Abundance and distribution of Indo-Pacific bottlenose dolphins at the Southern Seawater Desalination Plant, Binningup, Western Australia.

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Water shortage is becoming more evident in Australia. In response, water desalination plants are being proposed and constructed at numerous locations along the Australian coastline. The Water Corporation (principle supplier of water, wastewater and drainage services in Western Australia) is constructing a seawater desalination plant near Binningup, Western Australia. The long-term impact of discharged hyper-saline water on wildlife in the near-shore marine environment is as yet unknown. Here, we report on a two-year, intensive research program, initiated by the Water Corporation, aimed at obtaining baseline estimates of abundance and residency patterns of Indo-Pacific bottlenose dolphins (*Tursiops aduncus*) prior to the commencement of hyper-saline water discharge. The study area extends 3nm offshore, 9.5nm to the south and 19nm to the north of the discharge site. To date, forty-two boat-based surveys covering the complete study area have been carried out. Using standard photo-identification methods, we have identified 256 individual dolphins within 186 dolphin groups in the study area. Our field protocols of intensive systematic sampling provide even temporal and spatial effort across the two year study period. This in turn will allow accurate abundance and emigration rate estimates to be calculated, for the local dolphin population, using Pollock's Robust Design. The results will provide a baseline dataset for future comparisons to evaluate the possible long-term impacts of hyper-saline water discharge on the local marine wildlife. The pro-active approach by the Water Corporation to obtain a pre "impact" dataset of an appropriate temporal scale is commendable and serves as an ideal template for the design of a rigorous impact assessment study.

Use of the Robust Design model to estimate abundance and demographic parameters for a coastal bottlenose dolphin (*Tursiops aduncus*) population

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As delphinid populations become increasingly under threat we rely on our capacity to produce accurate estimates of abundance and distribution with which to make management decisions. Many studies have favoured population models where the underlying model assumptions of population closure may be violated due to the movements and biology of the species. This study applied the Robust Design and used photo-identification as a capture-recapture method for estimating abundance, demographic parameters and temporary emigration of an Indo-Pacific bottlenose dolphin (*Tursiops aduncus*) population between 2007 and 2009. Surveys were conducted along pre-determined transect lines over a 120 km^2 study area and occurred year-round through all austral seasons. The model with Markovian temporary emigration was favoured with all other parameters (survival, capture probability and emigration time) varying. Abundance estimates varied seasonally with a low of 65 (± SE 8.53, 95% CI: 54 to 90) in winter 2007 and a high of 139 (± SE 3.41, 95% CI: 134 to148) in autumn 2009. The overall survival estimate was 0.985 (± SE 0.006, 95% CI: 0.964 to 0.994). The abundance estimates provide a baseline for monitoring this population and should be used to parameterise future population viability analyses. These methods set a precedent for abundance estimation of dolphins using a systematic approach with intensive and consistent survey effort year round. The findings show that temporary emigration of individual dolphins from an area can result in different estimates of dolphin abundance seasonally. These modelling techniques could be applicable to population studies of coastal delphinids elsewhere. Given the current rate of coastal development in Western Australia this approach is highly relevant to Environmental Impact Assessment for evaluating impacts on coastal dolphin populations.

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