

Spatial and Temporal Patterns in Visual and Acoustic Detection Rates of Blue Whales in the Southern California Bight

Erin Oleson
Scripps Institution of
Oceanography
9500 Gilman Dr. #0205
La Jolla, CA 92093
eoleson@ucsd.edu

John Calambokidis
Cascadia Research
Collective
218 ½ W 4th Ave.
Olympia, WA 98501
calambokidis@cascadiaresearch.
org

Sean Wiggins
Scripps Institution of
Oceanography
9500 Gilman Dr. #0205
La Jolla, CA 92093
swiggins@ucsd.edu

Mark McDonald
www.whaleacoustics.com
11430 Rist Canyon Rd.
Bellvue, CO 80512
mark@whaleacoustics.com

John Hildebrand
Scripps Institution of
Oceanography
9500 Gilman Dr. #0205
La Jolla, CA 92093
jhildebrand@ucsd.edu

Abstract- We have been acoustically monitoring blue whale calling within the Southern California Bight, and compared detection rates with sighting rates from visual surveys. Northeast Pacific blue whales produce 3 different call types, a long duration, pulsed 'A' call, a long duration, tonal 'B' call, and down swept 'D' call. The function of each of these call types remains unknown; however, it is well documented that blue whales routinely produce type A and B calls in an alternating sequence for several hours at a time. Acoustic Recording Packages (ARPs) at Cortez and Tanner Banks have been acoustically monitoring the region since August, 2000 providing a detailed continuous record of calling presence for over 2.5 years. The continuous records from various sites at Cortez and Tanner Banks indicate that blue whale B calls are detected May-January, with a peak in call counts (1400 calls/day/site) in September. Continuous ARP data also indicate an aggregate diurnal pattern of call detection, with 30% more B calls near sunrise and sunset than the remainder of the day. The type D call season is slightly earlier than B calls, lasting from early May to the end of

October. Type D calls are also less numerous than B calls and have a peak in call counts in July.

Throughout our study at Cortez and Tanner Banks, several sites were simultaneously recording blue whales call presence. The records from each individual site indicate a higher rate of detection of B calls at sites along the outer edges of the banks then between the banks. In addition, we have determined that blue whales do not always produce A and B calls in consistent, long duration sequences called song. The number of B calls produced as part of a continuous song pattern is significantly greater at sites on the edges of the banks, with the number of song calls and unpatterned calls being nearly equal between the banks. There are significant interannual differences in the number of calls detected.

In addition to acoustic monitoring at Cortez and Tanner Banks, opportunistic visual and acoustic ship-based surveys have been conducted throughout the southern California Bight. Ship-based acoustic surveys use expendable sonobuoys which allow for the localization of individual calls. By localizing

individual calls, the number of animals calling rather than the number of call counts could be determined. The sighting rate for blue whales from these surveys was nearly equal between June and August, while the number of blue whales producing each of the call types switched from greater numbers of D callers in June to B callers in August. The acoustic patterns are similar to those observed at Cortes and Tanner Banks, but do not display a simple linear relationship between call counts and numbers of callers. These findings suggest seasonal variation in the proportion of animals producing both call types, as well as variation in call rate. Inter-annual, seasonal, and spatial differences in acoustic and visual detection rates suggest that the relationship between the two detection methods is complex, and cannot be derived from a single “calibration” season. The differing temporal and spatial patterns of the various call types likely indicate different functions for each. The results of this work will help us to determine if there are habitat preferences for blue whales in the Southern California Bight and also if certain habitats lead to the production of different call types, indicating call type, behavior, and habitat relationships.