

## Assessing Accuracy of Sampling Schemes to Estimate Western Snowy Plover Reproductive Success

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Like many wildlife species of management concern, the western snowy plover (*Charadrius nivosus nivosus*) is the subject of intensive population monitoring, including tracking of annual reproductive success. However, intensive monitoring of reproductive success for this shorebird is time consuming, expensive, and potentially disruptive to the birds of interest. Due to these constraints, intensive monitoring is not feasible throughout the range of the federally threatened Pacific Coast population.

In this study, we used data collected from one intensively monitored subpopulation in Monterey Bay, California to assess how reductions in monitoring effort (number of chicks individually banded) would affect the accuracy of estimates of fledging success. We used monitoring data collected on chicks hatching at 1,845 nests from 2003 to 2012 as a theoretical subpopulation from which to draw random samples for this assessment.

Using random samples of the theoretical subpopulation ranging from 10-90% of hatched nests, we quantified how accuracy of fledging estimates increased with the increasing percentage of plover broods monitored. We also determined that the day of the week that chicks hatched and were banded had no effect on fledging success.

These results are useful for designing a sampling scheme within a monitoring plan that is needed to meet a desired level of accuracy. For example, by monitoring nests hatching only on weekdays (equivalent to 71% of sampling effort), fledge rate estimates would typically be within 8.5% of the actual value. At 50% of sampling effort (the current target in Monterey Bay), fledge rate estimates would typically be within 13.4% of the actual value. Our results also may be useful for retrospective assessments of the accuracy of snowy plover chick fledging estimates, provided that the percentage of broods monitored is known.



Banded snowy plover chick,  
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### Main Points

We used snowy plover data from a long-term monitoring project in Monterey Bay, CA to assess the accuracy of fledging success estimates as a function of sampling effort.

As expected, accuracy increased with increasing percentage of plover broods (i.e. hatched nests) monitored.

Day of the week that chicks hatched and were banded had no effect on fledging success; thus sampling effort can be reduced by omitting chick banding on any day of the week.

Laird A Henkel, Kriss K Neuman, R William Stein, and Lynne E Stenzel 2020. [Assessing accuracy of sampling schemes to estimate reproductive success of western snowy plovers](#). *Journal of Fish and Wildlife Management*. Volume 11: Issue 1, pp: 210-216.