Spatial analysis on the critical habitats of bottlenose dolphins (Tursiops truncatus) and humpback whales (Megaptera novaeangliae) in Golfo Dulce, Costa Rica: Considerations for a marina construction project

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Abstract

Golfo Dulce harbors an important resident population of inshore bottlenose dolphins (T. truncatus) and migrating humpback whales (M. novaeangliae, Northern and Southern Pacific populations). The present study offers a detailed spatial analysis of the utilization distribution of bottlenose dolphins (2005-2014: n= 407) and humpback whales (2010-2014: n= 167), assessing the potential impacts due to coastal development by a marina project overlapping their critical habitats. Records yielding spatial and behavior information were analyzed through: 1) the average nearest neighbor index and 2) kernel density estimates, using two contours to illustrate the utilization distribution, a 50% contour for core critical

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areas and 95% contour for the potential home range. Bottlenose dolphins' nonrandom aggregations (KDE-adaptive: Density 21.36 records/km2; H=0.25; H-REF= 0.49) are associated with all the major river drainages at the inner basin and sill area of Golfo Dulce, which represents key critical foraging habitats. Humpback whales' nonrandom aggregations, including mother and calf pairs (KDE-adaptive: Density 1.33 records/km2; H=0.25; H-REF= 0.49) use the west coast of the sill area as calving and nursing critical habitat, whereas whales engaged in singing aggregate at the center of the Sill. Results suggest that the development of a luxury marina project has the potential of negatively affecting the critical habitats of both local species by becoming an important source of anthropogenic impacts due to increased maritime traffic and the associated noise pollution.

Downloads

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