

Manatee Estuarine Complex IMMA

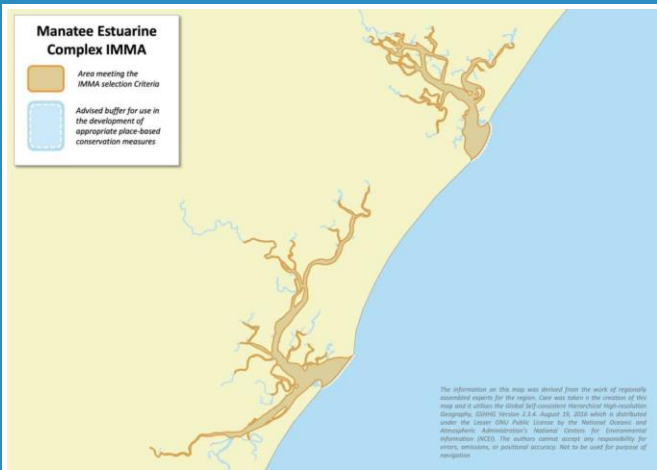
Summary, continued.

and Alagoas. Over the years, at least seven animals have been identified from sightings, locations issued by satellite transmitters and stranding records, using the Manatee Estuarine Complex IMMA (Souza et al., 2022). In addition, this complex is also used by Guiana dolphins, showing the ecological importance of the IMMA for the conservation of two nationally endangered species of marine mammals in Brazil.

Description:

West Indian manatee (*Trichechus manatus*) in Brazil initially had a continuous distribution along approximately 3,000 kilometers of coastline, from Espírito Santo to Amapá. However, over time, there was a drastic reduction of this area (Aquasis, 2016), with the species disappearing in the States of Espírito Santo, Bahia and Sergipe (Lima et al., 2011). In addition, the abundance estimates are of approximately 1,000 animals (Alves et al., 2015), which makes the species one of the most endangered aquatic mammals in Brazil (MMA, 2022).

Due to the releases of animals rehabilitated in captivity, the coast of Sergipe and the extreme north of Bahia are gradually being used again by these released specimens. For example, "Astro" is a manatee that was reintroduced to the natural environment in 1994, on the north coast of Alagoas. In 1998, this animal began to use the estuaries of Sergipe and Bahia as a home range, remaining in recent years between the Vaza-Barris river (SE), Praia do Saco (SE) and Real/Piauí/Fundo (SE/BA). Additionally, seven animals have already been



Area Size

120 km²

Qualifying Species and Criteria

West Indian manatee – *Trichechus manatus*

Criterion A; C (2)

Summary

The distribution of *T. manatus*, the West Indian manatee, is influenced by physiological and environmental factors (water salinity, temperature and depth, and availability of food resources), freshwater supply and anthropogenic habitat modifications. Manatees prefer naturally sheltered areas such as coves, bays and estuaries and are sensitive to disturbance caused by the construction and operation of cities, ports, marinas, shipyards, salt works, shrimp farms and other anthropogenic structures and human activities in these areas. In this manatee estuarine complex IMMA, the necessary ecological requirements for West Indian manatees are found and the relevance of the area becomes even more highlighted, due to its reoccupation by manatees, considering that locally the species was considered extirpated. In 1994, at the beginning of the Manatee Reintroduction Program in Brazil, the rescued and rehabilitated juveniles were released in the states of Paraíba

identified from sightings, locations issued by satellite transmitters and stranding records, using the Manatee Estuarine Complex IMMA (Souza et al., 2022), which is why it is a recommended priority in the conservation of coastal marine areas.

This evidence is of great relevance, as it implies the reuse of areas of historical occurrence and makes the region of this IMMA, which is the southernmost limit of the species' distribution, particularly important (Deutsch et al., 2008; Souza et al., 2022).



Figure 1: Records of West Indian manatees using historical distribution areas of the species. Seven manatees (Astro, Assú, Tico, Arani, Sereno, Tinga and Tupã) were identified based on sightings, locations issued by satellite transmitters and stranding records, using the coast of Sergipe and Bahia (Manatee Estuarine Complex), areas where the species went extinct. Photo credits: FMA Collection

The Manatee Estuarine Complex IMMA includes two discontinuous areas including the estuary of the Vaza Barris River, approximately 20 km wide, and the Piauí-Fundo-Real estuarine complex. The Piauí River is 132 km long and flows into the ocean between the municipalities of Estância (Sergipe) and Jandaíra (Bahia) after the confluence with the Fundo River on the left margin and Real River on the right margin (Carvalho & Fontes, 2006). The estuary of the Vaza Barris River and the Piauí-Fundo-Real estuarine complex have similar characteristics, with sandbars at the mouth providing protection from current and wave action. In the Piauí-Real-Fundo estuarine complex, both near-the-mouth and upstream areas used are shallow. The estuary of the Vaza Barris River has shallow points at both the mouth and more upstream (depth less than five meters), but deeper points between these two sites. The estuarine complex has green and red algae, and seagrasses, eaten by manatees (Dos Santos, 2020).

Criterion A: Species and Population Vulnerability

The West Indian manatee *Trichechus manatus* is categorized as Vulnerable on the IUCN Red List (Deutsch et al., 2008) and as Endangered on the Brazilian Red List (MMA, 2022). Meirelles et al. (2022) evaluated the extinction risk of the West Indian manatee in Brazil. Although available data on the species abundance and mortality is incomplete to apply the IUCN criteria, the authors worked with limited information following the guidelines for national red-listing, inferring, and projecting based on evidence to produce information and properly evaluate the West Indian manatee risk of extinction. The results indicate that *T. manatus* is 'Critically Endangered' in Brazil due to the extremely high ($\geq 80\%$) suspected and projected population reduction in the past and the future. Furthermore, although important mortality causes such as hunting were

reduced in some parts of the range of the species, other threats are increasing and are not expected to decrease in the coming decades. In the Manatee Estuarine Complex IMMA, the entanglements in fishing nets, and especially collisions with motorized vessels (Borges et al., 2007, 2018) are the main threat factors for the manatees that use this region (Dos Santos, 2020).

Along the Brazilian coast, manatee populations are patchily distributed from Amapá to Alagoas (Luna et al., 2008; de Lima et al., 2011) and there is evidence of released and satellite tagged manatees using the coasts of Sergipe and Bahia States (Deutsch et al., 2008; de Lima et al., 2012; dos Santos et al., 2022).

Criterion C: Key Life Cycle Activities Sub-criterion C2: Feeding Areas

Dos Santos (2020) characterized the home range areas of six rehabilitated manatees released in this region using satellite and VHF telemetry systems. The results showed manatees exhibited a preference for sites shallower than two meters, with food resources and freshwater availability. The Piauí-Real-Fundo estuarine complex has green and red algae, and seagrasses, whereas only seagrasses were found in the estuary of the Vaza Barris River.

The manatee's in this IMMA are using areas in the states of Sergipe and Bahia, with a home range of about 42 km² with two main sites used (data obtained between 2016-2019). In the Vaza Barris River, the animals traveled 14.2 km upstream and 0.4 km from the coast. The main area of use was the estuarine complex of the Piauí/Fundo/Real Rivers, where they traveled 12.6 km upstream (but used these areas with less intensity) and ranged 0.9 km from the coast (Dos Santos et al., 2022; Souza et al., 2022).

Supporting Information

Alves, M.D.O., Kinas, P.G., Marmontel, M., Borges, J.C.G., Costa, A.F., Schiel, N., and Araújo, M.E. 2015. First abundance estimate of the Antillean manatee (*Trichechus manatus manatus*) in Brazil by aerial survey. *J. Mar. Biol. Assoc. United Kingdom* 96: 1–12. doi:10.1017/S0025315415000855.

Aquasis. 2016. Peixe- boi – marinho *Biologia e Conservação* (1ª ed.) São Paulo – SP: Bambu Editora e Artes Gráficas.

Borges, J.C.G., Vergara-Parente, J.C., Alvite, C.M.C., Marcondes, M.C.C., and Lima, R.P. 2007. Embarcações motorizadas: uma ameaça aos peixes-boi marinhos (*Trichechus manatus*) no Brasil. *Biot Neotrop* 7: 199–204.

Borges, J.C.G., Araujo, V.R., Santos, S.S., Attademo, F.L.N., Normande, I.C., Velôso, M.T.V., Marmontel, M., and Vergara-Parente, J.E. 2018. Colisões ocasionadas por embarcações motorizadas em peixes-bois marinhos (*Trichechus manatus*) no Brasil. XII Congresso da Sociedade Latinoamericana de Especialistas em Mamíferos Aquáticos, Lima, Peru, p. 88.

Carvalho, M.E.S. and Fontes, A.L. 2006. Estudo ambiental da zona costeira sergipana como subsídio ao ordenamento territorial. *Geonordeste* 2: 10-39.

De Lima, R.P., De Alvite, C.M.C., Reid, J.P., and Bombassaro Juniro, A. 2012. Distribuição espacial e temporal de peixes-bois West Indian manatees in Brazil (*Trichechus manatus*) reintroduzidos no litoral nordeste do Brasil. *Natural Resources*, 2: 63-80.

Deutsch, C.J., Self-Sullivan, C., and Mignucci-Giannoni, A. 2008. *Trichechus manatus*. The IUCN Red List of Threatened Species 2008:

e.T22103A9356917. <https://dx.doi.org/10.2305/IUCN.UK.2008.RLTS.T22103A9356917.en>. Accessed on 26 January 2023.

Dos Santos, S.S. 2020. Área de vida de peixes-boi marinhos (*Trichechus manatus*) soltos no Brasil. PhD dissertation. 87 f.

Dos Santos, S.S., Medeiros, I.S., Rebelo, V.A., Carvalho, A.O.B., Dubut, J.P., Mantovani, J.E., Ciriaco, R.D., Dos Santos, R.E.G., Marmontel, M., Normande, I.C., Velôso, T.M.G., and Borges, J.C.G. 2022. Home ranges of released West Indian manatees in Brazil. *ORYX*, 56 : 1–8.

Fontes, J.A.C. 2010. Caracterização Geoambiental da Sub-bacia do Rio Fundo. PhD dissertation – Universidade Federal de Sergipe. 145 p.

Lima, R.P., Paludo, D., Soavinski, R.J., Silva, K.G., and Oliveira, E.M.A. 2011. Levantamento da distribuição, ocorrência e status de conservação do Peixe-Boi Marinho (*Trichechus manatus*, Linnaeus, 1758) no litoral nordeste do Brasil. *Natural Resources*, v: 41-57.

Luna, F.O., Lima, R.P., Araújo, J.P., and Passavante, J.Z.O. Status de conservação do peixe-boi marinho (*Trichechus manatus manatus* Linnaeus, 1758) no Brasil. *Revista Brasileira de Zoociências*, v. 10, p. 145-154, 2008.

Meirelles, A.C.O., Lima, D.S., Alves, M.D.O., Borges, J.C.G., Marmontel, M., Carvalho, V.L.C., and Santos, F.R.S. 2022. Don't let me down: West Indian manatee, *Trichechus manatus*, is still critically endangered in Brazil. *Journal for Nature Conservation*, 67: 1-15.

MMA – Ministério do Meio Ambiente. 2022. Portaria No. 148, de 07 de junho de 2022. Lista Nacional Oficial de espécies da fauna ameaçadas de extinção.

Souza, A.R., Carvalho, A.O.B., dos Santos, S.S., Brito, E.K., Parente, J.E.V., Marmontel, M., Attademo, L.N., Luna, F.O., Lima, R.P., Normande, I.C., and Borges, J.C.G. 2022. Peixes-bois-marinhos (*Trichechus manatus*) reabilitados usam o litoral de Sergipe e Norte da Bahia, Brasil. IV Simpósio Latinoamericano de Manatíes (SILAMA). 19ª Reunião de Trabalho de Especialistas em Mamíferos Aquáticos da América do Sul e XIII Congresso da Sociedade Latino Americana de Especialistas em Mamíferos Aquáticos. Abstract. 2022.

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