



Oceanographic drivers of winter habitat use in Cassin's auklets

Mike Johns

mjohns@pointblue.org

There is generally a lack of information on the marine conditions seabird populations are exposed to during the non-breeding period. Seabirds typically depart breeding colonies during the winter months, migrating to productive waters beyond the range of our binoculars in search of improved foraging habitat. But where they go and what factors influence their choice of winter habitat remain a mystery.

To help us answer these questions, we began deploying miniature light-sensing archival tags (or geolocators) on Cassin's auklets at the Farallon Islands National Wildlife Refuge. Cassin's are a small robust seabird and are considered an important indicator of ocean productivity and environmental variability.

Geolocators record the timing and duration of sunlight experienced by the tagged bird; data that is later used to estimate a geographic position every 12 hours. To place these estimated positions in the context of marine conditions,

and to explain the movement choices of tagged individuals, we compared habitat characteristics of estimated locations with available locations which were not used by auklets. This analysis technique (called step-selection analysis) has been widely used in movement studies of terrestrial mammals, but to our knowledge, this is the first application of this method to geocator data for a marine bird species.

Between 2015 and 2017, we recovered 35 geolocators, providing us with thousands of wintertime geographic locations to examine. Results from our analysis show auklets dispersed farther offshore and south of the Farallon Islands during winters with abnormally high sea surface temperatures (SST) than in years with average to cool SST. They also preferentially selected areas with strong SST frontal features that tend to aggregate the krill they predominately prey upon.

Coupling our ongoing long-term reproductive monitoring dataset with new information

on the winter habitat use of Cassin's auklets will help inform how future changes to the marine ecosystem may impact the reproductive success and population size of a species highly tuned to its environment.

Main Points

We report results of the first tracking study of Cassin's auklets on the Farallon Islands

This is the first application of step-selection functions using geocator data from a seabird species

Cassin's auklets remain off the central California coast during the winter

Auklets avoid high SST and select for areas with strong frontal features

Increased SST warming can lead to greater dispersal distances for this species

Michael E Johns, Pete Warzybok, Jaime Jahncke, Mark Lindberg, Greg A Breed. 2020. [Oceanographic drivers of winter habitat use in Cassin's auklets](https://doi.org/10.1002/eap.2068) *Ecological Applications*. 30(3), e02068. <https://doi.org/10.1002/eap.2068>