



Reduction in the number of gray whale calves (*Eschrichtius robustus*) in Bahía Magdalena Complex, B. C. S., Mexico, 2016-2021

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Abstract: The Bahía Magdalena complex (BMAG), on the west coast of the Baja California peninsula, Mexico, is the southernmost breeding area for the gray whale. Analysis of six-year census data (2016-2021) revealed a dramatic decline in the number of gray whales calves. The annual number of calves changed from an average of 110 (± 20) calves per year in 2016 and 2017 to 22 (± 9) calves per year from 2018 to 2021. We believe that the decline in the number of gray whales in the BMAG is related to the "skinny whale" syndrome (poor body condition), registered in the last four years (2018-2021).

Introduction: In cetaceans, poor body condition has been shown to affect an individual's ability to reproduce¹, as producing offspring requires significant energy expenditure. In 2018, the number of gray whales with "skinny whale" syndrome increased². Therefore, the objective of this work is to know if this increase in the number of skinny whales will be reflected in the number of calves of gray whales that arrive at the BMAG.



Figure 3. Percentage of female-calf pairs 2016-2021.

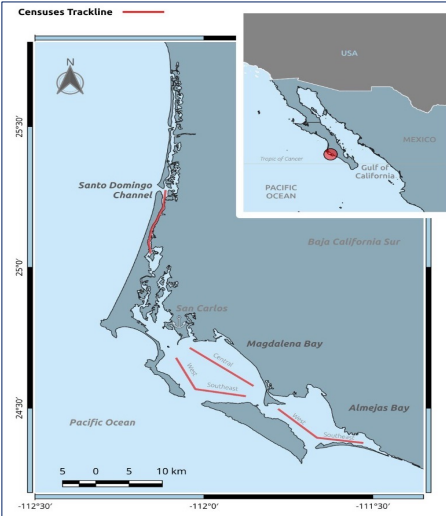


Figure 1. Bahía Magdalena complex (BMAG).

Methods: From 2016 to 2021, during the January-March winter season, 22 censuses were carried out on predefined transects for each study area (Fig. 1). During these censuses, two types of groups of gray whales will be counted: female-calf pairs (Fc) and individuals singles. In this work, we only present the results of the Fc grouping (Fig. 2).



Figure 2. A female-calf pair (Fc).

Results: Between 2016 and 2021, 22 censuses were conducted. Despite the same monitoring effort per year, more than 50% Fc were recorded from 2016 to 2017 (Fig. 3). In Bahía Almejas, 2017 was the year with the highest record, with 36 Fc, and the lowest record in 2020, with only 2 Fc (Fig. 4a). In Bahía Magdalena, 2017 was also the year with the highest record of Fc, with 7, and the lowest number in 2021, with no record (Fig. 4b). In the Santo Domingo Channel, both 2016 and 2017 were the years with the highest values, 85 and 81, respectively, with 2021 being the year with the lowest record, 8 Fc (Fig. 4c).

Discussion and Conclusions: In other whale species as killer whale (*Orcinus orca*)³, fin whales (*Balaenoptera physalus*)⁴, and right whale (*Eubalaena australis*)⁵, reproductive success depends on good body condition and feeding success, along with other factors. Therefore, we consider that the decrease in the number of gray whale calves in the BMAG is related to the "skinny whale" syndrome, recorded in the last four years (2018-2021).

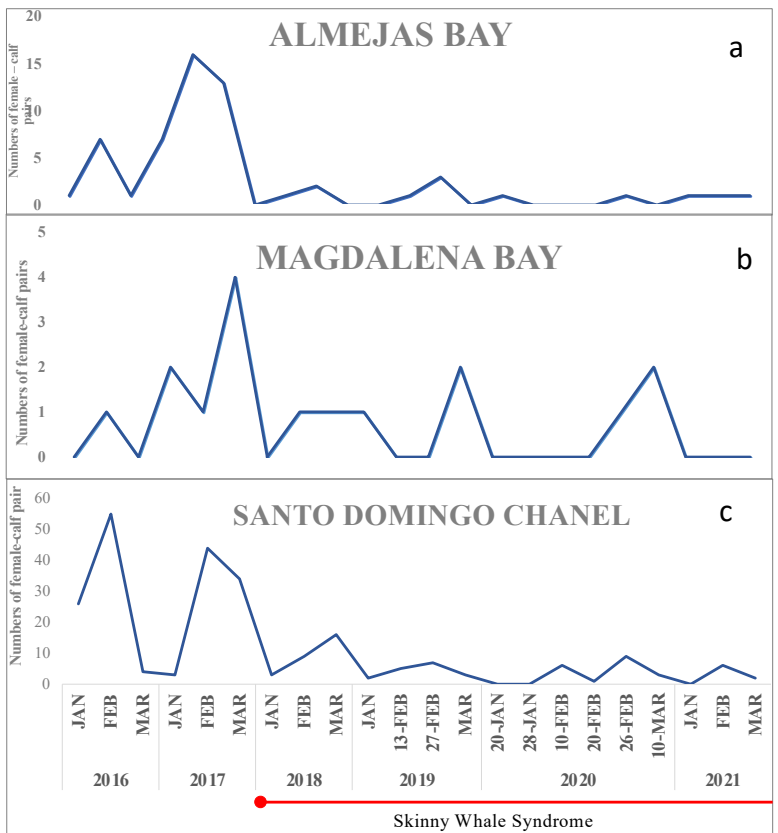


Figure 4. Numbers of female-calf pairs in a) Almejas Bay, b) Magdalena Bay and c) Santo Domingo Channel, 2016-2021. Note the scale on the Y axis is different for each plot.

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