

Bolinas Lagoon Heron and Egret Nesting Summary 2017

Results from Heronries at Picher Canyon, Kent Island, and the Bolinas Mainland



Scott Jennings
Cypress Grove Research Center
Audubon Canyon Ranch
P.O. Box 808, Marshall, CA 94940
E-mail: scott.jennings@egret.org

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P. O. Box 808, Marshall, CA 94940

INTRODUCTION AND DATA COLLECTION

Audubon Canyon Ranch (ACR) has been monitoring nesting Great Blue Herons (*Ardea herodias*), Great Egrets (*Ardea alba*) and Snowy Egrets (*Egretta thula*) in Picher Canyon since 1967. This colony site is located at the Martin Griffin Preserve, on the northeast side of the Bolinas Lagoon, near Bolinas, CA (Figure 1). ACR has also been monitoring nesting herons and egrets at the Bolinas colony site, at the base of the Francisco Mesa adjacent to the Bolinas Channel, since 1990. This colony site's subsite ("any isolated group of nests 100-500 m from other nests"), located on the south end of Kent Island at the mouth of Bolinas Lagoon, has also been monitored by ACR since the site was colonized in 2008.

ACR biologists monitor every heron or egret nest detected in the vicinity of Bolinas Lagoon. Active colonies are surveyed once-twice per week, from February through July, and historically-occupied colony sites are surveyed approximately once per month to check if the colony has been re-occupied. On each visit to active colonies, the biologist records for each nest the number of adults and chicks, the nest stage (i.e. incubating, nest guarded [at least one parent remains at the nest], nest un-guarded [chicks left alone]; a measure of intraseasonal timing), and any other pertinent information. Additionally, the biologist notes any observed disturbances, or potential predators observed or inferred, in the vicinity of the nesting site. The high frequency of nest checks allows relatively high precision in determining the outcome for each nest. From these nest-based data we derive the following annual summary statistics, which represent key information on breeding phenology and success:

- Peak nests: the total number of active nests in the colony on the earliest peak nesting date.
- Mean brood size: estimates the mean number of young fledged per successful nest (number of chicks at least 5-7 weeks of age, derived from observations during the post guardian period, "stage-4").
- Proportion of nests successful: the proportion of nests followed through the nesting cycle that fledge at least one chick.
- Chicks fledged per nest attempt: this is a derived estimate of the per capita productivity in the colony calculated by multiplying mean brood size by the proportion of nests successful. It is important to note that brood sizes can be calculated from nests that aren't followed for the entire season, if the age of the young can be confidently determined. Therefore, brood size and nest success are often calculated from different sets of nests.
- Proportion of nests guarded (early May and early June): the proportion of all active nests in the incubation or guardian stages during early May and early June. These proportions are calculated using data from a single visit in the second week of March and the first week of June, respectively. These proportions can be compared across years to evaluate the relative phenology (intraseasonal timing) of breeding for each species. A smaller proportion of nests being guarded indicates nesting is earlier that year than in years with a larger proportion of nests guarded.

RESULTS AND DISCUSSION

PICHER CANYON

Picher Canyon was surveyed for nesting Ardeids approximately once per month between March and June, 2017.

Great Blue Heron - There were 0 Great Blue Heron nests in Pitcher Canyon in 2017.

Parameter	2013	2014	2015	2016	2017
Peak nests	1	0	0	0	0
Mean brood size \pm se (n)	-	-	-	-	-
Proportion of nests successful \pm se (n)	0.0 \pm 0.000 (1)	-	-	-	-
Number of chicks fledged per nest attempt \pm se	-	-	-	-	-
Early-May proportion of nests guarded \pm se (n)	-	-	-	-	-
Early-June proportion of nests guarded \pm se (n)	1.0 \pm 0.000 (1)	-	-	-	-

Great Egret - There were 0 Great Egret nests in Pitcher Canyon in 2017.

Parameter	2013	2014	2015	2016	2017
Peak nests	32	0	0	0	0
Mean brood size \pm se (n)	-	-	-	-	-
Proportion of nests successful \pm se (n)	0.0 \pm 0.000 (35)	-	-	-	-
Number of chicks fledged per nest attempt \pm se	-	-	-	-	-
Early-May proportion of nests guarded \pm se (n)	1.0 \pm 0.000 (20)	-	-	-	-
Early-June proportion of nests guarded \pm se (n)	1.0 \pm 0.000 (16)	-	-	-	-

BOLINAS

Surveys of the Bolinas colony began on 6 Mar and were conducted approximately twice per week until 2 Aug. There were no observed disturbances to the colony by avian or non-human mammals during the 2017 breeding season. However, a Bolinas resident informed the ACR biologist that on 6 May, some people were discharging fireworks, including loud explosions and ‘rocket-type projectiles’ from a property under the colony. No nest failures or abandonments were observed in the days following this potential disturbance.

Great Blue Heron - The first active Great Blue Heron nest in the Bolinas colony in 2017 was observed on 6 Mar and the last active nest was observed on 2 Aug. There were 10 Great Blue Heron nests, and all of these appeared to fledge at least one chick.

Parameter	2013	2014	2015	2016	2017
Peak nests	9	9	9	10	10
Mean brood size \pm se (n)	2.6 ± 0.038 (8)	2.8 ± 0.037 (8)	1.8 ± 0.072 (6)	1.5 ± 0.030 (8)	1.6 ± 0.026 (9)
Proportion of nests successful \pm se (n)	0.6 ± 0.000 (10)	0.9 ± 0.000 (9)	0.7 ± 0.000 (9)	0.8 ± 0.015 (9)	1.0 ± 0.000 (10)
Number of chicks fledged per nest attempt \pm se	1.6 ± 0.117	2.4 ± 0.171	1.2 ± 0.179	1.2 ± 0.229	1.6 ± 0.160
Early-May proportion of nests guarded \pm se (n)	1.0 ± 0.000 (8)	0.6 ± 0.171 (8)	1.0 ± 0.000 (6)	0.5 ± 0.177 (8)	0.9 ± 0.105 (9)
Early-June proportion of nests guarded \pm se (n)	0.1 ± 0.106 (8)	0.0 ± 0.000 (8)	1.0 ± 0.000 (7)	0.1 ± 0.100 (9)	0.2 ± 0.163 (6)

Great Egret - The first active Great Egret nest in the Bolinas colony in 2017 was observed on 23 Mar and the last active nest was observed on 2 Aug. There were 17 Great Egret nests, and all of these appeared to fledge at least one chick. There were the same number of nests in 2017 as in 2016, possibly indicating that colony size is stabilizing following the influx of breeding pairs that appeared to result from the abandonment of the Picher Canyon colony.

Parameter	2013	2014	2015	2016	2017
Peak nests	15	34	26	17	17
Mean brood size \pm se (n)	2.3 ± 0.067 (6)	2.6 ± 0.033 (17)	2.2 ± 0.110 (6)	2.0 ± 0.054 (9)	2.3 ± 0.000 (18)
Proportion of nests successful \pm se (n)	0.6 ± 0.000 (17)	0.7 ± 0.005 (31)	0.3 ± 0.000 (26)	0.3 ± 0.007 (16)	1.0 ± 0.000 (17)
Number of chicks fledged per nest attempt \pm se	1.4 ± 0.152	1.8 ± 0.216	0.6 ± 0.089	0.6 ± 0.184	2.3 ± 0.000
Early-May proportion of nests guarded \pm se (n)	1.0 ± 0.000 (8)	1.0 ± 0.000 (23)	1.0 ± 0.000 (22)	1.0 ± 0.000 (16)	1.0 ± 0.000 (14)
Early-June proportion of nests guarded \pm se (n)	0.3 ± 0.145 (10)	0.4 ± 0.085 (33)	0.9 ± 0.069 (19)	0.5 ± 0.204 (6)	0.7 ± 0.115 (16)

Double-crested Cormorant - Double-crested Cormorants (*Phalacrocorax auritus*) nested in the Bolinas colony site for the first time on record in 2016. However, while these cormorants were observed roosting in the colony on multiple occasions in 2017, nesting behavior was not observed.

Parameter	2013	2014	2015	2016	2017
Peak nests	0	0	0	2	0
Mean brood size \pm se (n)	-	-	-	3.0 \pm 0.000 (1)	-
Proportion of nests successful \pm se (n)	-	-	-	1.0 \pm 0.000 (2)	-
Number of chicks fledged per nest attempt \pm se	-	-	-	3.0 \pm 0.000	-
Early-May proportion of nests guarded \pm se (n)	-	-	-	-	-
Early-June proportion of nests guarded \pm se (n)	-	-	-	1.0 \pm 0.000 (1)	-

KENT ISLAND

Kent Island was checked for nesting Ardeids approximately two times per month during the regular Bolinas colony site surveys. Observations of a pair of Common Ravens on and around Kent Island suggested this species was nesting somewhere on the island, but direct evidence of nesting was not observed.

Great Blue Heron - No Great Blue Heron nests were detected on Kent Island in 2016. Great Blue Herons were last observed nesting on Kent Island in 2013.

Parameter	2013	2014	2015	2016	2017
Peak nests	1	0	0	0	0
Mean brood size \pm se (n)	-	-	-	-	-
Proportion of nests successful \pm se (n)	0.0 \pm 0.000 (1)	-	-	-	-
Number of chicks fledged per nest attempt \pm se	-	-	-	-	-
Early-May proportion of nests guarded \pm se (n)	-	-	-	-	-
Early-June proportion of nests guarded \pm se (n)	-	-	-	-	-

Great Egret - There were no Great Egret nests detected on Kent Island in 2016. Great Egret were last observed nesting on Kent Island in 2012.

Parameter	2013	2014	2015	2016	2017
Peak nests	0	0	0	0	0
Mean brood size \pm se (n)	-	-	-	-	-
Proportion of nests successful \pm se (n)	-	-	-	-	-
Number of chicks fledged per nest attempt \pm se	-	-	-	-	-
Early-May proportion of nests guarded \pm se (n)	-	-	-	-	-
Early-June proportion of nests guarded \pm se (n)	-	-	-	-	-

Figure 1. Approximate locations of Picher Canyon, Bolinas and Kent Island colony sites on Bolinas Lagoon.



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