PRELIMINARY ASSESSMENT OF THE ABUNDANCE OF ATLANTIC SPOTTED (*Stenella frontalis*) AND COMMON BOTTLENOSE (*Tursiops truncatus*) DOLPHINS IN THE STATE OF ARAGUA, VENEZUELA, ON THE BASIS OF PHOTO-ID TECHNIQUES (WINTER 2009)

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ABSTRACT

The State of Aragua, in central Venezuela, is habitat for the Atlantic spotted (*Stenella frontalis*) and common bottlenose (*Tursiops truncatus*) dolphins. Both species are found year-round in nearshore habitats. This is part of a larger project aimed to provide stakeholders and authorities with a scientific foundation for management decisions. Small boat surveys were conducted from January 22nd through March 3rd, 2009, totaling 38.7 hrs of effort and yielding 32 dolphin sightings, including 15 of *Stenella frontalis*, seven of *Tursiops truncatus* and seven of mixed aggregations of these two species. A total of 2,549 dolphins were encountered and 5,932 pictures were taken for further analysis using capture-recapture methods. All records were pooled together, analyzed through descriptive statistics and integrated into a Geographical Information System. Relative abundance is expressed as number of dolphins sighted per hour of effort (APUE). *Stenella frontalis* was the dominant species in terms of relative abundance, even though the values of APUE of the two species (including mixed aggregations) were not statistically significant (Kruskal Wallis, X2: 5.15, DF: 2, $p>0.05$). Statistical differences in APUE (Kruskal Wallis, X2:24.37, DF: 3, $p <0.05$) indicate that the study area could be divided into four main areas, where the sections of highest abundance seem to be related to aggregations of dolphins during feeding events. Mixed aggregations and spatial overlap between the two species suggest a very low level of interspecies competition. Ongoing research effort will yield additional information on habitat preferences, resource partitioning and baseline information on population status and trends.

INTRODUCTION.

The State of Aragua, in central Venezuela, is habitat for the Atlantic spotted (*Stenella frontalis*) and common bottlenose (*Tursiops truncatus*) dolphins. These dolphins can be found in nearshore habitats throughout the year (Bolaños-Jiménez et al. 1998, 2007; González-Fernández 2000). The most recent studies focused on evaluating dolphin abundance in this area (Silva-Hernández 2007, Silva-Hernández et al. 2007) and interactions between dophin groups and small boats (Herrera-Trujillo 2007). In their study, Silva-Hernández (2007) and Silva-Hernández et al. (2007) used line transect methods, but small sample size precluded the use of the method to determine robust estimates. Instead, they used relative abundance indices, expressed as numbers of dolphins sighted per unit of effort. These authors recommended intensive research effort in order to evaluate population aspects of these species. The aim of this research was to evaluate the abundance of dolphins in the study area using photo-id techniques. This was the first of a series of three surveys designed to evaluate the abundance of dolphins in the study area during different seasons throughout 2009.

MATERIALS AND METHODS.

Field effort. We conducted surveys on a daily basis -weather permitting- between January 22nd through February 1st and then from February 19th through March 3rd, 2009. The general sampling protocol followed Bolaños-Jiménez et al. (1998, 2007), González-Fernández (2000) and Read et al. (2003). The sampling platform was a 27 feet fibre-glass boat powered with an outboard engine (40 HP). The research team included the skipper and 1-3 photographers. At each encounter with dolphins, the skipper recorded the position using a GPS (Garmin, Etrex). The total number of dolphins in the group was estimated every 5-10 minutes and the maximum number was recorded at the end of the encounter. Photographs of the dorsal fin of dolphins were taken with SLR cameras (18-55 mm lenses). Attempts were made to photograph the dorsal fin of every dolphin in each group encountered.

Photo-identification analysis. Photographs were graded for Picture Quality (PQ) and the distinctiveness (D) of features on each dolphin's dorsal fin, based on the system developed by Urian et al. (1999).

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Relative abundance estimation. All records were pooled together, analyzed through descriptive statistics and integrated into a Geographical Information System. Dolphin abundance per unit of effort (APUE) was expressed as number of dolphins sighted per hour of survey Densities were predicted by means of the effort corrected APUE and geographical coordinates as input parameters, using the geo-statistical analysis tool of ArcGIS 9.2 (see Oviedo et al. 2009).

RESULTS.

38.7 hrs of effort yielded 32 dolphin sightings, including 15 of *Stenella frontalis*, seven of *Tursiops truncatus* and seven of mixed aggregations of these two species. A total of 2,549 dolphins were encountered and 5,932 pictures were taken for further analysis using capture-recapture methods.

Stenella frontalis was the dominant species in terms of relative abundance, even though the values of APUE of the two species (including mixed aggregations) were not statistically significant (Kruskal Wallis, X2: 5.15, DF: 2, p>0.05). Statistical differences in APUE (Kruskal Wallis, X2:24.37, DF: 3, p <0.05) indicate that the study area could be divided into four main areas, where the sections of highest abundance seems to be related to aggregations of dolphins during feeding events (Figure 1). Ongoing analysis using mark-recapture models will yield results on absolute numbers of dolphins in the study area. Sightings data was contributed to the OBIS SEA MAP Program (Read et al. 2009)

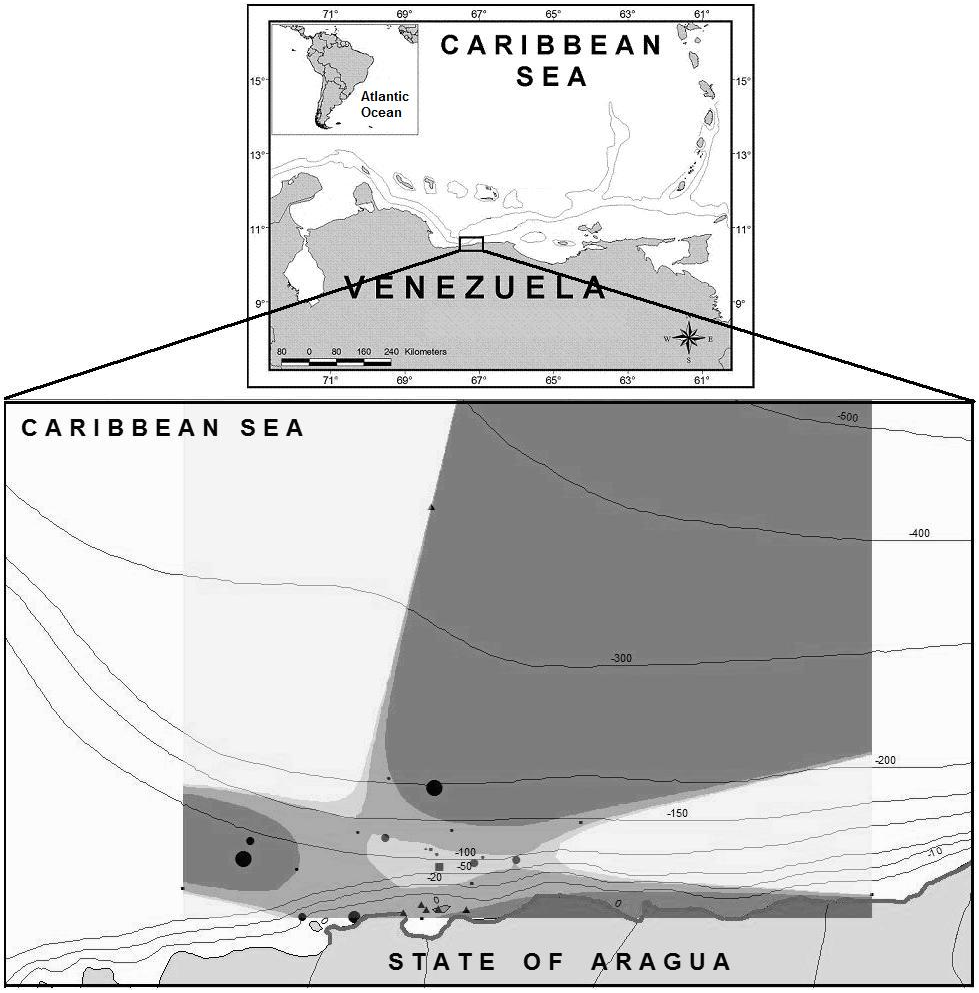

Figure 1. Predicted densities of dolphins off the State of Aragua, January-March 2009. Darker areas indicate higher densities. Maps produced by Ignacio Moreno and Lenín Oviedo, modified by J. Bolaños-Jiménez.

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