

Quantifying whale deaths and strategies to decrease vessel collisions off the Bay Area

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Recent estimates of blue and humpback whale death on the U.S. West Coast from ship strikes showed the region off the San Francisco Bay Area to have high mortality, especially within the shipping lanes. Since 2015, these areas have had voluntary vessel speed restrictions (VSR) with the intent to decrease whale mortality.

To understand fine-scale patterns of mortality, assess the VSR's effectiveness in 2015-17, and recommend ways to save more whales, we improved upon a quantitative strike mortality model to calculate mortality per vessel transit. We compared active vs. inactive VSR periods while controlling for confounding variables such as whale distribution. This allowed us to simulate potential management strategies and a range of hypothetical VSR cooperation levels.

We estimate that in our study region an average of 2.7 blue and 7.0 humpback whales die from ship strikes during May-

July and September each year. Half of blue and 1/3 of humpback strike deaths occur in relatively small areas extending beyond the shipping lane ends.

Speed decreases since 2014 led to 13 and 10% fewer blue and humpback whale deaths, respectively. Simulations show that increasing cooperation with lane speed limits would further decrease mortality by approximately 25-26%.

To address ship strike mortality, we recommend placing seasonal speed management areas at the ends of each lane and increasing speed limit cooperation to greater than 80%. Incentives or regulations could help achieve greater cooperation.

Our approach to predicting and evaluating the effects of speed management on whale mortality can be applied to address ship strikes around the globe.

Main Points

Voluntary speed reductions have led to 10-13% reductions in deaths.

Half of blue whale and 1/3 of humpback mortality occurs in the areas just beyond the ends of the shipping lane.

Significantly higher cooperation with a 10-knot speed limit in high risk areas will be necessary to achieve strong decreases in whale strike mortality.

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