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Short Note

Hidden on the Edge: Franciscana Dolphins (*Pontoporia blainvillei*) Are Highly Overlapped with a Marine Protected Area at the Limit of a Management Area

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Assessing population abundance and distribution is key for defining strategic management plans for conservation. However, for many elusive species, even basic information of occurrence records is notoriously difficult to obtain (Sucunza et al., 2022). The franciscana dolphin (*Pontoporia blainvillei*) is a small dolphin endemic to shallow coastal and estuarine waters (Lodi & Borobia, 2013) from southeastern Brazil to Argentinian Patagonia (Siciliano, 1994; Crespo et al., 1998). Classified as "Vulnerable" by the International Union for Conservation of Nature's (IUCN) *Red List* (Zerbini et al., 2017), the species is considered the most endangered cetacean in the western South Atlantic. The main reasons sustaining this status are the species' low survival and reproduction rates, and their proximity to multiple coastal anthropogenic stressors such as fishing, wastewater discharge, and maritime and coastal infrastructure (Frainer et al., 2016; Domit et al., 2022; Sucunza et al., 2023).

Franciscana distribution has been discussed largely based on Franciscana Management Areas (FMAs), where genetics, morphology, and life history have been used to establish the limits of each FMA (Secchi et al., 2003; Cunha et al., 2014; Nara et al., 2022). Recently, the possibility of dividing FMA-II into FMA-IIa and FMA-IIb based on genetic, organochlorine compound, and stable isotope data (Cunha et al., 2020) has gained support. In addition to FMAs, areas where occurrence records are absent may be considered as discontinuity areas (Moura et al., 2009; Amaral et al., 2018). Examples of these are the so-called Gap I and Gap II, where the latter refers to the extent of Armação de Búzios to Piraquara de Dentro in Rio de Janeiro State (Amaral et al., 2018). A stranded female and a male calf collected alive by tourists (Azevedo et al., 2002) served as the basis for establishing the upper-northern limits of FMA-IIa (Cunha et al., 2014). Aerial surveys conducted in 2008 and 2009 along the area recorded no sightings of the species, even covering 84 transects and totaling 2,164 km of inshore sampling (Zerbini et al., 2010). Sixteen stranded franciscanas, collected between 2017 and 2019, were used to confirm population differentiation between FMA-IIa and FMA-IIb and were reported to belong to southern Rio de Janeiro but without a specific location (Cunha et al., 2020). While these are the only published data on franciscana dolphin occurrence within the west side of Ilha Grande Bay (WIGB), eight stranding records spanning from 2019 and 2022 are publicly available through the SIMBA platform (Sistema de Informação de Monitoramento da Biota Aquática: http://simba.petrobras.com.br). Among the SIMBA records, there are two individuals considered to be calves (including a weakened newborn with umbilical cord remnants that died 3 d later), one juvenile, and five individuals with undetermined age; the newborn and the juvenile had interaction marks with a fishery. The lack of data from live individuals imposes a critical limitation in understanding the ecological aspects of the potentially small and rare WIGB population. Herein, we present the first at-sea information about habitat use, behavior, and group size of franciscana dolphins in their northern FMA-IIa limit.

This study is part of a long-term research program to monitor and evaluate cetacean populations' distribution in Ilha Grande Bay. The WIGB presents a variety of microhabitats, such as rocky

Table 1. Group size, number of groups, sighting days, field hours, and days spent per year on field data collection at Ilha Grande Bay

Year	Days	Sampling effort (h)	Sighting days	Groups	Group sizes (number of individuals)
2012	2	49.70	0	0	--
2013	22	11.06	0	0	--
2019	4	50.68	0	0	--
2020	3	53.71	0	0	--
2021	9	10.63	0	0	--
2022	9	21.98	2	2	(8, 4)
2023	3	37.43	1	1	(4)
2024	8	6.16	4	6	(6, 4, 3,3, 3, 2)
Total	60	241.35	7	9	

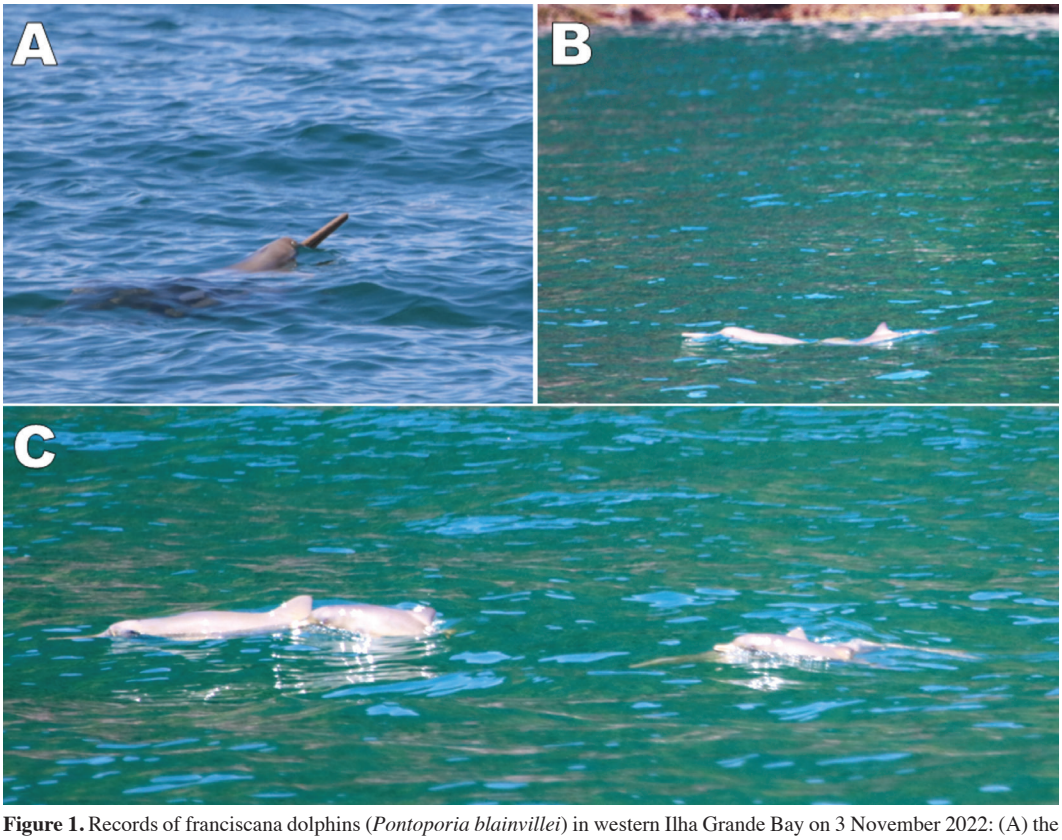

Figure 1. Records of franciscana dolphins (*Pontoporia blainvillei*) in western Ilha Grande Bay on 3 November 2022: (A) the long rostrum is characteristic of the species; (B) individuals usually spend most of the time near the coast; and (C) calves can be observed in the area. (*Photo credit:* Guilherme Maricato)

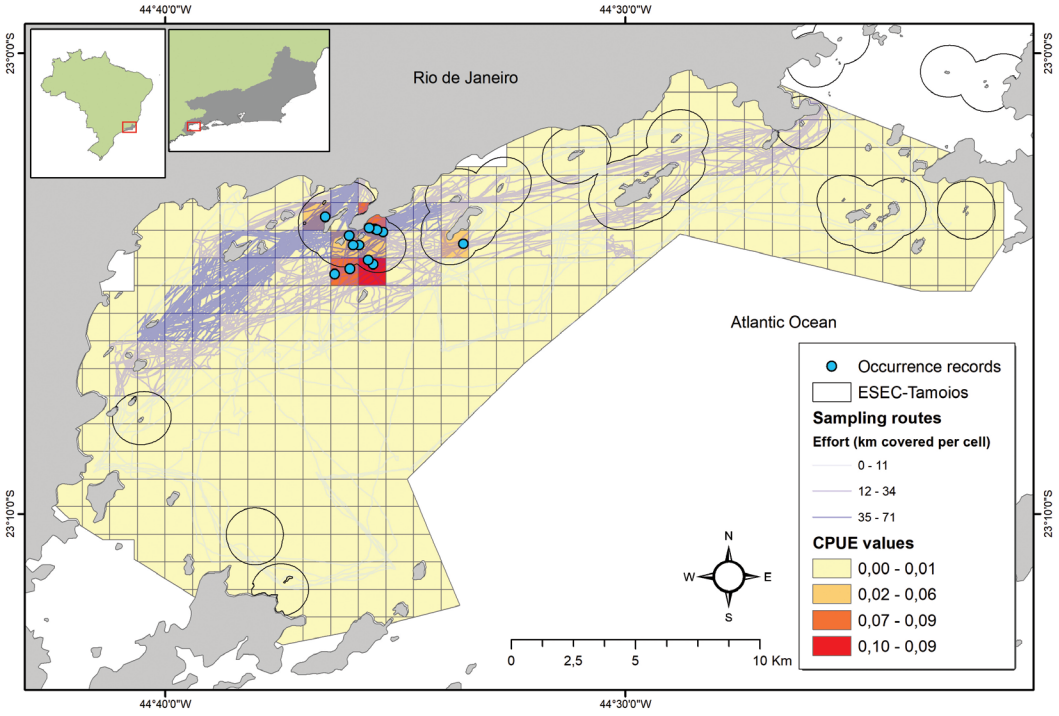

Figure 2. Occurrence records of the endangered franciscana dolphins in western Ilha Grande Bay, Catch Per Unit Effort (CPUE), and limits of the Estação Ecológica de Tamoios (ESEC Tamoios) Marine Protected Area. Sampling routes are represented by faint blue lines, graded according to effort (kilometers covered in each 1 km^2 grid cell).

coasts, mangroves, and beaches, varying between 1 and 20 m deep, and it contains part of a Marine Protected Area (MPA), the Tamoios Ecological Station (IUCN Category IV; Estação Ecológica de Tamoios, hereafter ESEC Tamoios). Although the ESEC Tamoios was not created specifically for the protection of franciscana dolphins, it holds an important role as a restrictive agent in that no recreational activities are allowed and only traditional communities can fish within its limits, which was mediated through a compromise signed both by the fishermen and the MPA council board (Dias & Seixas, 2019).

The sampling effort comprised 60 d of fieldwork (2012-2013 and 2019-2024; see Table 1), totaling 2,750 km covered. Field protocols included the usage of a 12-m vessel at a mean velocity of 15 km/h for dolphin sightings along pre-established routes, and focal group and scan follows (Mann, 1999) at a minimum distance of 50 m. When dolphins were sighted, we recorded the group size, presence of calves, and georeferenced group positions using a GARMIN eTrex GPS (GARMIN Ltd., Olathe, KS, USA) every 15 min of the focal group while it was being followed or whenever the group moved more than 500 m. We obtained photographic records using a DSLR camera equipped with 70-300 lenses for species confirmation (Figure 1 & Supplemental Video; the supplemental video for this short note is available on the *Aquatic Mammals* website). To evaluate the habitat use by the individuals, adjusting for potential biases on spatial coverage, we calculated the Catch Per Unit Effort (CPUE) by establishing 1 km^2 grid cells within the study area and comparing how many records were obtained per km covered.

On 7 d of fieldwork (out of the 60 d), we recorded nine groups of franciscana dolphins with a mean size of four individuals (SD = 1.7; range = 1 to 9) and the presence of calves in at least two groups (28.5%). Our CPUE indicated that franciscana dolphins were observed within a narrow range, which was inside the MPA (Figure 2).

The results highlight the importance of ESEC Tamoios as an essential MPA for the WIGB franciscana dolphin population (Ott et al., 2022), where the strict limitations to fisheries activities potentially address bycatch threats, which are reported in the literature as one of the main non-natural

causes of death for the species (Prado et al., 2013; Secchi et al., 2021). Although the elusive behavior of the species hampers a detailed description of habitat use and the ecological aspects of the species (Sucunza et al., 2019; Paitach et al., 2023), both living and stranded calf records indicate a potential usage of ESEC Tamoios as a breeding and nursery area.

Despite all efforts in covering most WIGB coastal waters, the occupancy of franciscana dolphins appears to be concentrated in a small area with low CPUE. This highlights the urgent need to intensify dedicated sampling efforts towards franciscana dolphins in this area, applying monitoring techniques such as drone surveys, bioacoustics, and photo-identification to better understand WIGB's population dynamics, behavior, habitat use, and ecological aspects.

Note: The supplemental video for this short note is available in the "Supplemental Material" section of the *Aquatic Mammals* website: https://www.aquaticmammalsjournal.org/supplemental-material.

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