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Publication Brief for Resource Managers

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California Gull Chicks Raised Near Colony Edges Have Elevated Stress Levels

Colony formation in nesting birds is a life history strategy that can improve reproductive success. But a study by USGS researchers published in *General and Comparative Endocrinology* suggests that a bird nest's location within the colony can influence the stress level experienced by that nests's chicks.

Researchers studied three California gull (*Larus californicus*) colonies in San Francisco Bay, with 150, 3,297 and 11,554 nests respectively. The study sites included ponds A1, N2A/3A and A6 of the Don Edwards San Francisco Bay National Wildlife Refuge, part of the South Bay Salt Pond Restoration Project.

To examine whether colony size or nest location influenced a chick's physiological condition, researchers collected fecal material from gull chicks and analyzed them for corticosterone metabolites — a hormone naturally produced in response to physiological stress.

Analysis found that chicks being raised near colony edges had higher fecal corticosterone metabolite concentrations than chicks raised near colony centers. Colony size had no influence on fecal corticosterone levels. Thus, similarly aged California gull chicks raised near colony edges experience more physiological stress than chicks raised near colony centers.

Younger, less experienced breeding adults are more likely to nest at colony edges and often have lower reproductive success than older, more experienced adults. Nests on colony edges may be exposed to more stressors, such as predators. Stress levels in colony-edge offspring may be a response to lower quality parents, although it is uncertain whether elevated corticosterone metabolites can impact chick growth or survival.

Management Implications

- This is one of the first studies to examine differences in corticosterone concentrations in bird chicks raised in different parts of a nest colony.
- California gull chicks raised near colony edges exhibit higher stress levels than chicks raised near colony centers, and stress levels in colony-edge offspring may be associated with lower reproductive success.
- Colony size had no additional influence on stress levels between colony-edge and colony-center chicks.

THIS BRIEF REFERS TO:
Herring, G. and J.T. Ackerman. 2011. California Gull Chicks Raised Near Colony Edges Have Elevated Stress Levels. General and Comparative Endocrinology 173(1): 72-77. doi: 10.1016/j.ygcen.2011.04.029

http://www.werc.usgs.gov/davis
http://www.werc.usgs.gov/ProductDetails.aspx?ID=4308
http://www.southbayrestoration.org

The California gull colony in Pond A6 near Alviso, CA, was sampled prior to the tract's conversion into flooded tidal wetland. Photo: Josh Ackerman/USGS