano at the base of the pole near the remains suggested that the guano may have been from an owl.

Great Egret nest success at Picher Canyon fell steeply over the three years preceding the 2013 nesting failure, providing the first instance of consecutive declines in below-average reproductive success at this colony since the late 1960s (Figure 4). Although the previous period of decline was associated with the widespread effects of DDT compounds, which resulted in egg-shell thinning (Faber et al. 1972), the recent decline was localized, limited to only Picher Canyon, and we found no evidence of egg-shell thinning or other symptoms of chemical toxicity (Millus et al. 2013). However, the declining nest success rate since 2011 suggests that the underlying cause(s) of colony failure may not have been limited to the 2013 season.

Nearest neighbors

The colony site at Picher Canyon is part of a system of heronries that extends throughout the San Francisco Bay area and beyond. The closest colony to MGP lies across Bolinas Lagoon, near the town of Bolinas, at the foot of the Francisco Mesa. A Great Blue Heron colony was established in nearby trees in 1990 and persisted until the nesting trees were cut down in 1999. Great Blue Herons recolonized the site in 2007

and, in 2008, established a "satellite colony" on nearby Kent Island.

Great Egrets first nested at the Bolinas colony in 2011, when four egret pairs initiated nesting late in the season, but none of the four attempts was successful. In 2012, Great Egrets returned to establish three nests at this colony, and one was successful, fledging two chicks.

In 2013—when all of the nest attempts failed in Picher Canyon—the Bolinas colony grew substantially: Great Egrets established 15 nests, 40% of which were successful. At least 13 chicks were fledged from the colony, at an above-average rate of 2.4 ± 0.24 (SE, standard error) young per successful nest. On 17 June that year, six additional pairs of Great Egrets initiated new nests. This jump in nest initiations coincided with four nest failures and the sighting of an adult Bald Eagle in Picher Canyon (Table 1), suggesting that the new nesting pairs at the Bolinas site may have been fleeing from disturbance by the eagle in Picher Canyon. Bald Eagles are a well-known source of nesting disturbance in heronries throughout the United States (Norman et al. 1989, Vennesland and Butler 2004, Kenyon et al. 2007). They prey directly on both heron and egret chicks and adults, and they flush adults off nests, which can facilitate predation on eggs and chicks by opportunistic ravens, crows, and gulls. Bald Eagles have successfully nested every year since 2008 at Kent Lake, approximately four miles north of the Picher Canyon heronry.

Likely causes

Using available information on egret nesting biology, twice-weekly observations of the nesting colony (Table 1), careful reconnaissance of Picher Canyon, and information gained from interviews with people that have particular knowledge of egrets or Bolinas Lagoon, we considered a number of possible explanations for the decrease in nest numbers and poor reproductive performance of egrets (Table 2; Millus et al. 2013). However, we found no evidence to conclusively determine the cause(s) of nest failure or colony-site abandonment at Martin Griffin Preserve.

We reasoned that local disturbance related to predation and/or harassment by avian nest predator(s), especially Bald Eagle, is the most compelling scenario leading to the 2013 failure in Picher Canyon. Although inconclusive, this explanation is supported by the presence of a Bald Eagle in the heronry, the flushing of egrets from their nests, the predation of at least one adult egret, continuing weekly nest failures leading to the failure of all nest attempts, normal survival rates among nests in the nearby Bolinas colony, and an intensive analysis suggesting that most other potential causes were unlikely (Table 2, Millus et al. 2013).

However, multiple influences may have affected the egrets' sensitivity to colony-site disturbance. Our analysis concluded that human disturbance, the absence of nesting Great Blue Herons, and infertile eggs could not be excluded as potential contributing factors. However, because evidence to support these potential causes was lacking, they were rejected as the most likely reasons for colony decline or abandonment.

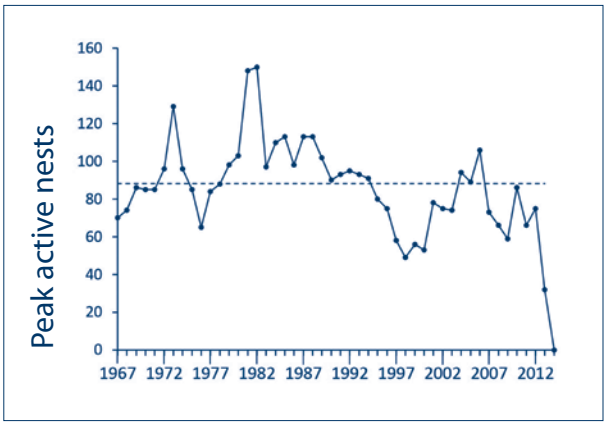

Figure 2. Peak number of active Great Egret nests at Picher Canyon 1967–2014. Dashed line represents the 46 year average of 88 ± 26.1 (SD) nests, 1967–2012.

Nearby successes

Although many people remained hopeful that the egrets would return to Picher Canyon, no herons or egrets nested there in 2014. Two Great Blue Herons flew low over the colony on 29 January, but no other herons or egrets were seen in the canyon. However, the Bolinas colony saw a dramatic increase in the number of nesting Great Egrets in 2014, with a peak of 34 nests—more than double the number of nests in the preceding year. In addition, nesting performance in Bolinas was strong: 68% of the Great Egret nests were successful and fledged an average of 2.8 ± 0.19 (SE) chicks per nest. Nine Great Blue Heron nests were also established, 89% of which were successful and fledged an average of 2.8 ± 0.31 (SE) chicks per nest.

Table 1. Unusual observations of the Picher Canyon heronry during the 2013 nesting season.

19 April	Broken egg shell fragments observed above a previously occupied egret nest.
7 June	Large group of adult egret feathers found in the MGP courtyard.
11 June	Adult egret flight feathers and nuptial plumes observed on an empty nest that had been occupied the previous monitoring visit.
16 June	Unidentified large bird with a yellow beak observed in Picher Canyon.
18 June	Adult Bald Eagle flushed the colony. Most nests were still unoccupied about an hour after the egrets were flushed.
6 July	Depredated remains of a Great Blue Heron chick found near the Volunteer Center.

Table 2. Likelihood of potential causes leading to nest failure and colony decline (Millus et al. 2013).

Potential cause	Unlikely	Possible contributing influence	Most likely
Disease and parasites	●		
Chemical toxicity	●		
Food availability	●		
Weather	●		
Vegetation changes	●		
Predation/Disturbance - mammals	●		
Eggs infertile or inviable		●	
Absence of Great Blue Heron		●	
Disturbance from humans		●	
Predation/Disturbance - avian			●

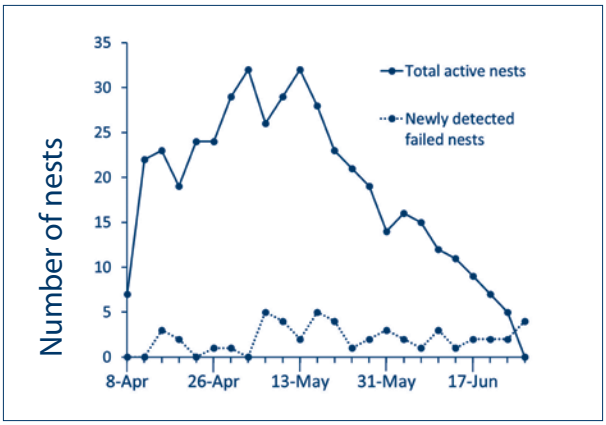

Figure 3. Number of Great Egret nests observed at Picher Canyon in 2013. Dashed line represents the number of newly failed Great Egret nests observed on each monitoring visit.

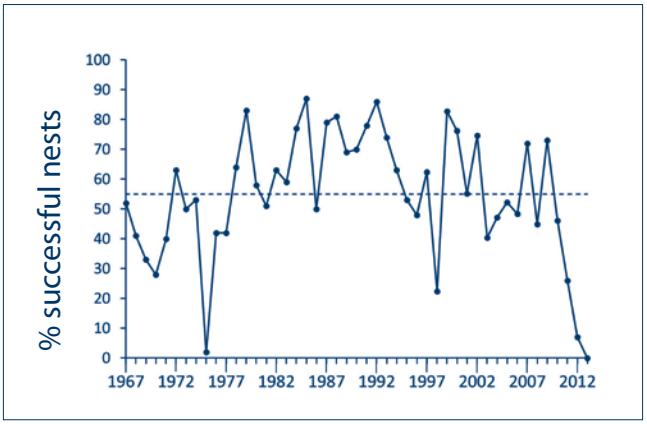

Figure 4. Proportional success of Great Egret nest attempts at Picher Canyon 1967–2013. Dashed line represents the 47 year average percent nest success of 55 ± 20% (SD), 1967–2013.

Bald Eagles were observed at both the Picher Canyon and Bolinas colony sites during the 2014 nesting season. On 19 March, a Bald Eagle was seen flying over Picher Canyon. A juvenile Bald Eagle landed in the Bolinas colony early in the season, after the Great Blue Herons had arrived but before the Great Egrets arrived. Landing in the colony trees, it flushed all the herons, but it was not observed chasing or attacking them. Bald Eagles were also seen regularly on Bolinas Lagoon throughout the nesting season.

For Great Blue Heron, both nest survivorship and the number of chicks fledged per nest was higher at the Bolinas colony in 2014 than the average for the San Francisco Bay region. For Great Egret, brood size was higher than average and nest success was slightly below the regional average, but higher than the historical average for Picher Canyon. The high number of young produced per successful nest suggests that food was not limiting for herons and egrets nesting on Bolinas Lagoon. The processes leading to the abandonment of Picher Canyon appear to be specific to that site and did not apparently have any adverse effects on the nesting colony at Bolinas.

Shifting but stable

The birds that nest at any colony site are members of a much larger breeding population and will readily move to different sites between years. Therefore, local colony dynamics such as the abandonment of Picher Canyon do not generally reflect the status of these birds in the surrounding region. Since the inception of ACR's regional Heron and Egret Project in 1991 (see Ardeid 2005), Great Egrets in the northern San Francisco Bay area have abandoned nesting colonies 49 times. Despite these local perturbations, the number of nesting Great Egrets has remained relatively stable, and nearly half of the abandoned sites have been recolonized (see the following article in this issue). We are hopeful that egrets will recolonize Picher Canyon and, in the meantime, we continue to watch their nesting activities throughout our region.

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Sarah Millus is the Helen Pratt Field Biologist at ACR's Martin Griffin Preserve.

Remembering Helen Pratt

Helen Pratt, who passed away peacefully in her home on July 27, 2014, brought a gentle and thoughtful presence to Audubon Canyon Ranch. It was from this quiet presence that Helen's legendary influence on ACR grew. She was one of the first to notice the unusual opportunity at Martin Griffin Preserve to view nesting herons and egrets from above. This motivated Helen, in the spring of 1967, to begin an intensive, volunteer effort to understand the lives of these beautiful birds. Picher Canyon and the Henderson Overlook became her second home, where she closely followed the nesting performance and behaviors of every heron and egret, every year, for more than 30 years. Helen became an outstanding naturalist who showed ACR how connecting with nature can be the key to lifelong learning. She placed the natural history of Great Egrets and Great Blue Herons within reach of everyone who visits ACR, and her scientific research established much of what is currently known about the nesting behaviors of these birds (See Ardeid 2000). Helen's humble, evidence-based way of thinking provided a powerful model that inspired ACR to promote a careful and respectful interpretation of nature—grounded in what we actually know.—*John Kelly*