



Area Size

4 898 km²

Qualifying Species and Criteria

Franciscana dolphin – *Pontoporia blainvillei*

Criterion A; B (1)

Marine Mammal Diversity

Criterion D (1)

Pontoporia blainvillei

Summary

This IMMA encompasses the range of the northernmost population of the threatened franciscana (*Pontoporia blainvillei*) located off the northern coast of Espírito Santo State, Brazil. The population is estimated at ~1000 dolphins, and is among the smallest and the most restricted in distribution of this species. Habitat degradation, due to agriculture/industrial activities and environmental disasters, is potentially reducing the available habitat for these dolphins, increasing the exposure of individuals to threats. Feeding behaviours have been consistently observed near the Doce River mouth, a high-density area within this IMMA. This area also provides foraging habitat for other cetacean species such as Guiana dolphins (*Sotalia guianensis*). Groups of rough-toothed dolphins

Northern Espírito Santo Coastal Waters IMMA

Summary, continued.

(*Steno bredanensis*) and common bottlenose dolphin (*Tursiops truncatus*) are commonly seen in the area as well as groups of humpback whales (*Megaptera novaeangliae*) during the species' breeding season in the austral summer.

Description:

This area of Brazil's coastline is known as Franciscana Management Area Ia (FMA Ia, *sensu* Secchi et al., 2003; Cunha et al., 2014) and comprises ~200 km of coastline in the Espírito Santo State (ES) between Santa Cruz in the south (19.95°S; 40.12°W) and Itaúnas in the north (18.36°S; 39.67°W). The area used to determine the boundary of this IMMA encompasses the whole latitudinal range of the FMA Ia population, extending up to 20 km offshore, the known franciscana primarily habitat in ES (Amaral et al., 2018).

The area is influenced by the Abrolhos bank, a biodiversity hotspot for marine organisms, and receives significant input of mineral and organic matter from the Doce River (De la Torre et al., 2012). In 2015, one of the most catastrophic environmental disasters in Brazil's history was caused by the collapse of a tailing dam in the Doce River. This discharged millions of cubic meters of metal-contaminated slurry into ES coastal waters (Hatje et al., 2017; Magris et al., 2019). The plume of pollutant sediments from the dam collapse spread towards the area with the highest documented density of franciscanas in ES (Sucunza et al., 2023).

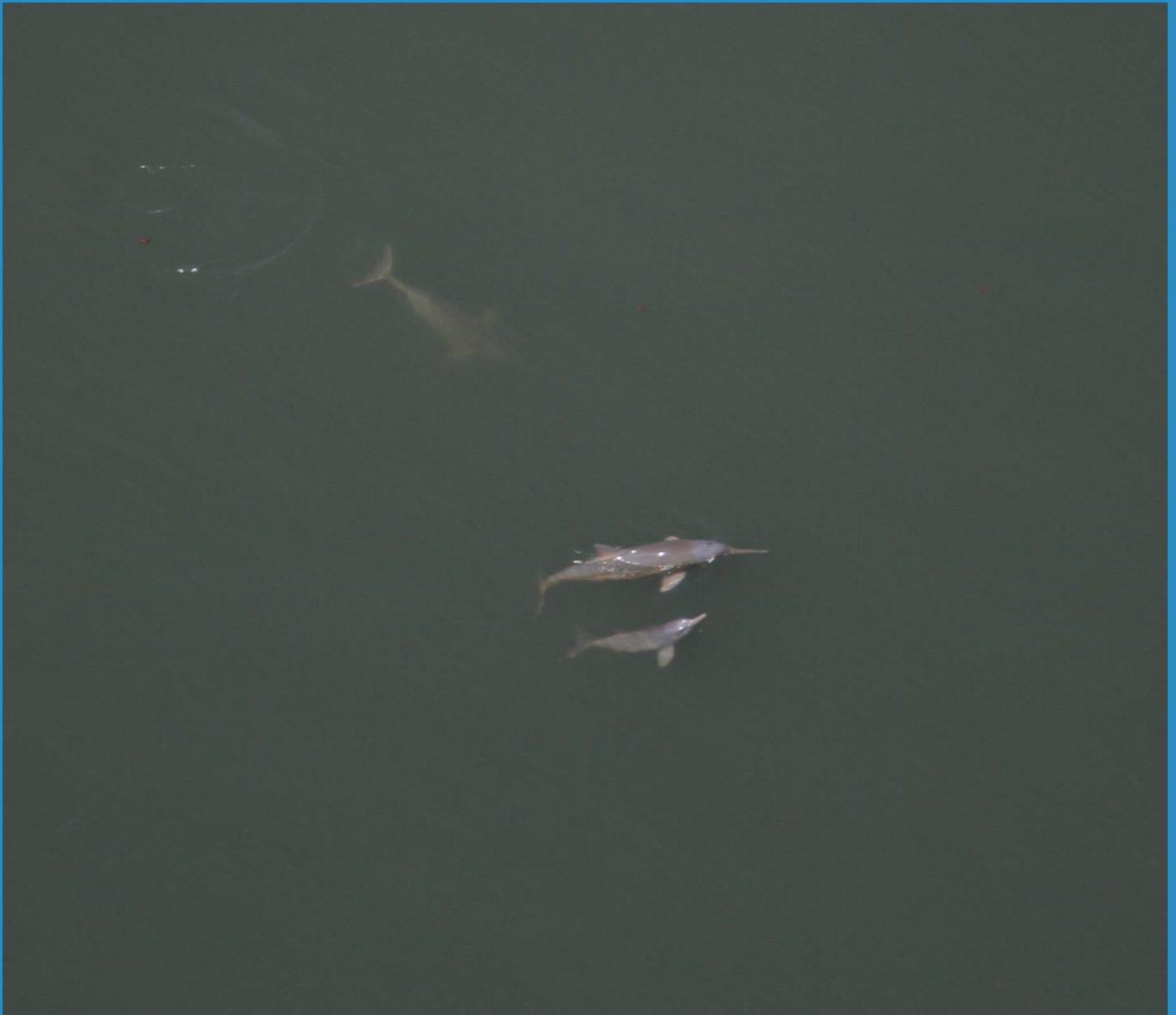


Figure 1: Franciscana dolphins (*Pontoporia blainvillei*) sighted during aerial survey. Photo credit: Daniel Danilewicz / GEMARS

Criterion A: Species and Population Vulnerability

The franciscana (*Pontoporia blainvillei*) is endemic to the coastal waters of Brazil, Uruguay and Argentina. The species is currently listed as "Vulnerable" in the IUCN Red List of Threatened Species (Zerbini et al., 2017) and "Critically Endangered" by the Brazilian Government (MMA/ICMBio, 2022). Franciscana abundance in Franciscana Management Area Ia was estimated at 1,183 (CV = 0.76, 95% CI = 163 – 3,150) individuals based on aerial surveys conducted in 2018 (Sucunza et al., 2023). The authors of that study

suggested that the population would qualify for listing as an "Endangered" population under the IUCN Red List Criterion C2a(ii), because of the small size (less than 2,500 mature individuals) and because of an inferred decline in mature individuals and of least 95% of mature individuals in one subpopulation (Zerbini et al., 2017; Sucunza et al. 2023). Habitat degradation, due to agriculture/industrial activities and environmental disasters, is potentially shrinking available habitats for franciscana dolphins, increasing the exposure of individuals to threats (Pinheiro et al., 2019; Domit et al., 2022).

Criterion B: Distribution and Abundance

Sub-criterion B1: Small and Resident Populations

The northern coast of Espírito Santo State (ES) encompasses the range of a small and isolated population of franciscanas known as FMA Ia (Siciliano et al., 2002; Cunha et al., 2014; Amaral et al., 2018; Nara et al., 2022). A hiatus of ~180 km with no known historical or recent records exists between the southern limit of FMA Ia and the next FMA Ib further to the south in Itabapoana (21.34oS; 40.95oW) (Siciliano et al., 2002; Amaral et al., 2018). In 2018, aerial surveys following line transect distance sampling methods were conducted and abundance, corrected for visibility and group size biases, was estimated at 1,183 individuals (CV = 0.76) (Sucunza et al., 2023). In addition, aerial surveys indicate that franciscanas occurring off the north ES coast are limited to nearshore waters, extending only as far as the 30 m isobath (Danilewicz et al., 2009), between Conceição da Barra in the north (18o35'S) and Santa Cruz in the south (19o56'S), which results in an estimated area of occupancy of only 1400 km² (Sucunza et al., 2023).

Franciscana dolphins have been recorded year-round off this IMMA during drone-monitoring and beach surveys for stranded specimens (Mayorga et al., 2020; Giacomo et al., 2021). In addition, stranding and bycatch events of franciscana adults, juveniles and calves (Siciliano, 1994; Marcondes et al., 2018; Mayorga et al., 2020) as well as records of franciscana mother and calf pairs during aerial surveys and drone-monitoring (Giacomo et al., 2021; Sucunza et al., 2023) indicate that the reproductive cycle of franciscanas in ES occurs within this IMMA. Feeding behaviours have been consistently observed near the Doce River mouth, which hosts high densities of franciscanas and is also also a foraging habitat for other cetacean species such as Guiana dolphins

(*Sotalia guianensis*) (Rupil et al., 2018; Rodrigues et al., 2020).

Criterion D: Special Attributes

Sub-criterion D1: Distinctiveness

Based on mitochondrial and nuclear data available related to stock structure across the range of the franciscanas range, Cunha et al. (2020) proposed the existence of 11 Franciscana Management Areas (FMAs). These areas have been recognized as appropriate units for assessment of the species by the International Whaling Commission (IWC in press). The northern coast of Espírito Santo (ES) corresponds to the range of the northernmost population, which is geographically, demographically and genetically isolated from all other franciscana populations (Siciliano et al., 2002; Nara et al., 2022; Sucunza et al., 2023). Genetic variability decreases from south to north throughout the species' range, and franciscanas in ES are one of the most genetically differentiated populations, with extremely low genetic diversity (Cunha et al., 2014; Cunha, 2022).



Figure 2: Franciscana (*Pontoporia blainvillei*) mother and calf pair sighted during aerial survey.
Photo credit: Federico Sucunza – GEMARS / IA

Supporting Information

Amaral, K.B., Danilewicz, D., Zerbini, A. et al. 2018.

'Reassessment of the franciscana *Pontoporia blainvillei* (Gervais & d'Orbigny, 1844) distribution and niche characteristics in Brazil'. *Journal of Experimental Marine Biology and Ecology*, 508:1-12.

Cunha, H.A., Medeiros, B.V., Barbosa, L.A., Cremer, M.J., Marigo, J., Lailson-Brito, J., Azevedo, A.F., and Solé-Cava, A.M. 2014. 'Population structure of the endangered franciscana dolphin (*Pontoporia blainvillei*): Reassessing management units'. *PLOS ONE* 9:e85633.

Cunha, H.A., Gariboldi, M.C., Mendez, M., Secchi, E.R., Oliveira, L.R., Ott, P.H., Torres-Florez, J.P., and Farro, A.P.C. 2020. 'Review on franciscana stock structure and Franciscana Management Areas (FMAs)'. International Whaling Commission, Scientific Committee paper SC/68b/SDDNA7.

Cunha, H.A. 2022. Genetic diversity, population structure, and phylogeography. Pages 111-125 in *The franciscana dolphin: On the edge of survival*, eds. Simões-Lopes, P. C. and M. J. Cremer, Academic Press.

Danilewicz, D.S., Secchi, E.R., Ott, P.H., Moreno, I.B., Bassoi, M., and Martins, M.B. 2009. 'Habitat use patterns of franciscana dolphin (*Pontoporia blainvillei*) off southern Brazil in relation to water depth'. *The Journal of the Marine Biological Association of the United Kingdom*, 89:943-949. doi: 10.1017/s002531540900054x.

De la Torre, A., Alonso, M.B., Martinez, M.A., Sanz, P., Shen, L., Reiner, E.J., Sanz, P., Shen, L., Reiner, E.J., Lailson-Brito, J., Torres, J.P.M., Bertozzi, C., Marigo, J., Barbosa, L., Cremer, M., Secchi, E., Malm, O., Eljarrat, E., and Barceló, D. 2012. 'Dechlorane-Related

Compounds in Franciscana Dolphin (*Pontoporia blainvillei*) from Southeastern and Southern Coast of Brazil'. *Environmental Science & Technology*, 46:12364-12372.doi:10.1021/es302934p.

Domit, C., Tailise, H.T., Farro, A.P.C., Silva, A.Z., Belleghem, T.V., Herbst, D.F., Tardin, R.H., Bisi, T.L., Laporta, P., Vidal, L.G., Chupil, H., Marcondes, D.S., da Fonseca, G.F., do Valle, R. del R., Berninsone, L.G., Barbosa, C.B., Cremer, M.J., and Broadhurst, M.K. 2022. Coastal development and habitat loss: understanding and resolving associate threats to the franciscana, *Pontoporia blainvillei*. Pages 265-302 in *The franciscana dolphin: On the edge of survival*, eds. Simões-Lopes, P. C. and M. J. Cremer, Academic Press.

Giacomo, A.B.D., Barreto, J., Teixeira, J.B., Oliveira, L., Cajaíba, L., Joyeux, J.C., Barcelos, N., and Martins, A.S. 2021. 'Using drones and ROV to assess the vulnerability of marine megafauna to the Fundão tailings dam collapse'. *Science of Total Environment*, 800:149302.

Hatje, V., Pedreira, R.M.A., De Rezende, C.E., Schettini, C.A.F., De Souza, G.C., Marin, D.C., and Hackspacher, P.C. 2017. The environmental impacts of one of the largest tailing dam failures worldwide. *Scientific Report* 7:1-13. <https://doi.org/10.1038/s41598-017-11143-x>.

IWC. in press. Report of the Workshop of the International Whaling Commission to finalize the review of the franciscana. 4-5 June 2022, Curitiba, Brazil. 29p.

Magris, R.A., Marta-Almeida, M., Monteiro, J.A.F., and Ban, N.C. 2019. A modelling approach to assess the impact of land mining on marine biodiversity: Assessment in coastal catchments experiencing catastrophic events (SW Brazil). *Science of Total*

Environment, 659:828-840.

Marcondes, M.C.C., Angeli, M., Fontes, F., Pallazo Jr., J. T., Campos, R., Daper C., and Cremer, M. 2018. Report on franciscana fisheries interaction. International Whaling Commission, Scientific Committee paper SC/67b/SM/03.

Mayorga, L.F.S.P., Vanstreels, R.E.T., Bhering, R.C.C., Mamed, N., Costa, L.M.B., Pinheiro, F.C.F., Reis, L.W.D., Trazzi, A., Meirelles, W.L.C., Ribeiro, A.M. and Siciliano, S. 2020. Strandings of cetaceans on the Espírito Santo coast, southeast Brazil, 1975-2015. ZooKeys 948:129-152.

MMA/ICMBio. 2022. Lista Nacional de Espécies Ameaçadas. Ministério do Meio Ambiente.

Nara, L., Cremer, M.J., Farro, A.P.C., Colosio, A.C., Barbosa, L.A., Bertozzi, C.P., Secchi, E.R., Pagliani, B., Costa-Urrutia, P., Gariboldi, M.C., Lazoski, C., and Cunha, H.A. 2022. 'Phylogeography of the Endangered Franciscana Dolphin: Timing and Geological Setting of the Evolution of Populations'. Journal of Mammalian Evolution, 29:609-625. <https://doi.org/10.1007/s10914-022-09607-7>.

Pinheiro, F.C.F., Pinheiro, H.T., Teixeira, J.B., Martins, A.S., and Cremer, M.J. 2019. Opportunistic development and environmental disaster threat franciscana dolphins in Southeast of Brazil. Tropical Conservation Science, 12:1-7.

Rodrigues, V.L.A., Wedekin, L.L., Marcondes, M.C.C., Barbosa, L. and Farro, A.P.C. 2020. Diet and foraging opportunism of the Guiana Dolphin (*Sotalia guianensis*) in the Abrolhos Bank, Brazil. Marine Mammal Science, 36: 436-450.

Rupil, G.M., Bogoni, J.A., Barbosa, L., Marcondes, M.C.C., and Farro, A.P.C. 2018. Climate influences on

Guiana dolphin diet along the Brazilian coast. Scientia Marina, 82: 159-168.

Rupil, G.M., Babosa L., Marcondes M.C.C., de Carvalho, B.M. and Farro, A.P.C. 2019. 'Franciscana dolphin (*Pontoporia blainvillei*) diet from Northern Espírito Santo Sate coast, Brazil'. Biotemas, 32: 87-96.

Secchi, E.R., Danilewicz, D. and Ott, P.H. 2003. Applying the phylogeographic concept to identify franciscana dolphin stocks: Implications to meet management objectives. Journal of Cetacean Research and Management, 5:61-68.

Siciliano S. 1994. Review of small cetacean and fishery interaction in coastal waters of Brazil. Pages 241-450 in Gillnets and cetaceans: Incorporating the proceedings of the symposium and workshop on the mortality of cetaceans in passive fishing nets and traps, eds. Perrin, W. F., G. P. Donovan and J. Barlow. International Whaling Commission, Special Issue 15.

Siciliano, S., Di Benedetto, A.P. and Ramos, R. 2002. 'A toninha, *Pontoporia blainvillei* (Gervais & D'Orbigny, 1884) (Mammalia: Cetacea) nos Estados do Rio de Janeiro e Espírito Santo, costa sudeste do Brasil: caracterização dos habitats e possíveis fatores de isolamento das populações'. Boletim do Museu Nacional, Nova Série, Zoologia, 146:1-15.

Sucunza, F., Danilewicz, D., Ott, P.H., Neves, M., Berchieri, N., Farro, A.P., Martins, A., and Zerbini, A.N. 2020. 'Population size and IUCN Red Listing of the isolated northern population of the franciscana (*Pontoporia blainvillei*)'. International Whaling Commission, Scientific Committee paper SC/68B/ASI/05.

Zerbini, A.N., Secchi, E., Crespo, E., Danilewicz, D., and Reeves, R. 2017. *Pontoporia blainvillei*. The IUCN Red List of Threatened Species.

Sucunza, F., Danilewicz, D., Ott, P.H., Neves, M., Farro, A.P., Martins, A., and Zerbini, A.N. 2023. Population size and IUCN Red Listing of the isolated northern population of the franciscana (*Pontoporia blainvillei*). Endangered Species Research.

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