

# 1994 HERON AND EGRET MONITORING RESULTS AT WEST MARIN ISLAND

## A Report to the San Francisco Bay National Wildlife Refuge

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### INTRODUCTION

The Marin Audubon Society has monitored the sizes of nesting colonies of Great Egrets, Snowy Egrets, Black-crowned Night-Herons, and Great Blue Herons on West Marin Island annually since 1979. These counts, conducted by boat, provide only rough estimates of colony sizes because of the difficulty of observing hidden nests. In 1993, as part of a regional study of heron and egret colonies in the northern San Francisco Bay area (Kelly *et al.* 1993, *Colonial Waterbirds* 16(1):18-27; Kelly 1995, ACR Project Report 90-3-5, Audubon Canyon Ranch, Stinson Beach, CA), Audubon Canyon Ranch began to gather data on reproductive success of Great Egrets on West Marin Island by monitoring focal nests from observation points on East Marin Island (Kelly *et al.* 1994; *unpubl. Report to the San Francisco Bay NWR*). In this report, we present (1) results of the second year of monitoring reproductive success of Great Egrets and Great Blue Herons on West Marin Island, (2) estimates of colony sizes based on counts conducted from East Marin Island in 1994, and (3) estimates of colony sizes based on counts conducted by boat since 1979.

### METHODS

Sixty-two Great Egret nests were mapped and numbered on nesting panoramas (made from photographs) and monitored with telescopes on four visits to East Marin Island and 16 observation days from the mainland. Reproductive success of Snowy Egret and Black-crowned Night-Heron nests was not monitored because of the difficulty of observing the contents of hidden nests from remote positions. Focal Great Egret nests were selected by mapping all visible nests in four main areas of the island: (1) Middle North Side, observed from the mainland; (2) Upper and (3) Lower East End of

the North Side, observed from the slope above the East Marin Island landing; and (4) Upper East End, observed from the west end of East Marin Island. To allow efficient monitoring and accurate identification of numbered nests, all focal nests observed in the four main areas were mapped in contiguous blocks; therefore, results reflect the fates of nests found in the four main areas of the island, but may not accurately represent more isolated nests or nests in other areas of the island.

On each visit, the active status, nest contents, and nesting (behavioral) stage of each focal nest were recorded. The five nesting stages used to evaluate nesting chronology in ACR's regional monitoring program are described in Table 1.

Table 1. Behavioral stages used to classify nests in analysis of differences in intraseasonal reproductive timing.

#### NESTING STAGE

- 1 Egg-laying or incubation; adult lying down in nest for long periods, standing to turn eggs, defecate, or if mate arrives
- 2 Hatching; small (downy) chicks, or feeding observed low in the nest (Watch carefully when adults stand or move.)
- 3 Chicks (usually) standing; most or all of down replaced by juvenal plumage; parent(s) continuously at the nest
- 4 Adults not continuously at nest (but may be present for some time after feeding!); chicks (usually) on nest platform
- 5 Young often off the nest, on nearby branches

Table 2. Marin Audubon Society counts of active heron and egret nests on West Marin Island. All counts were conducted by boat.

Year	Great Egret	Snowy Egret	Black-crowned Night-Heron	Great Blue Heron
1979	58	262	98	
1981	75	325	109	
1982	187	500	80	
1983	190	345	89	
1984	139	347	54	
1985	84	161	79	
1986	160	126	40	
1987	89	239	41	
1988	77	212	35	
1989	79	245	61	
1990	119	300	37	1
1991	90	277	45	2
1992	189	220	30	1
1993	120	98	41	
1994 <sup>a</sup>	89	6	32	1

<sup>a</sup>Counts conducted from East Marin Island in 1994 estimated 163 Great Egret, 8 Snowy Egret, and 2 Great Blue Heron nests.

Two of us (Kelly and Fischer) monitored reproductive success of Great Egrets on 16 April, 13 May, 6 June, and 22 June, 1994. We used a double kayak for transportation to East Marin Island because it provided access during all tides. Two of us (Pratt and Fischer), assisted by Barbara Salzman, conducted a census of all active nests on West Marin Island on 24 May (see attached report). The census boat was provided by Keith Fraser who also acted as skipper.

Methods are described in detail on the attached "1994 Instructions for Field Observers," in the summary report on the 1994 heron and egret breeding season in the northern San Francisco Bay area (Kelly 1995), and in Kelly *et al.* (1993).

## DISCUSSION AND RESULTS

### Snowy Egret

From 25 April to 17 May we observed repeated synchronous alarm flights of numerous Snowy Egrets, apparently in response to flights of a Red-tailed Hawk through the colony site. As in 1993, when similar disturbance flights by a Red-tailed Hawk were observed (Kelly *et al.* 1994), other nesting species on the Island generally did not exhibit alarm flights during this period of time. We observed no predation in 1993 or 1994. In both years, Great Egrets and Black-crowned Night-Herons did not generally leave their nests during the disturbance

events, possibly because they were already committed to brooding eggs or young. Snowy Egrets, however, had only recently arrived at the Island and were still courting and selecting nesting sites. The relatively greater sensitivity of Snowies to these disturbances reflects behaviors often observed in other species. For example, Great Blue Herons flush more readily from nesting colonies early in the season; after making a significant investment of time or energy required for reproduction, they become more tenacious and are less easily disturbed (Vos *et al.* 1985; *Colonial Waterbirds* 8:13-22). At the peak of the 1993 nesting season, we observed only 98 active Snowy Egret nests, indicating a 55% decline compared with numbers of active nests observed in 1992. In 1994, we observed only 8 active Snowy Egret nests. Given the numbers of active Snowy Egret nests on West Marin Island since 1979 (Table 2), it was clear that Snowy Egrets had virtually abandoned the Island.

When ACR completed its first regional assessment of heron and egret populations in 1991 (Kelly *et al.* 1993), the results generated a concern about the breeding distribution of Snowy Egrets: the occurrence on West Marin Island of most (84%) of the Snowy Egret nests in the San Francisco

Bay area suggested that catastrophic impacts at this site could threaten the regional population. Therefore, although the 1993 and 1994 declines of Snowy Egrets on West Marin Island suggests a loss of habitat value, movements of Snowies to other colony sites might be advantageous to the regional population as a hedge against local impacts to nesting sites. During the 1992 nesting season, field observers on ACR's North Bay Counties Heron/Egret Project documented new Snowy Egret colonies at three sites: Santa Rosa, Red Rock Island, and Napa State Hospital. The number of Snowy Egret nests at West Marin Island declined slightly that year, but was well within expected range of variation, based on the previous 14 years of monitoring (Table 2). During the 1993 nesting season, when a Red-tailed Hawk was observed harassing Snowies at West Marin Island, ACR field observers noticed that Snowy Egrets were appearing in greater numbers at all six other colonies in the five-county region of Marin, Sonoma, Napa, Solano, and Contra Costa Counties (Table 3). In 1994, when all but 8 pairs of Snowies abandoned the Island, Snowy Egret nesting colonies at nearby Red Rock and Brooks Islands increased more than threefold, and the colony at Napa State Hospital increased more than

Table 3. Sizes of Snowy Egret colonies in 1991, 1992, and 1993, in the northern San Francisco Bay area.

Colony Site	1991	1992	1993	1994
Brooks Island	7	5	26	95
Napa State Hospital	0	6	15	114
Picher Canyon, ACR	5	3	11	10
Penngrove	2	7	13	2
Peterson Lane	0	1	9	0
Gold Hill	0	0	0	2
Red Rock	0	5	20	65
West Marin Island	277	220	98	8
West Seventh, Santa Rosa	0	0	0	6
Total	291	247	182	301

sevenfold (Table 3). We also recorded the first known Snowy Egret nesting records in Suisun Bay since 1962 (Kelly 1995; USFWS 1992, *Status and Trends Report on Wildlife in the San Francisco Estuary*). The 1995 nesting season will be valuable in monitoring either a persistence of the newly decentralized Snowy Egret nesting distribution or a return of Snowy Egrets to traditional nesting sites at West Marin Island.

### Great Egret

We compared counts of active Great Egret nests conducted by boat with counts conducted from East Marin Island with telescopes, and concluded that the East Marin Island counts were more accurate. We counted a seasonal peak of 163 active nests on 13 May compared with an 89 nests counted from a boat on 24 May. Numbers of active Great Egret nests decreased in late May and June. We estimated the mean pre fledging brood size of successful Great Egret nests at 1.81 young per nest (SE = 0.086, n = 31). This was slightly, although not significantly, lower than the 1993 mean of 1.91 (SE = 0.07, n=54). The probability of Great Egret nest mortality was much greater in 1994 (0.32, based on 62 focal nests) than in 1993 (0.08, based on 96 focal nests), and greater than the estimated nest mortality at other colonies in the region (0.13, based on 187 focal nests). Most (65%) of the observed nest mortality in 1994 occurred from late April to mid-May. Although this was the period of apparent disturbance of Snowy Egret nests by a Red-tailed Hawk, we observed no direct evidence that the Red-tailed Hawk influenced the failure of Great Egret nests. Overall mean productivity in 1994, based on nests with all possible outcomes was approximately 1.23 young per nest (SE = 0.058, excluding unmeasured variance of nest mortality), compared with approximately 1.75 in 1993 (SE = 0.06, excluding unmeasured variance of nest mortality). Mean stage of nesting (Table 1) among Great Egret nests was 1.00 (SE = 0.00, n = 65) on 15 April, 1.69 (SE = 0.10, n = 54) on 13 May, 2.60 (SE = 0.19, n = 52) on 6 June, and 3.15 (SE = 0.19, n = 48) on 22 June. Mean nesting stage on 7 June 1993 was 3.66 (SE = 0.10, n = 76), indicating that timing of the nesting cycle was two to three weeks earlier than in 1994. The first observation of a Great Egret nestling was on 27 April, and the mean date of first nestlings observed was 9 May (SE = 12.8 days, n = 19).

### Black-crowned Night-Heron

The Black-crowned Night-Heron nest count decreased from 41 in 1993 to 32 in 1994. We were not able to determine if Black-crowned nesting activity was affected by the Red-tailed Hawk harassment that

apparently disturbed Snowy Egrets (see above). However, it is possible that 26 night-herons that stood along the shoreline on 9 May could have left their nest sites in response to previous harassment.

The nest count conducted by boat provides a poor indication of colony size for Black-crowned Night-Herons because their nests are well-concealed in the vegetation. Counts conducted by boat in 1991 and 1992 were between 15% and 22% of the USFWS counts conducted from land on West Marin Island in those years (Roger Hothem, pers. communication). However, the boat counts may serve as a rough index of colony size. According to boat counts conducted since 1979, the number of nesting Black-crowned's appears to be holding steady in recent years (Table 2).

### Great Blue Heron

Two pairs of Great Blue herons nested on West Marin Island in 1994, compared to none in 1993. Both nests were successful. One of the nests produced 3 young and the second nest, which was mostly hidden, produced at least one young. Great Blue Heron nests have been observed on West Marin Island since 1990 (Table 2).

### Other Species

A breeding pair of Black Oystercatchers, suggested by the presence of two adults, one apparently sitting at a nest site, was observed on 6 June 1993. We also observed two Oldsquaws (one male and one female) on the East Marin Island sand bar and in the vicinity of West Marin Island on 15 April. Seven Canada Geese were observed in the vicinity of the Marin Islands in April, May, and June. We made no attempts to count total numbers of nesting Western Gulls. However, Helen Pratt counted 29 Western Gull nests on the south side of the Island. This is lower than the 40 nests observed in 1993, but approaches the 14-20 range that prevailed from 1984-89 (Pratt, unpubl. data).

## FUTURE MONITORING

We recommend continued monitoring of colony sizes using counts conducted by boat and checked with counts using telescopes from East Marin Island. Reproductive success of Snowy Egrets and Black-crowned Night-Herons cannot be determined without entering the colonies; therefore, to avoid disturbance, we have not monitored reproductive success in these species. However, Great Egrets should be monitored annually from remote positions on East Marin Island to provide estimates of reproductive success that can be compared with other colonies in the region.