THE RECENT BREEDING OF CALIFORNIA AND LAUGHING GULLS AT THE SALTON SEA, CALIFORNIA

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ABSTRACT: California Gulls successfully colonized the Salton Sea in 1997 with 22 nesting pairs near Obsidian Butte, extending their breeding range 650 km into one of the world's hottest environments. Although the colony site is often subjected to seasonal flooding, the number of nesting pairs has increased to at least 40 in 1999. One or two pairs of Laughing Gulls continue to nest sporadically although unsuccessfully; a nesting attempt in 1994 extended their range 50 km north into Riverside County.

The California Gull (*Larus californicus*) nests widely in the interior of western North America, south to Mono Lake, and along the coast at San Francisco Bay (AOU 1998, Winkler 1996). The breeding range of the Laughing Gull (*L. atricilla*) in western North America extends from the Salton Sea, California, northeastern Baja California Norte (Molina and Garrett unpubl. data), and Isla Montague in the northern Gulf of California (Mellink and Palacios 1992) south along the Pacific coast of Mexico (Howell and Webb 1995). Since the sporadic reports of up to 5 to 10 nesting pairs until the late 1950s (Small and Pyle 1952, Remsen 1978), the Laughing Gull has not bred at the Salton Sea, though it has remained a common postbreeding visitor in summer (Garrett and Dunn 1981). Here I describe a newly established nesting colony of California Gulls at the Salton Sea and document its breeding phenology, success, and growth from 1997 to 1999. This colony extends the species' successful breeding range some 650 km south into one of the world's hottest nesting environments (Grant 1982). I also describe recent nesting attempts by Laughing Gulls, including one at the north end of the sea, extending that species' breeding range 50 km north to Riverside County, California. While the Salton Sea supports large numbers of wintering Ring-billed (*L. delawarensis*), Herring (*L. argentatus*), and California Gulls, the recent colonization by the last represents the sea's first significant colony of breeding gulls.

CALIFORNIA GULLS

On 4 May 1997 I noted an aggregation of 40–50 California Gulls apparently nesting on a small unvegetated islet just offshore of Obsidian Butte, approximately 8 km northwest of Calipatria, Imperial Co. (Figure 1). This site had been used previously by nesting Gull-billed Terns (*Sterna nilotica*), Caspian Terns (*S. caspia*), Black Skimmers (*Rynchops niger*, Molina 1996), and, most recently, Brown Pelicans [*Pelecanus occidentalis*; nest-building attempts by three pairs in 1997, Salton Sea National Wildlife Refuge (NWR) files]. The islet's low-lying western perimeter forms a narrow peninsula composed largely of small boulders and rocks. Along this strip I

Figure 1. The T-shaped nesting islet (upper left) near Obsidian Butte, Imperial Co. The California Gull colony forms along the islet's seaward edge.

Photo courtesy Salton Sea National Wildlife Refuge

found 22 active (plus three abandoned) gull nests on my first visit on 15 May. The colony was oriented linearly along the rocky perimeter, and the distance from the nests to water's edge ranged from 1 to 4 m. Many of these nests were within the spray and surge zone during the strong winds prevalent in spring. Placed in relatively flat areas between rocks, the nests were composed of dried cane (*Phragmites* sp.) and lined with filamentous algae and feathers. The mean clutch size [± standard error (SE)] for the 22 active nests was 2.1 ± 0.2. The abandonment of three nests with eggs may have been due to inundation by waves.

To minimize disturbance to the colony I monitored its progress from the mainland shore at weekly intervals until fledging was complete. I surveyed it from a kayak on 19 June and 5 July (Figure 2), when I recorded 8 and 12 chicks, respectively, seeking shelter among the low boulders. This rocky, uneven substrate helped to conceal chicks, and the observed number is a conservative estimate of nesting success. On 19 June the chicks ranged from recent hatchlings to near fledging, suggesting marked asynchrony within the colony. On 31 July, my last visit, I noted a solitary nearly fledged chick swimming away from the islet but no further nesting activity.

At Obsidian Butte in 1998, I observed copulation and nest building by 2 May, although gulls in high breeding color were at the site in late April. I confirmed 37 active nests and the onset of hatching on 6 June. Using an interval from egg laying to hatching of 30–33 days (Winkler 1996), I estimated the earliest date of egg laying as 2–5 May for this year. The mean

Figure 2. California Gulls with juvenile (second from left) along rocky perimeter of Obsidian Butte islet, 5 July 1997.

Photo by Kathy Molina

clutch size (± SE) of 37 active nests in 1998 was 2.2 ± 0.09. On 28 June I counted the highest minimum of 15 chicks. In 1999 I noted nest building at this site by 16 April and confirmed 40 active nests (plus 5 abandoned attempts) on 21 May. Hatching had already commenced by my visit on 10 June. The mean clutch size (± SE) for 40 nests in 1999 was 2.5 ± 0.11. On 15 June I counted the highest minimum of 24 chicks.

The colony's orientation and nest composition in 1998 and 1999 were similar to those of 1997. Despite all nests in both years being farther from the water (> 5 m) than in 1997, shallow puddles persisted among many of them in late May, indicating that they were still well within the inundation zone.

Earlier nesting attempts by California Gulls have been reported from the Salton Sea. Small (1994) cited an undocumented and apparently unsuccessful attempt by one pair in the early 1970s. More recently I recorded the nesting attempts by one or two pairs on 7 June 1996 at the Johnson Street tern and skimmer colony (site described by Molina 1996) at the north end of the sea, Riverside Co. Here nest composition (dried cane, feathers, and a few twigs) was similar to that at Obsidian Butte, but nesting substrate and distance to water differed. One nest containing two eggs was placed on top of a bare earthen levee 3 m from the sea's surface. The second nest was placed on the floor of a dry and sparsely vegetated impoundment surrounded by an earthen wall 2 m high. The single egg in this nest was obviously abandoned when I found it. By 28 June the levee nest contained two recently hatched nestlings; I estimated the largest, at 44 g, to be ≤ 2 days old. By 12 July I found one desiccated chick (LACM 110635) at the levee nest and no further evidence of

the other chick or the adults; I presumed that this attempt was unsuccessful. I estimated an egg-laying date between 25 and 27 May, nearly a month later than the successful nests at Obsidian Butte.

Additional attempts by California Gulls to nest at the Rock Hill tern and skimmer colony at the Salton Sea NWR (three to four attempts each during May of 1998 and 1999) have been discouraged by the refuge's personnel since in recent years California Gulls have begun to prey on tern chicks (pers. obs.).

LAUGHING GULLS

Miller and van Rossem (1929) described the first nesting of several pairs of Laughing Gulls at the Salton Sea on 9 June 1928. A few pairs continued to nest sporadically up until the late 1950s, when American White Pelicans (*Pelecanus erythrorhynchos*) and Caspian Terns also ceased to nest along the south end of the sea (Remsen 1978). While visiting the Johnson Street colony on 5 August 1994, Ken Sturm and I discovered a large stick nest under an *Allenrolfea* shrub containing two recently hatched Laughing Gulls, one of which was freshly dead (LACM 108310). The larger chick survived until at least 12 August, when it regurgitated two small *Tilapia* during examination. By 23 August I could find neither it nor mobbing adults. I encountered no further breeding evidence for this species until 27 May 1999, when a single pair nested at Salton Sea NWR. This two-egg clutch failed to hatch, although the adults continued to attend it until 15 July.

DISCUSSION

With the recent establishment of the Obsidian Butte colony at the Salton Sea, the California Gull has expanded its breeding range south into the one of the world's harshest nesting environments (Grant 1982). Although at the Salton Sea eggs and hatchlings can be vulnerable to even brief periods of exposure to the sun, and thus require nearly constant attendance, a variety of charadriiform birds nests successfully at the sea. The proximity of nest sites to water for brief episodes of belly soaking and adequate exposure to breezes are believed to enhance evaporative cooling for adult stilts, avocets, plovers, and terns at the Salton Sea, where ambient temperatures during the nesting season commonly exceed birds' body temperature (Grant 1982). At Rock Hill off-duty mates of nesting gulls, like those of terns and skimmers, often rested at the shore near their nests, with legs and feet submerged in water. Although Gull-billed Terns and Black Skimmers frequently, but briefly, left their nests to drink and wet their extremities and bellies (Molina 1999) I have not observed nest-attending gulls to interrupt incubation to do so.

Gulls at Obsidian Butte nested on a low windward strip of rocks and boulders, often subjected to flooding during high winds. The near-water placement and phenology of nests at Obsidian Butte differed from the unsuccessful attempts at Johnson Street. At the latter, two of the three unsuccessful attempts by gulls occurred at the base of an impoundment and were surrounded by a wall 2 m high that blocked the wind. Additionally, incubation at Obsidian Butte was predominantly in May, whereas at Johnson

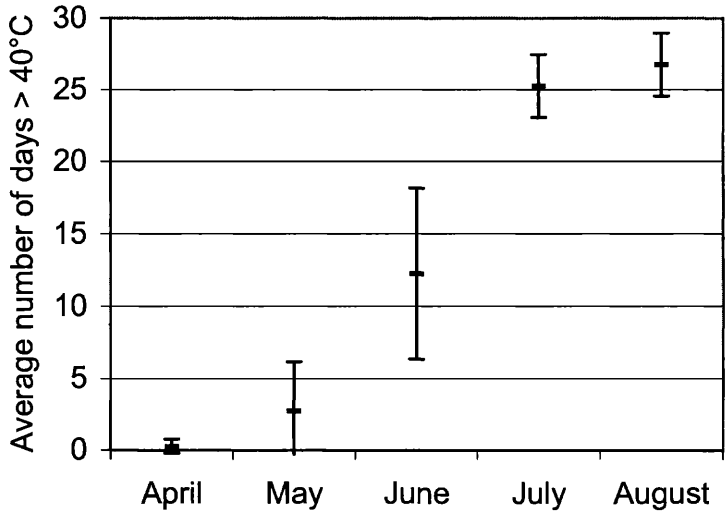

Figure 3. Mean number of days per month (± standard deviation) in which ambient temperature maxima (measured at Imperial Airport) reached or exceeded a gull's mean body temperature (41°C), 1995–1998.

it was in June and July, months in which the number of days with ambient temperatures reaching or exceeding 41°C, a mean body temperature calculated for larids on the basis of McNab (1966), increased three- and eightfold, respectively, over that for May (Figure 3). Hand et al. (1981) believed that proximity to water with unobstructed exposure to convective air currents ameliorated the effects of intense solar radiation for Yellow-footed Gulls (*L. livens*), nesting in the Gulf of California. Variation in chick mortality among nesting subcolonies of Western Gulls (*L. occidentalis*) on the California Channel Islands during an unusual heat wave was thought to be due to variation in nest-site microclimate (Salzman 1982). However, Jehl and Mahoney (1987) believed that predation risk, rather than variation in nest-site microclimate, was responsible for California Gulls' selection of nest sites at Mono Lake. Although quantitative data for the Salton Sea gull-nesting sites are lacking, differences in nest substrate and location and the timing of nesting could lead to important differences in exposure to wind and sun. Because microenvironmental variation may have important consequences for adults' and chicks' thermoregulation and, ultimately, nest success at the Salton Sea, nest-site selection by larids deserves further investigation.

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LITERATURE CITED

American Ornithologists' Union. 1998. Checklist of North American Birds, 7th ed. Am. Ornithol. Union, Washington, D. C.

Dawson, W. L. 1923. The Birds of California, vol. 4. South Moulton Co., Los Angeles.

Garrett, K., and Dunn, J. 1981. Birds of Southern California: Status and Distribution. Los Angeles Audubon Soc., Los Angeles.

Grant, G. S., and Hogg, N. 1976. Behavior of late-nesting Black Skimmers at Salton Sea, California. W. Birds 7:73–80.

Grant, G. S. 1982. Avian incubation: Egg temperature, nest humidity, and behavioral thermoregulation in a hot environment. Ornithol. Monogr. 30.

Hand, J. L., Hunt, G. L., Jr., and Warner, M. 1981. Thermal stress and predation: Influences on the structure of a gull colony and possibly on breeding distributions. Condor 83:193–203.

Howell, S. N. G., and Webb, S. 1995. A Guide to the Birds of Mexico and Northern Central America. Oxford Univ. Press, Oxford, England.

Jehl, J. R., Jr., and Mahoney, S. A. 1987. The roles of thermal environment and predation in habitat choice in the California Gull. Condor 89:850–862.

McNab, B. K. 1966. An analysis of the body temperatures of birds. Condor 68:47–55.

Miller, L., and van Rossem, A. J. 1929. Nesting of the Laughing Gull in southern California. Condor 31:141–142.

Molina, K. C. 1996. Population status and breeding biology of Black Skimmers at the Salton Sea, California. W. Birds 27:143–158.

Molina, K. C. 1999. An exploration of parental investment hypotheses using Gull-billed Terns and Black Skimmers (Aves: Laridae) at the Salton Sea, California. M. S. thesis, Calif. State Univ., Northridge.

Palacios, E., and Mellink, E. 1992. Breeding bird records from Montague Island, northern Gulf of California. W. Birds 23:41–44.

Remsen, J. V., Jr. 1978. Bird species of special concern in California. Calif. Dept. Fish & Game Nongame Wildlife Invest. 78-1.

Salzman, A. G. 1982. The selective importance of heat stress in gull nest location. Ecology 63:742–751.

Small, A., and Pyle, R. L. 1952. Southern Pacific Coast Region. Audubon Field Notes 5:308.

Small, A. 1994. California Birds: Their Status and Distribution. Ibis Publ., Vista, CA.

Winkler, D. W. 1996. California Gull (*Larus californicus*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 259. Acad. Nat. Sci., Philadelphia.

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