

Habitat use and implications for the conservation of a population of bottlenose dolphins, *Tursiops truncatus*, in the San Antonio Bay, Rio Negro province, Argentina

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The San Antonio Bay, in Patagonia (Argentina) harbors a resident population of bottlenose dolphins (*Tursiops truncatus*). It seems to be a privileged area to give birth and nurse their young (Vermeulen *et al.*, 2009; Vermeulen *et al.*, 2010). Given that the species has been declining throughout the world and more particularly in South America (Bastida *et al.*, 2003), the population of San Antonio Bay takes its whole significance. However, human population growth and touristic development, especially dolphin-watching activities, represent a potential threat for the dolphin population (Lusseau *et al.*, 2004; Mattson *et al.*, 2005). Meanwhile, its residency makes it an adequate subject for long term studies which are essential for the understanding and the appropriate management of the subspecies *Tursiops truncatus geophyreus* (Vermeulen *et al.*, 2010). The aim of this study was to understand the bottlenose dolphin's habitat use inside the bay. This work also aimed at putting back the results into the human population growth and tourism development context. For this purpose, three months were spent on the field to collect data, between January and May 2011. In total, 25 boat-based surveys were carried out in the bay, covering approximately 164km², and 21 of these surveys were positive allowing us to spend 27h45 with bottlenose dolphins. The sighting frequency was of one group every 2h49. The median group size (4 individuals) was relatively small compared to other populations and would reflect the isolated and safe character of the bay. The habitat use of the bay was heterogeneous: some areas were more intensely used than others (representing 23 to 33% of the total surface occupied by the dolphins). Time-budgets indicate that dolphins spend most of their time traveling and diving. Differences among time-budgets were observed between summer and autumn. The observed behaviours were associated with environmental variables and differentiated one from another through several statistical analyses. Many similarities were highlighted between the feeding and the diving behaviours, underlining the fact that they could be two different strategies both aiming for one thing: to get food. Variables associated to resting behaviours indicated that the San Antonio Bay would be a safe place compared to other areas. The Kernel Density Estimation method is commonly used to visualize the most probable distribution of the sightings on a map. Here it was also used to geographically distinguish behaviours. Results show that they are not evenly distributed within the bay. Seen that bottlenose dolphins are more sensitive to anthropogenic disturbances while engaged in resting or socializing behaviours (Lusseau *et al.*, 2004; Lusseau, 2005), it would be crucial to take this into account in the prospective creation of protected areas in the future. If the results are confirmed by further studies and if the whole San Antonio Bay cannot be protected, this work indicates that at least the northern area should. Moreover, the KDE method seems to be an appropriate and advantageous tool when determining critical habitats and it would be worth using in other studies.

References

- Bastida R. and D. Rodriguez. 2003. Delphin nariz de botella. Mamíferos marinos de Patagonia y Antártida:135-142. Buenos Aires, Vazquez Mazzini Editores.
- Lusseau D. 2005. Residency pattern of bottlenose dolphins *Tursiops spp.* in Milford Sound, New Zealand, is related to boat traffic. Marine Ecology Progress Series 295:265-272.
- Lusseau D. and J. Higham. 2004. Managing the impacts of dolphin-based tourism through the definition of critical habitats: the case of bottlenose dolphins (*Tursiops spp.*) in Doubtful Sound, New Zealand. Tourism Management 25(6):657-667.
- Mattson M., J. Thomas *et al.* 2005. Effects of boat activity on the behavior of bottlenose dolphins (*Tursiops truncatus*) in waters surrounding Hilton Head Island, South Carolina. Aquatic Mammals 31(1):133-140.
- Vermeulen E. and A. Cammareri. 2009. Residency patterns, abundance, and social composition of bottlenose dolphins (*Tursiops truncatus*) in Bahía San Antonio, Patagonia, Argentina. Aquatic Mammals 35(3):378-385.
- Vermeulen E. and A. Cammareri. 2010. Proyecto Tonina Preserving bottlenose dolphins (*Tursiops truncatus*) in Northeast Patagonia. Marybio foundation.