

2014 MONITORING RESULTS FROM THE DESILVA ISLAND HERONRY

A report to the DeSilva Island Home Owners' Association



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INTRODUCTION

The Great Blue Heron nesting colony at DeSilva Island, in Marin County, California, is one of many colony sites monitored by Audubon Canyon Ranch (ACR) in the northern San Francisco Bay area. This report to the DeSilva Island Home Owners' Association is written to inform annual tree management activities conducted as part of the DeSilva Island Tree Management Plan, by Dr. Kent Julin of Arborscience in Woodacre.

The heronry at DeSilva Island is one of several colony sites in Marin County and is known to have supported nesting herons and egrets since 1979 (Pratt 1983, Kelly et al. 2006). The trees used for nesting are blue gum eucalyptus and are located along the southern waterfront of the DeSilva Island town homes complex.

ACR's North Bay Heron and Egret Project was initiated in 1990 and reflects an ongoing effort to monitor the status of colonially nesting herons and egrets throughout five counties in the northern San Francisco Bay region. The primary goal of the Heron and Egret Project is to develop and apply current and historical information on the status of herons and egrets to wetland conservation concerns in the San Francisco Bay area. Specifically, the project focuses on monitoring local and regional trends in nesting abundance and reproductive performance (Kelly et al. 2006, 2007). A brief summary of colony site locations and results is posted online at <http://www.egret.org/googleearthheronries>.

METHODS

ACR staff and trained volunteers use binoculars and spotting scopes to monitor nesting activities, from vantage points along Seminary Drive south of the colony site and from locations on DeSilva Island near the nesting trees. Each year, a colony map or "panorama" is created to document the locations of individual nests. The data recorded include: (1) the number of active nests, (2) reproductive success (nest survival rates and the number of chicks fledged from

successful nests), (3) the nesting stage (a measure of seasonal timing), and (4) any observed disturbances or potential predators observed or inferred in the vicinity of the nesting site.

Two indicators of reproductive success in the heronry, each reflecting a different set of ecological conditions, are used to measure the persistence and health of the nesting colony (Kelly et al. 2007). First, nest survivorship (percent of nests that fledge at least one young) is primarily related to colony site disturbance by nest predators or human activities. Intensive or repeated disturbance can cause nesting herons or egrets to abandon their nests. The number of successful nests in the colony is estimated as the number of Great Blue Heron nests with one or more young that survive to the minimum fledging age of eight weeks. Second, the number of young fledged in successful nests is closely related to the availability of food in the surrounding feeding areas. Brood sizes decline when herons or egrets find less food to provision their nestlings. The number of young fledged in successful nests is estimated from the “prefledging brood size,” based on the number of young that survive at least five-to-eight weeks of age after hatching. Young herons that reach this age have a very high likelihood of fledging (Kelly et al. 2007).

Our estimates of reproductive performance at DeSilva Island are highly precise because most or all of the nests are closely monitored each year (Table 1). Therefore, the level of certainty achieved in our annual observations is much greater than suggested by the standard errors (SE) in this report. The reported SEs provide a conservative estimate of precision because they account for the possibility of different outcomes if different individuals from the regional population choose to nest at DeSilva Island. We consider this approach to be the most appropriate for measuring nesting performance across years.

We do not attempt to measure the intraseasonal timing of arrival or initial occupation of nests at the onset of the nesting season. However, to evaluate the intraseasonal timing of nesting activity, we measure the proportions of nests in the parental guardian period (egg laying, incubation, young generally less than three-to-four weeks of age) and the post-guardian period (nests not continuously guarded by parents, young generally greater than three-to-four weeks of age). A detailed account of the monitoring methods is available in Kelly et al. (2006, 2007). Results are reported as means \pm SE.

RESULTS AND DISCUSSION

Nest locations

In 2014, we monitored Great Blue Heron nesting activity at the DeSilva Island Heronry approximately weekly from 5 January through 14 July (36 visits, for a total of 50.0 hours of field

observations). The locations of nest sites active in 2014 were documented on panoramic photographs of the colony site (Figure 1). The spatial extent of nesting activity remains limited to nesting trees along the southern shore of DeSilva Island. No Great Egrets nested at DeSilva in 2014. The only record of nesting Great Egrets at DeSilva occurred in 1995 when there were three recorded nest attempts.

Active nests

The number of active nests in heron and egret colonies is normally dynamic among years, sometimes revealing large year-to-year changes in nesting abundance (Kelly et al. 2007). In 2014, peak colony size at the DeSilva Island Heronry was 10 active Great Blue Heron nests, which is the same peak number of nests that occurred in 2013. However, nest numbers remained lower than in most previous years (Table 1, Figure 2). We first noted the presence of herons in the colony on 4 January, with nest building and evidence of pair bonding observed on 19 February. Peak nest abundance was reached on 19 March.

Reproductive success

In 2014, all nests were in locations that were visible enough to track nest survivorship. Observations of these nests indicated that $90 \pm 9.5\%$ ($n = 10$, all nests sampled) of nests survived to fledge at least one young. The nest that failed was apparently abandoned, for unknown reasons, between 18 March and 4 April. With only one nest failure, nest survival increased slightly over 2013, when eight of ten nest attempts were successful (Table 1, Figure 3). Although Common Ravens and other nest predators were seen in the colony trees, no interactions between avian predators and herons were observed. In 2014, 2.6 ± 0.16 ($n = 10$) young were produced, on average, in successful nests, based on clearly observed broods. This rate is slightly higher than average at this site and in the region (Kelly et al. 2012), and it is similar to the productivity of successful nests at DeSilva Island in 2013 (Figure 4, Table 1).

Intraseasonal timing

On 6 May, 2014, $80 \pm 12.3\%$ of nests ($n = 10$) in the colony had reached the postguardian stage. This was below the $90 \pm 9.5\%$ of nests that had reached the postguardian stage in early May 2013. Therefore, nesting activity occurred slightly (but not significantly) later in the season, on average, in 2014 than in 2013—yet earlier than in many other previous years (Figure 5). Historically, the timing of nesting varies considerably and is likely related to weather patterns, especially rainfall, or other factors that affect conditions in the nesting colony or the availability

of food in surrounding wetlands. Therefore, the relatively early nesting in 2014 may be related to the lack of substantial winter and spring rainfall during the last two nesting seasons.

Disturbance

We found no evidence of nest predation in 2014. In addition, we found no evidence of colony site disturbance by predators or human activities. However, Common Ravens, a well-documented nest predatory species in heronries (Kelly et al. 2005), nested near the nest trees at DeSilva Island, just east of the colony and heron nest #10 (Figure 1).

Conclusions

Great Blue Heron nest numbers at DeSilva Island remained the same as in 2013. However, nest abundance in both years was lower than in many previous years. Heron nesting performance in 2014 was also very similar to the nest success and productivity rates in 2013—with relatively successful nesting in both years. We found no evidence of disturbance by potential nest predators or humans.

ACKNOWLEDGEMENTS

We would like to thank Madelon Halpern, a dedicated volunteer observer who spends many hours each year documenting activity at the DeSilva Island heronry. In 2014 she was assisted by Ann Taylor and Ron Mallory whom we also thank for their efforts.

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ABOUT AUDUBON CANYON RANCH

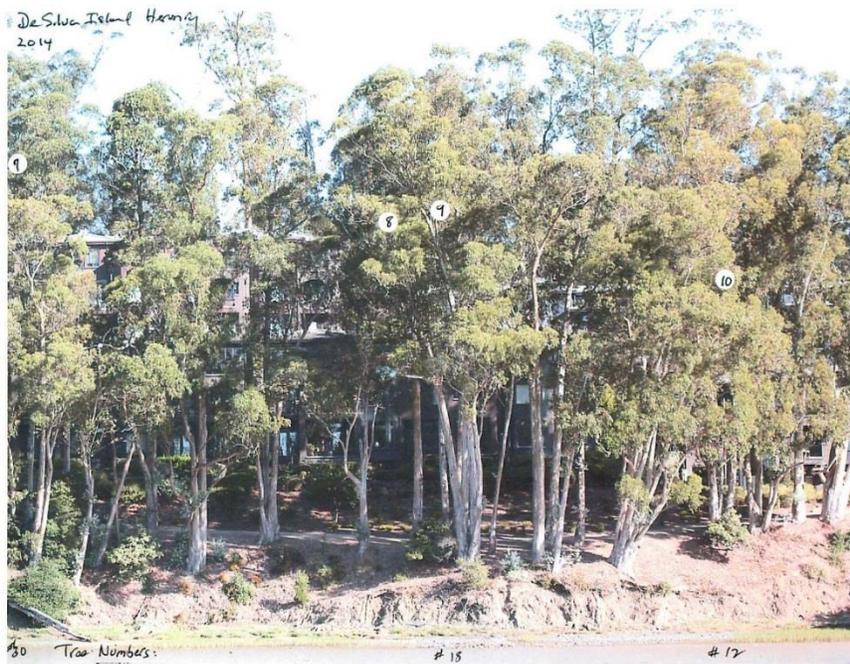
Audubon Canyon Ranch is a non-profit scientific research, environmental education, and land preservation organization. Audubon Canyon Ranch properties include the Martin Griffin Preserve at Bolinas Lagoon in Stinson Beach, the Bouverie Preserve in Sonoma County's Valley of the Moon, the Modini Mayacamas Preserves in the upper reaches of the Russian River watershed in northern Sonoma County, and the Cypress Grove Research Center and protected shoreline properties around Tomales Bay. Audubon Canyon Ranch's mission is to protect the natural resources of its sanctuaries while fostering an understanding and appreciation of these environments. We conduct research and restoration that advances conservation science, educates adults and children, and promotes ecological literacy that is grounded in direct experience. ACR's vision is for all adults and children to feel a strong connection with the wonder and beauty of the natural world. We are working to support the development of a region-wide community of people who share a commitment to restore and preserve the natural environment.

Table 1. Annual Great Blue Heron colony size (peak number of active nests), percent nest survivorship (percent of nests that fledged at least one young), prefledging brood size, and percent of nests that reached the post-guardian period in early May (on or near 6-8 May) at the DeSilva Island Heronry, Marin County, California (SE = standard error; n = sample size; * indicates data were not available).

Year	Colony Size	Percent nest survivorship \pm SE (n)	Prefledging brood size \pm SE (n)	Percent nests in post-guardian period \pm SE (n)
1990	8	*	2.2 \pm 0.15 (6)	*
1991	9	89 \pm 10.5 (9)	2.1 \pm 0.31 (7)	*
1992	12	75 \pm 12.5 (12)	2.8 \pm 0.24 (7)	0 \pm 0.0 (9)
1993	13	77 \pm 11.7 (13)	2.3 \pm 0.29 (8)	67 \pm 15.7 (9)
1994	15	100 \pm 0.0 (15)	2.0 \pm 0.26 (11)	57 \pm 13.2 (14)
1995	16	81 \pm 9.8 (16)	1.9 \pm 0.26 (10)	0 \pm 0.0 (14)
1996	15	73 \pm 11.4 (15)	2.4 \pm 0.14 (12)	31 \pm 12.8 (13)
1997	13	92 \pm 7.4 (13)	2.5 \pm 0.19 (12)	23 \pm 11.7 (13)
1998	15	93 \pm 6.9 (15)	2.1 \pm 0.2 (13)	0 \pm 0.0 (15)
1999	13	92 \pm 7.4 (13)	2.9 \pm 0.14 (12)	0 \pm 0.0 (11)
2000	13	69 \pm 12.8 (13)	2.3 \pm 0.23 (11)	23 \pm 11.7 (13)
2001	12	67 \pm 13.6 (12)	3.3 \pm 0.34 (8)	27 \pm 13.4 (11)
2002	13	77 \pm 11.7 (13)	2.7 \pm 0.16 (14)	42 \pm 14.2 (12)
2003	14	71 \pm 12.1 (14)	2.0 \pm 0.22 (9)	45 \pm 15.0 (11)
2004	13	83 \pm 10.8 (13)	2.8 \pm 0.14 (9)	90 \pm 9.5 (10)
2005	16	73 \pm 11.4 (16)	2.4 \pm 0.19 (14)	93 \pm 6.9 (14)
2006	14	29 \pm 12.1 (14)	2.2 \pm 0.14 (9)	0 \pm 0.0 (8)
2007	12	83 \pm 10.8 (12)	2.5 \pm 0.16 (10)	18 \pm 11.6 (11)
2008	11	73 \pm 13.4 (11)	1.9 \pm 0.28 (8)	11 \pm 10.5 (9)
2009	10	67 \pm 15.7 (10)	2.1 \pm 0.13 (7)	0 \pm 0.0 (8)
2010	10	70 \pm 14.5 (10)	2.2 \pm 0.14 (9)	75 \pm 15.3 (8)
2011	13	62 \pm 13.5 (13)	1.9 \pm 0.19 (9)	22 \pm 13.9 (9)
2012	11	64 \pm 14.5 (11)	1.6 \pm 0.22 (5)	43 \pm 18.7 (7)
2013	10	80 \pm 12.6 (10)	2.4 \pm 0.21 (10)	90 \pm 9.5 (10)
2014	10	90 \pm 9.5 (10)	2.6 \pm 0.16 (10)	80 \pm 12.6 (10)



West end of colony



East end of colony

Figure 1. Photographic panoramas showing the locations of active, numbered nest sites (circled) at the DeSilva Island Heronry, Marin County, California, 2014.

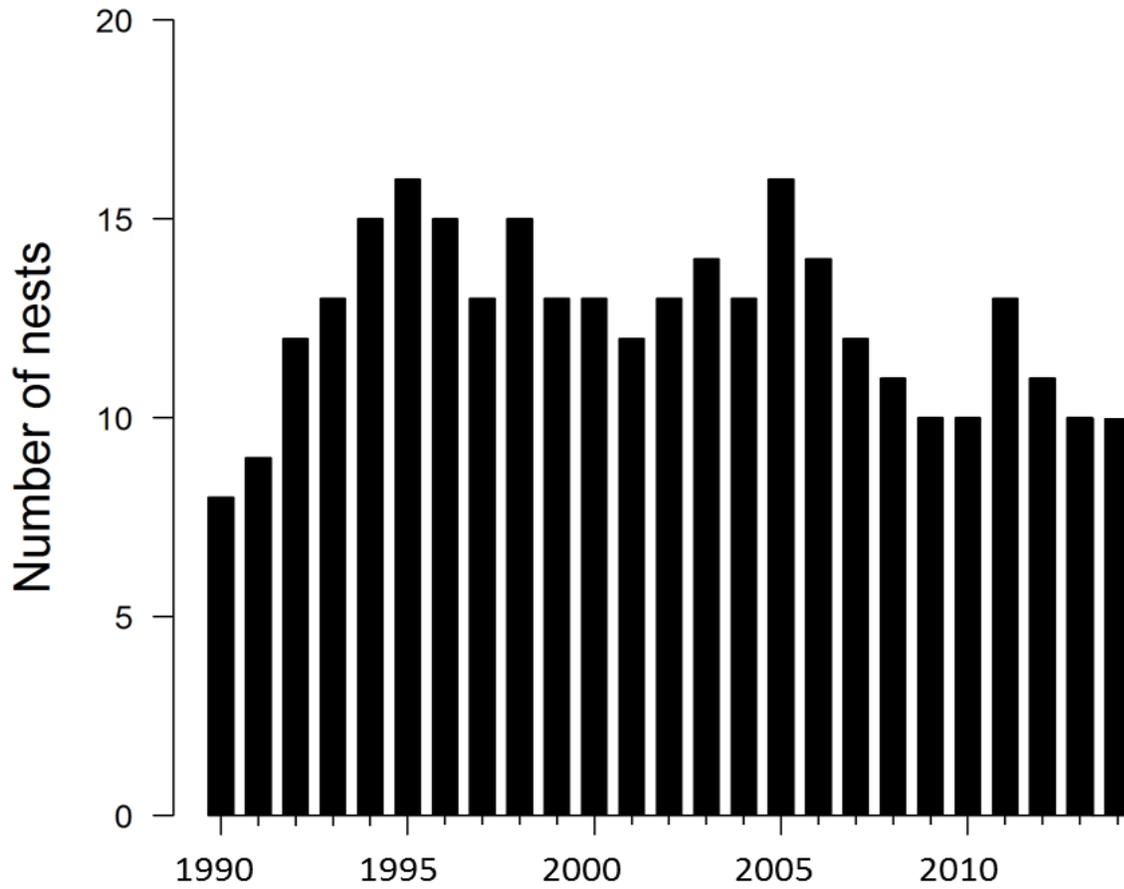


Figure 2. Annual Great Blue Heron colony size (peak number of active nests) at the DeSilva Island Heronry, Marin County, California.

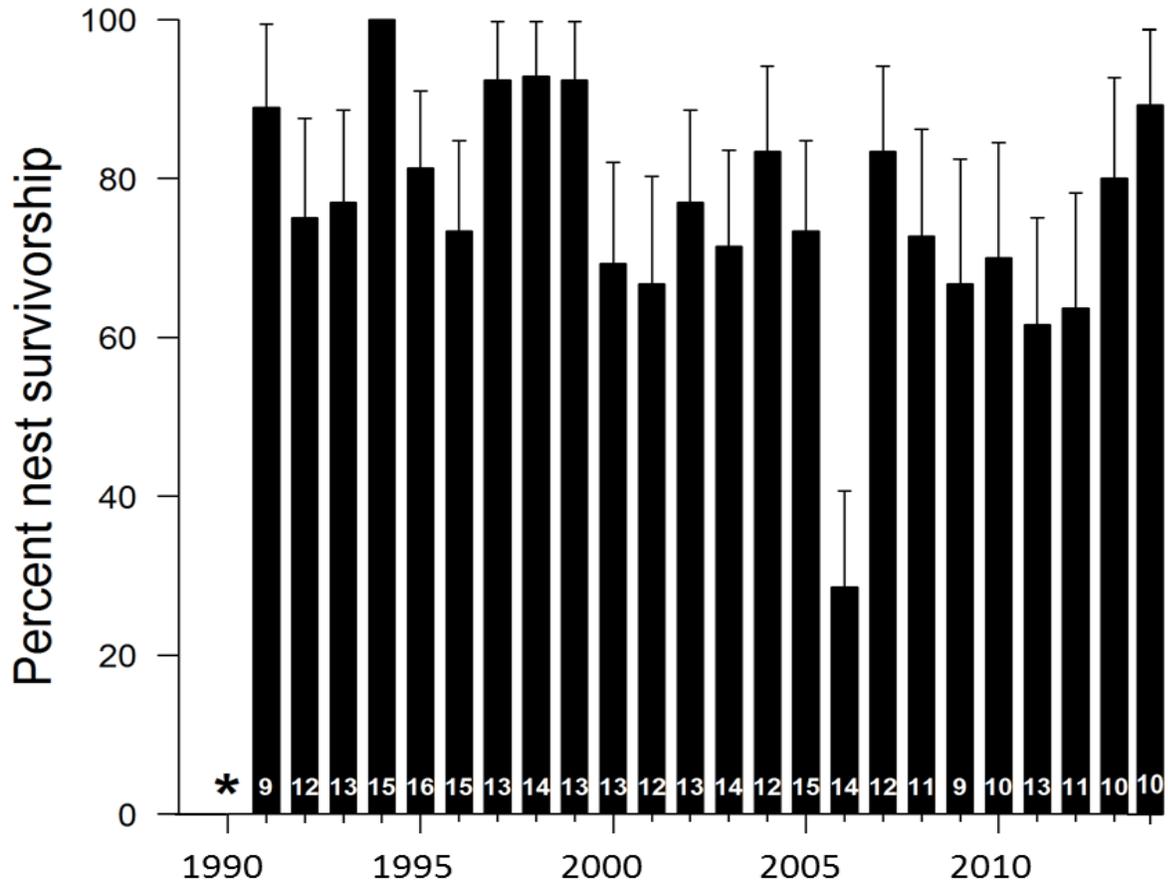


Figure 3. Annual percent nest survivorship \pm standard error of Great Blue Herons at the DeSilva Island Heronry, Marin County, California (labels on bars indicate sample size; * indicates nest survivorship data were not available).

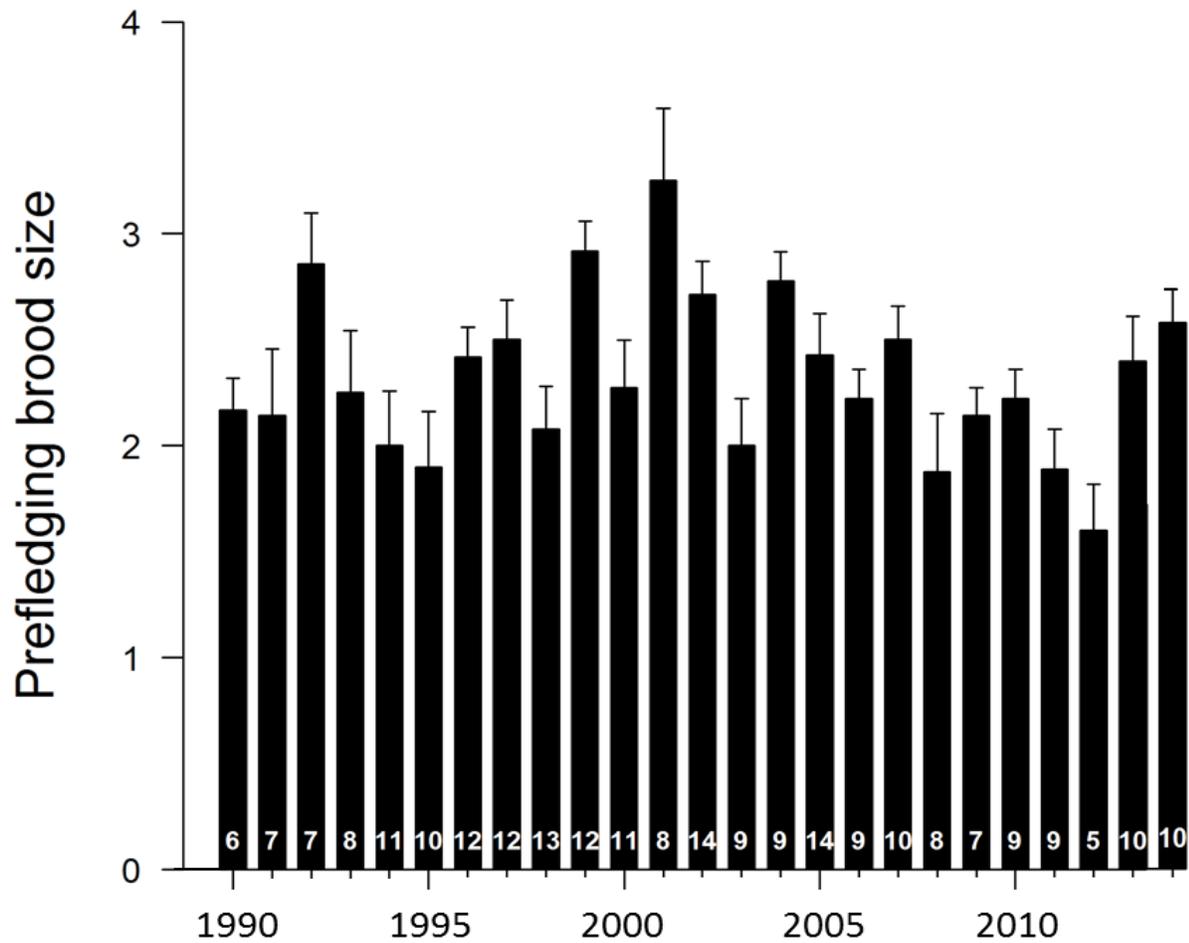


Figure 4. Annual prefledging brood size \pm standard error of Great Blue Herons at the DeSilva Island Heronry, Marin County, California (labels on bars indicate sample size).

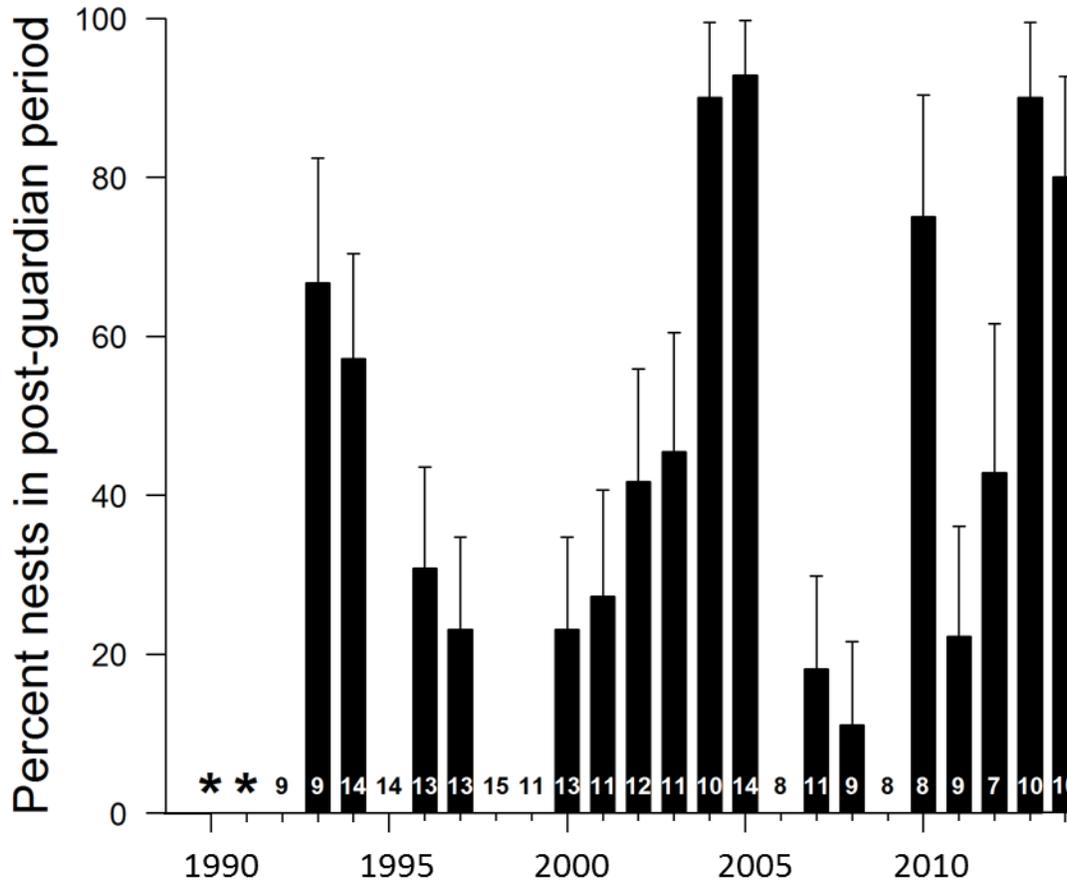


Figure 5. Annual percent of Great Blue Heron nests \pm standard error that reached the post-guardian period in early May (on or near 6-8 May) at the DeSilva Island Heronry, Marin County, California (labels on bars indicate sample size; * indicates stage data were not available).