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# Blue and fin whale habitat modeling using calls

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## Abstract

Passive acoustics provide a cost-effective method to estimate presence of marine animals. However, extrapolation of presence data to ecologically relevant topics, such as abundance estimation or habitat use, requires application of assumptions about detection range, calling behavior, etc. A case study in how to use passive acoustics for habitat modeling will be presented based on multi-year, passive acoustic recordings collected at multiple locations off Southern California since 2006. Automatic detection methods were used to extract blue whale B calls and fin whale 20 Hz calls from the recordings. There was a seasonal variation in calling for the two species. Peak in blue whale B calls occurred in late summer and early fall. Fin whale 20 Hz calls, on the other hand, peaked in late fall, often with a secondary peak in the spring. Since propagation varied among sites, to use them as response variables for habitat modeling, call rates were normalized by the area over which detection was feasible at each location based on reported source levels and propagation modeling. A variety of environmental, remotely sensed data were available for habitat modeling, including sea surface temperature, sea surface height, chlorophyll a concentration, etc. In addition, anthropogenic factors such as presence of noise from boats or naval sonar activities, as well as temporal variables like month and year were used as explanatory variables for the models. The variability in model output across sites will be used to discuss implications of using calls for habitat modeling.

**Keywords:** baleen whales, habitat modeling, passive acoustics, blue whale, fin whale

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