

Critical areas of abundance & distribution of *Balaenoptera edeni* off the northeastern coast of Venezuela: implications for management and conservation

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Abstract: The northeast coast of Venezuela hosts a great diversity of megafauna, particularly related with the existence of big sardine schools (*Sardinella aurita*) along an important community of top predators, including *Balaenoptera edeni*. Bryde' whales are still classified as Data Deficient by the IUCN. Locally there is a considerable lack of knowledge on baseline information such as abundance and distribution (indicators of habitat use), necessarily to assess predatory patterns of *B. edeni* on the local fishery resources. The aim of this contribution is to describe the species' pattern of relative abundance (Abundance per Unit of Effort: APUE) and distribution along the shelf and transitional- oceanic marine habitat. We base our assessment on the hypothesis considering *S. aurita* as the major food source of the local population of Bryde' whales, therefore, distribution should emulate that of the most important prey. Opportunistic and systematic sightings records (published and non- published accounts) from 1998 – 2005 were pooled together and integrated into a Geographical Information System (ArcGIS 9.2), with information on date, time, group size, sea state (Beaufort scale), geographic coordinates, and effort-corrected (days invested during searches) relative abundance and sighting indices. Areas of higher densities for *B. edeni* seemed to be closely related with the focal location of sardine fisheries and the most active upwelling in the area, overlapping with areas of major concentration of common dolphin (*Delphinus spp.*). Management and conservation strategies should consider the areas of major productivity along this coast as potential critical habitat for the species.

INTRODUCTION

* Bryde' whales (*Balaenoptera edeni*) are still classified as Data Deficient by the IUCN. Locally there is a considerable lack of knowledge on baseline information such as abundance and distribution (indicators of habitat use), necessarily to assess predatory patterns of *B. edeni* on the local fishery resources (based on *Sardinella aurita*).

* The distribution of another important cetacean predator, *Delphinus spp.*, would emulate that of its main prey round sardinella. Therefore, the distribution of *B. edeni*, would be expected to follow the same pattern.

* The aim of this contribution is to describe the species' pattern of relative abundance (Abundance per Unit of Effort: APUE) and distribution along the shelf and transitional- oceanic marine habitat.

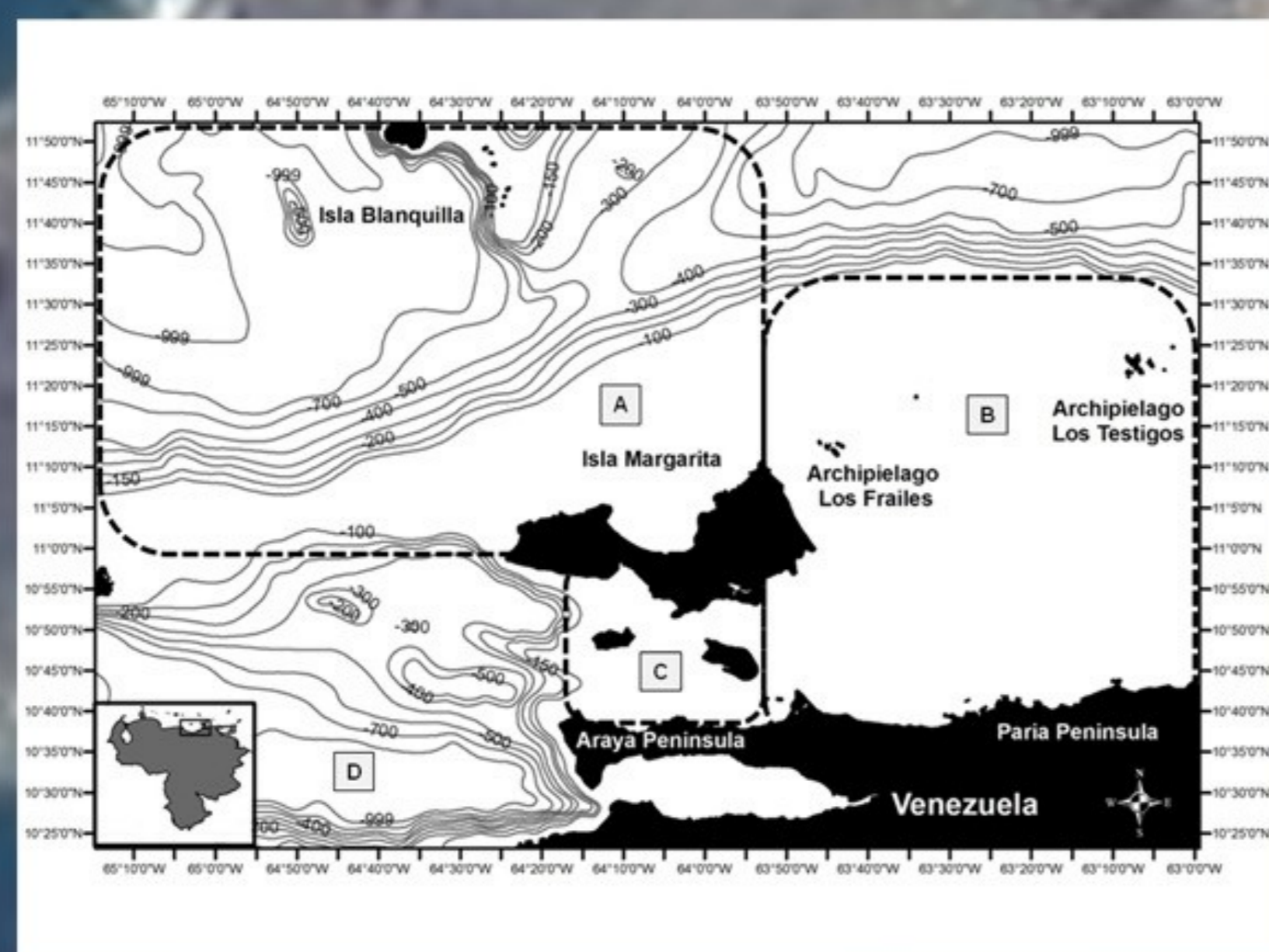


Figure 1. Study area in Northeast Venezuela, Overall the four sections comprise approximately 37% (>5,700 Km²) of shelf habitat and 63% (>10,500 Km²) of oceanic environment off the shelf break.

MATERIALS & METHODS

Opportunistic and systematic sightings records (published and non-published accounts) from 1998 – 2005 were pooled together and integrated into a Geographical Information System (ArcGIS 9.2), with information on date, time, group size, sea state (Beaufort scale), geographic coordinates, and effort-corrected (days invested during searches) relative abundance and sighting indices (abundance per unit of effort APUE and sighting per unit of effort indices SPUE respectively).

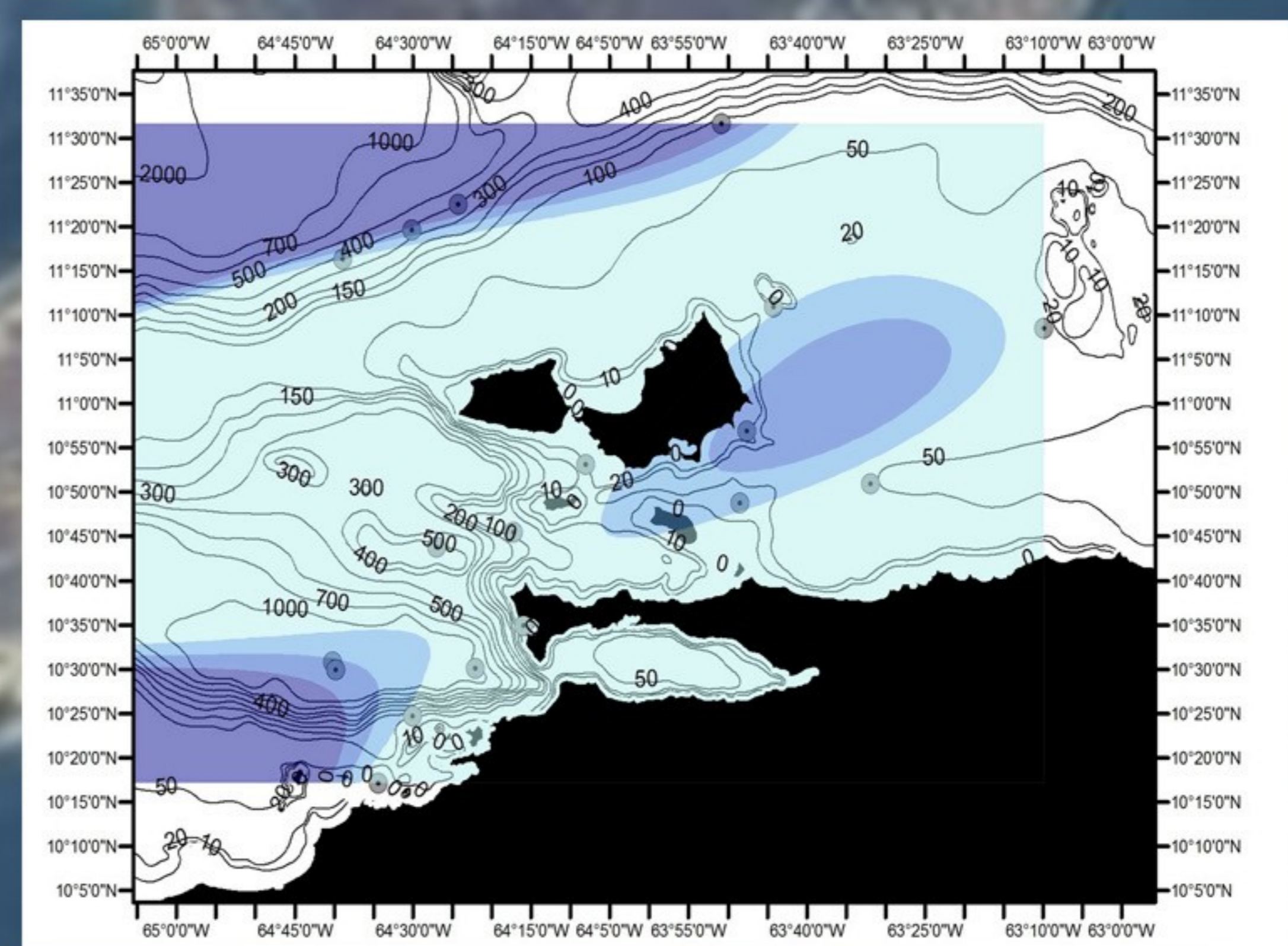


Figure 2. Distribution and abundance of *B. edeni* in Northeast Venezuela, areas of mayor abundance, are illustrated by darker blue shades.

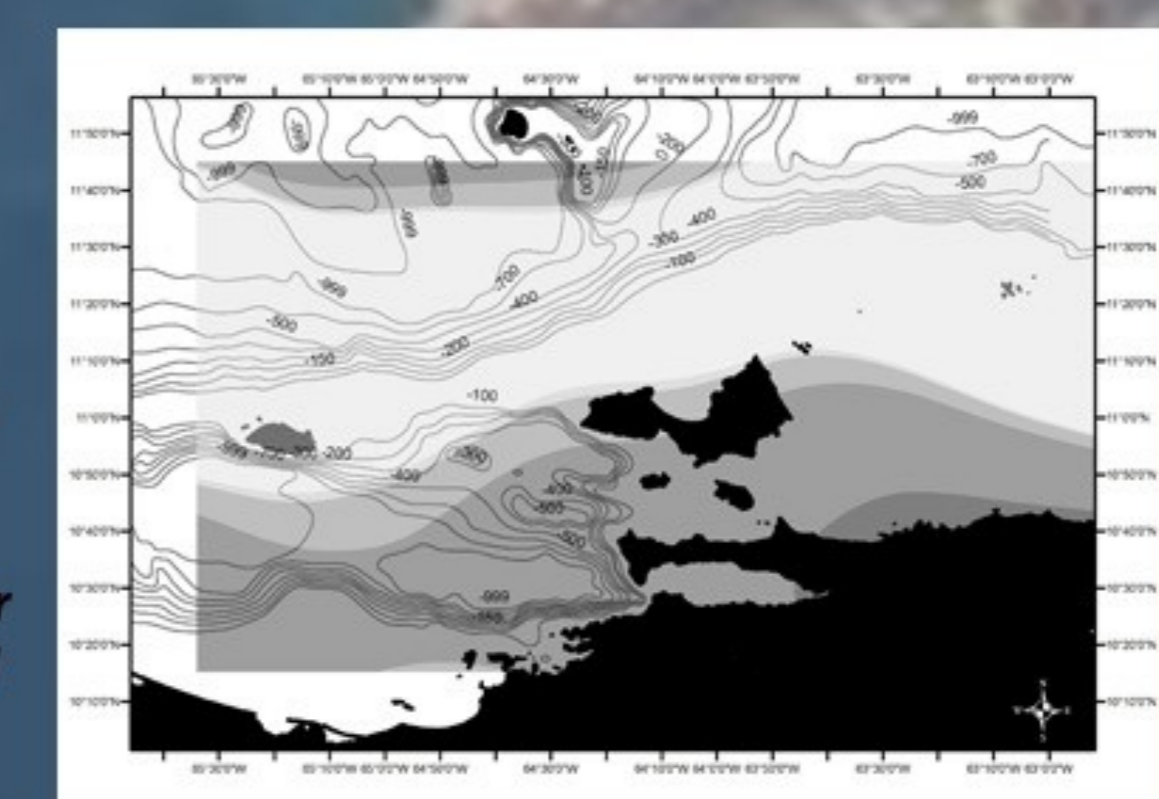


Figure 3. Distribution and abundance of *Delphinus spp.* in Northeast Venezuela, areas of mayor abundance, are illustrated by darker gray shades.

RESULTS & DISCUSSION

The distribution of Bryde whales in the study area (Figure 2) showed three major concentration nuclei: two toward the transitional oceanic habitat at the shelf edge and another within neritic domains at the eastern coast of Margarita Island. This focal area of concentration within shelf waters, would concord with the expected pattern predicted in the hypothesis, where areas of higher densities for *B. edeni* would be closely related with the focal location of sardine fisheries and the most active upwelling in the area (as described by Castellanos et al., 1997), overlapping with localities of major concentration of common dolphin (*Delphinus spp.*), according to Oviedo et al (2007) as illustrate in Figure 3. The information presented here is conditioned by two important limitations: the scant number of sightings, and the fact that the estimations of relative abundance is mostly based on a major data set derived of a non-systematic research effort.

Cetaceans are notably sensitive to habitat degradation and prey depletion. That is not yet, the situation in the northeast coast of Venezuela, therefore there is an implicit value of these conservation surrogates as monitors of ecosystem disturbance. Management and conservation strategies should consider the areas of major productivity along this coast as potential critical habitat for the species, as proposed by Acevedo et al. (2007).

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