

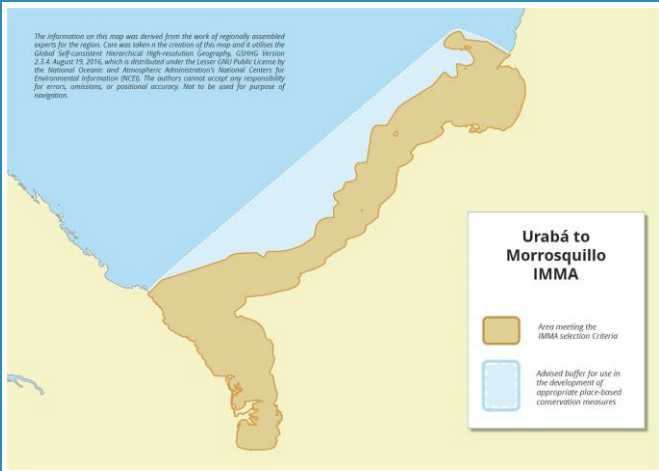
Urabá to Morrosquillo IMMA

Summary, continued.

habitats support coastal species such as the Endangered Greater Caribbean manatee (*Trichechus manatus manatus*), the Near Threatened Guiana dolphin (*Sotalia guianensis*), and the common bottlenose dolphin (*Tursiops truncatus*). Two dolphin species are resident in the IMMA, which is also an important feeding area for manatees. A total of 21 marine mammal species have been reported within the IMMA, of which seven occur regularly, including a few normally pelagic species that would not be expected in shallow coastal areas. The IMMA encompasses six Marine Protected Areas: Acandí, Playón and Playona Fauna Sanctuary, DRMI La Playona, DRMI Lago Azul de los Mantíes, Humedales entre los Ríos León y Suriquí NNP, DRMI Ensenada del Rionegro, DRMI Manglar de la Bahía de Cispata, and PNR Sistema Manglarico del Sector de la Boca de la Guacamaya.

Description:

The Urabá to Morrosquillo IMMA is located along the western Colombian Caribbean coast, extending from the Gulf of Urabá, including Cispata Bay, to the Gulf of Morrosquillo. The IMMA extends approximately 55 km into the sea, from the coast to the 50 m isobath. Habitats include coral reef, mangroves, seagrass beds, estuaries, and mouths of rivers (Figure 1). The weather in the IMMA is mainly warm, with precipitation, modulated by the Inter-tropical Convergence Zone (ITCZ), being higher in the Gulf of Urabá (mean annual precipitation of 2,500 mm) (Urrego et al., 2018). Six Marine Protected Areas are located within the IMMA: Acandí, Playón and Playona



Area Size

7,473 km²

Qualifying Species and Criteria

Common Bottlenose Dolphin – *Tursiops truncatus*

Criterion B (1)

Guiana Dolphin – *Sotalia guianensis*

Criterion B (1)

Greater Caribbean Manatee –

Trichechus manatus manatus

Criterion A; C (2)

Sperm Whale – *Physeter macrocephalus*

Criterion A

Criterion D (2) – Marine Mammal Diversity

Tursiops truncatus, *Sotalia guianensis*, *Trichechus manatus manatus*, *Stenella frontalis*, *Stenella longirostris*, *Stenella attenuata*, *Physeter macrocephalus*

Summary

The Urabá to Morrosquillo IMMA is located along the western Colombian Caribbean, extending from the Gulf of Urabá, including Cispata Bay, to the Gulf of Morrosquillo. The IMMA includes the estuarine waters of the Gulf of Urabá and extends from the coast to the 50 m isobath, encompassing coral reefs, mangroves, seagrass beds, and estuarine habitats. These varied

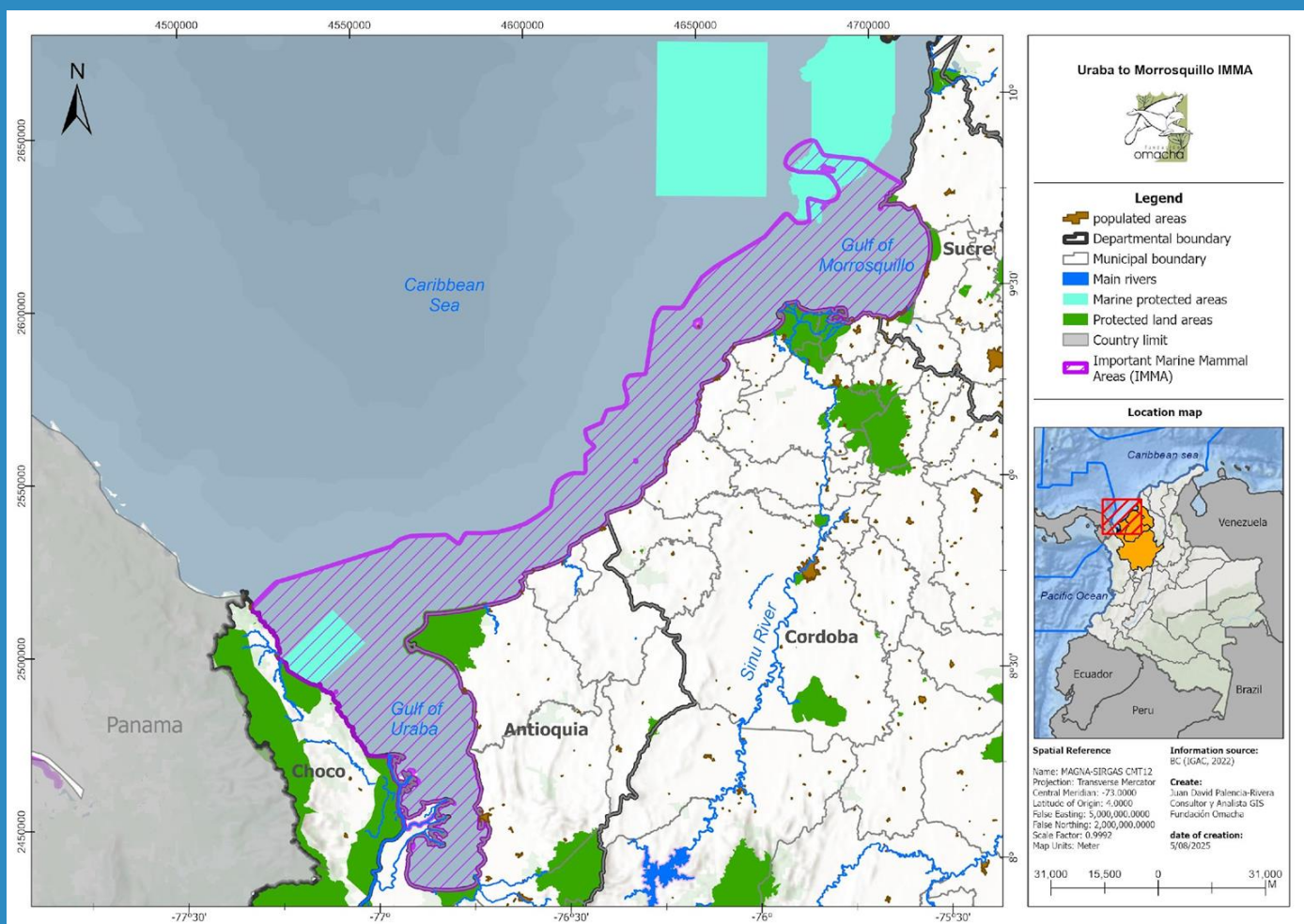


Figure 1: Map of Urabá to Morrosquillo IMMA with local references (Created by Juan David Palencia, Omacha Foundation).

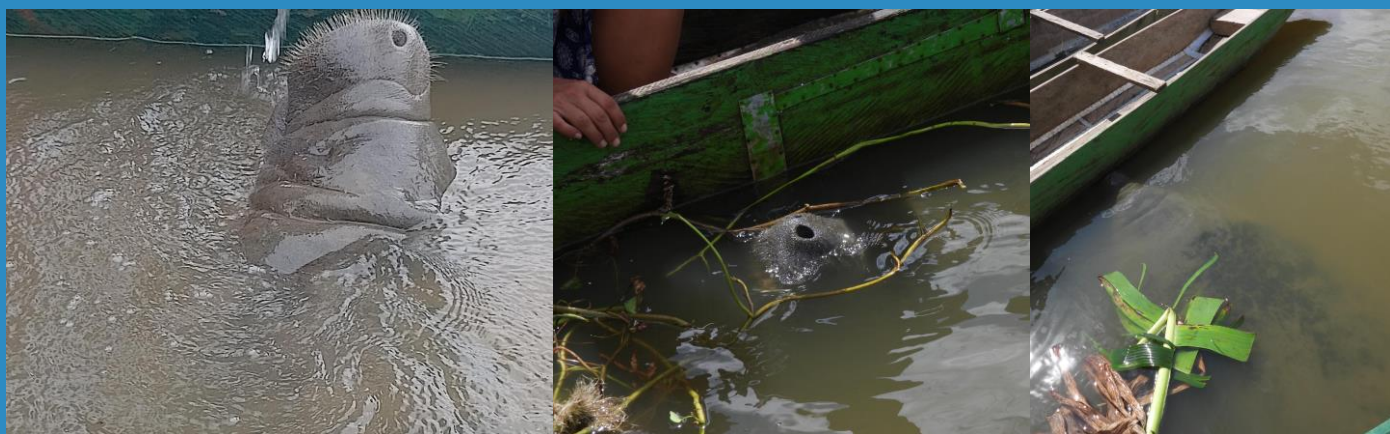


Figure 2: Greater Caribbean manatee (*Trichechus manatus manatus*) female observed at the mouth of the Sinú River, Colombia. Photo credits: Juan Sebastián Rodríguez, Fundación Omacha.

Fauna Sanctuary, DRMI La Playona, DRMI Lago Azul de los Manatíes, Humedales entre los Ríos León y Suriquí NNP, DRMI Ensenada del Rionegro, DRMI Manglar de la Bahía de Cispatá, and PNR Sistema Manglárico del Sector de la Boca de la Guacamaya.

Criterion A: Species or Population Vulnerability

The IMMA hosts American Manatees (*Trichechus manatus*), which, as a species are assessed as Vulnerable (Deutch et al., 2024). The subspecies occurring in the IMMA, the Greater Caribbean manatee (*T. manatus manatus*) (Figure 2) (Mignucci-Giannoni et al., 2024), is listed as Endangered (EN) on the IUCN Red List of Threatened species (Morales et al., 2024).

Maxent models have shown a high occurrence probability and/or predicted potential distribution in coastal waters along the Gulf of Urabá for sperm whales (*Physeter macrocephalus*; Avila et al., 2022), which are assessed as Vulnerable on the IUCN Red List of Threatened Species (Taylor et al., 2019).

Criterion B: Distribution and Abundance

Sub-criterion B2: Aggregations

The IMMA hosts small resident populations of both common bottlenose dolphins (*Tursiops truncatus*) (Figure 3) and Guiana dolphins (*Sotalia guianensis*) (Figure 4).

The range of the Guiana dolphin extends from southern Brazil to Honduras, with populations occurring in separate and sometimes discontinuous groups (da Silva & Best, 1996; Secchi et al., 2018). In Colombia, two small populations have been identified—one in the Gulf of Urabá and another in the Gulf of Morrosquillo (Palacios et al., 2013; Rosso-Londoño et al., 2024).

In the Gulf of Urabá, mark-recapture analyses based on photo-identification surveys conducted between 2017 and 2020 estimated a small resident population of 63 individuals (CV = 9.42%; 95% CI = 53–76) (Rosso-Londoño et al., 2024). In Cispatá Bay (Gulf of Morrosquillo), photo-identification analyses conducted in 2010 estimated the Guiana dolphin population at 225 individuals during the dry season (CV = 0.34; 95% CI = 118–426) and 232 during the wet season (CV = 0.32; 95% CI = 127–246) (Dussan-Duque, 2013). Comparison of the photo-ID catalogues of both study areas on the west and eastern sides of the IMMA has revealed that some individuals use both gulfs and move through the shallow coastal waters (maximum depth 50 m) between them (Ballesteros Pers. Comm. and Rosso-Londoño, 2024).

There is evidence that a rich prey base allows Guiana dolphins to sustain themselves entirely within this IMMA. They are regularly observed feeding, making foraging the most common behaviour recorded for this species in both the Gulf of Urabá (95%) and Cispatá Bay (54%) (García & Trujillo, 2004; Orensa & Fundación Omacha, 2024; Rosso-Londoño et al., 2024).

Photo-identification analyses based on surveys conducted between 2017 and 2020 in the Gulf of Urabá indicate that there is also a resident population of common bottlenose dolphins (*Tursiops truncatus*), with individuals being recaptured over multiple years (Rosso-Londoño, 2024). Mark-recapture analyses from the same surveys estimated a small resident population of around 50 individuals (CV = 7.87%; 95% CI = 43–58) (Rosso-Londoño et al., 2024).

Criterion C: Key Life Cycle Activities

Sub-criterion C2: Feeding Areas

Within the IMMA, 4,896 hectares of seagrass meadows have been documented and mapped,

representing 11.33% of the total seagrass coverage in the Colombian Caribbean. The dominant species are *Thalassia*, *Syringodium*, and *Halodule*, with the largest areas found in the Gulf of Morrosquillo region (Díaz et al., 2003). These ecosystems are considered potential feeding grounds for the Greater Caribbean manatee (Figure 1). Additionally, riverine and aquatic macrophytes, such as water lettuce (*Pistia stratiotes*), and semi-aquatic herbs like dense-flower knotweed (*Polygonum densiflorum*), have been reported as part of the diet of the Greater Caribbean manatee in Colombian rivers (e.g., Farías-Curtidor, 2008). These plants are present along the Atrato and Suriquí deltas in the Gulf of Urabá, where several manatee feeding grounds have been identified (Farías-Curtidor, 2008; Causil, 2022). The Greater Caribbean manatee is observed in coastal waters along the Caribbean coast of Colombia, but the majority of studies on this species within this IMMA have been conducted in the Gulf of Urabá (west side of the IMMA) to Cispatá Bay at Morrosquillo Gulf (east side) (Figure 1) (Caicedo-Herrera et al., 2005; Farías-Curtidor, 2008; Palacios et al., 2013; Causil, 2022).

In the eastern sector of the IMMA, in Cispatá Bay, foraging behavior of Guiana dolphins (*S. guianensis*) was recorded with frequencies of 95% (García & Trujillo, 2004; Orensa & Fundación Omacha, 2024) and 54% (García & Trujillo, 2004) of all documented encounters. In the western sector of the IMMA, in the Gulf of Urabá, 35% of recorded groups were observed foraging (Rosso-Londoño, 2022; Rosso-Londoño et al., 2024). In this area, 20% of the entire Gulf was identified as a dolphin feeding area (Rosso-Londoño, 2022).

Criterion D: Special Attributes

Sub-criterion D2: Diversity

The waters of the Atrato and Sinú rivers flow into the sea, bringing nutrients to the IMMA. This influx

increases the concentration of phytoplankton and food resources throughout the entire food web, which may enhance the availability of prey for cetaceans in the area, resulting in multiple sightings (Farías-Curtidor et al., In Prep.).

A total of 21 marine mammal species, representing 17% of the world's marine mammal species (Committee on Taxonomy, 2021), have been documented within the IMMA, of which seven occur with regularity (Avila, 1995; Muñoz-Hincapié et al., 1998; García & Trujillo, 2004; Pardo et al., 2009; Patiño, 2011; Palacios et al., 2013; Bolaños-Jiménez et al., 2014; Botero-Acosta et al., 2020; Mignucci-Giannoni et al., 2021; Avila et al., 2022; Chacón et al., 2022; Rosso-Londoño, 2022; Farías-Curtidor et al., In Prep.).

In addition to the manatees and well-studied Guiana and bottlenose dolphins (Dussan-Duque, 2013; Rosso-Londoño, 2022; Rosso-Londoño et al., 2024), other cetacean species have been documented by Marine Mammal Observers (MMO) through platforms of opportunity (e.g., Avila et al., 2022; Farías-Curtidor et al., In Prep.), with data available in public Colombian databases (e.g., SIAM INVEMAR and INVEMAR marine mammals database). Maxent models have shown a high occurrence probability and/or predicted potential distribution in coastal waters along the Gulf of Urabá for sperm whales (*Physeter macrocephalus*; Avila et al., 2022), and for Atlantic spotted dolphins (*Stenella frontalis*), common bottlenose dolphins, pantropical spotted dolphins (*Stenella attenuata*), and spinner dolphins (*Stenella longirostris*) in both the Gulf of Urabá and Cispatá Bay (Pardo et al., 2009; Barragán-Barrera et al., 2019).



Figure 3: Common bottlenose dolphins (*Tursiops truncatus*) sighted in the Gulf of Morrosquillo, Colombian Caribbean.
Photo credit: Camila Rosso, Fundación Omacha.



Figure 4: Guiana dolphins (*Sotalia guianensis*) in the Gulf of Morrosquillo, Colombian Caribbean.
Photo credits: Felipe Ballesteros, Fundación Omacha.

Supporting Information

Avila, J.M. 1995. Aspectos biológicos y etológicos de delfines costeros con énfasis en la especie *Sotalia fluviatilis* (Delphinidae) en la Bahía de Cispatá, Caribe Colombiano. BSc Thesis. Universidad Jorge Tadeo Lozano.

Avila, I., Fariás-Curtidor, N., Castellanos-Mora, L., Do Amaral, K., Barragán-Barrera, D., Orozco, C., . . . Puentes, V. 2022. 'The Colombian Caribbean Sea: A tropical habitat for the Vulnerable sperm whale *Physeter macrocephalus*?' *Oryx*, 1-11. Available at: doi:10.1017/S0030605321001113

Barragán-Barrera, D.C., do Amaral, K.B., Chávez-Carreño, P.A., Fariás-Curtidor, N., Lancheros-Neva, R., Botero-Acosta, N., Bueno, P., Moreno, I.B., Bolaños-Jiménez, J., Bouveret, L., Castelblanco-Martínez, D.N., Luksenburg, J.A., Mellinger, J., Mesa-Gutiérrez, R., de Montgolfier, B., Ramos, E.A., Ridoux, V., and Palacios, D.M. 2019. 'Ecological Niche Modeling of Three Species of *Stenella* Dolphins in the Caribbean Basin, With Application to the Seaflower Biosphere Reserve'. *Front. Mar. Sci.* 6:10. Available at: doi: 10.3389/fmars.2019.00010.

Bolaños-Jiménez, J., Mignucci-Giannoni, A., Blumenthal, J., Bogomolni, A., Casas, J.J., Henríquez, A., Iñiguez, B.M., Landrau-Giovannetti, N., Rinaldi, C., Rinaldi, R., Rodríguez-Ferrer, G., Sutti, L., Ward, N., and Lusenburg, J.A. 2014. 'Distribution, feeding habits and morphology of killer whales *Orcinus orca* in the Caribbean Sea'. *Mammal Review*, 1-13. Available at: doi:10.1111/mam.12021.

Botero-Acosta, N., do Amaral, K.B., Barragán-Barrera, D.C., Fariás-Curtidor, N., Moreno-Sotomayor, J.H., Macías-Campo, H.M., Álzate-Montoya, A., and Barrientos-Muñoz, K.G. 2020. 'First record of a Fin whale (*Balaenoptera physalus*) in the Rosario and San

Bernardo Corals National Natural Park, Colombian Caribbean'. *Bulletin of Marine and Coastal Research – INVEMAR*. 49(Spec. Suppl.):259–266 (Scientific note). Available at: <https://doi.org/10.25268/bimc.invemar.2020.49.Supl.Esp.1092>.

Caicedo-Herrera, D., Trujillo, F., Rodríguez, C., and Rivera, M. (Eds.). 2005. Programa Nacional de Manejo y Conservación de Manatíes en Colombia. Ministerio de Ambiente, Vivienda y desarrollo Territorio y Fundación Omacha. Bogotá, Colombia.

Causil, Y.F. 2022. Distribución, oferta alimentaria y presión de uso del manatí antillano (*Trichechus manatus manatus*) en la cuenca baja del río Suriquí (Antioquia, Colombia) [Bachelor thesis]. Universidad de Antioquia.

Chacón Pacheco, J., Sánchez-Londoño, J. D., Villada-Cadavid, T., and Ballesteros-Correa, J. 2022. 'Actualización de la lista de mamíferos silvestres del departamento de Córdoba, Colombia'. *Biota colombiana*, 23(1).

Committee on Taxonomy. 2021. 'List of marine mammal species and subspecies'. Society for Marine Mammalogy [online]. Available at: <http://www.marinemammalscience.org> (Accessed: 19 April 2024).

Currey, R.J.C., Dawson, S.M. and Slooten, E. 2011. *Tursiops truncatus* (Fiordland subpopulation). The IUCN Red List of Threatened Species 2011: e.T194300A67107359. Available at: <https://dx.doi.org/10.2305/IUCN.UK.2011-1.RLTS.T194300A67107359.en> (Accessed: 17 May 2024).

Da Silva, V.M.F. and Best, R.C. 1996. '*Sotalia fluviatilis*'. *Mammalian Species*, 527:1-7.

- Debrot, A.O., Caicedo-Herrera, D., Gomez-Camelo, I., Moná-Sanabria, Y., Rosso, C., van der Wal, J.T., and Mignucci-Giannoni, A.A. 2022. 'The Antillean manatee (*Trichechus manatus manatus*) along the Caribbean coast of Colombia: underused incidental records help identify present and past coastal-lowland hotspots'. *Marine Mammal Science*, 1–16. Available at: <https://doi.org/10.1111/mms.12972>.
- Deutsch, C.J. and Morales-Vela, B. 2024. '*Trichechus manatus*. *The IUCN Red List of Threatened Species* 2024': e.T22103A43792740. (Accessed: 18 November 2024).
- Díaz Merlano, J.M., Barrios Suárez, L.M. and Gómez López, D.I. 2003. Las praderas de pastos marinos en Colombia : Estructura y distribución de un ecosistema estratégico. Instituto de Investigaciones Marinas y Costeras-INVEMAR. Serie Publicaciones Especiales No. 10, Santa Marta, 160 p.
- Dussan-Duque, B.S. 2013. *Ecology of the Guiana Dolphin (Sotalia guianensis) in the southern area of the gulf of Morrosquillo, Colombia: Implications for conservation*. PhD Thesis. University of St. Andrews p. 252.
- Fariás-Curtidor, N.E. 2008. Distribución del manatí *Trichechus manatus manatus* y percepción de la comunidad local con respecto a la especie en la cuenca media y baja del Río Atrato (Chocó, Colombia) [Distribution of the manatee *Trichechus manatus manatus* and perception of the local community regarding the species in the middle and lower basin of the Atrato River (Chocó, Colombia)] [Bachelor thesis]. Facultad de Ciencias, Pontificia Universidad Javeriana.
- Fariás-Curtidor, N., López-Ramírez, P., Alarcón, J., Barragán-Barrera, D.C., do Amaral, K. B., Berlitz, E., Avila, I. C., León, J., and Puentes, V. *In Prep*. Potential ecological niche of odontocetes in the Colombian Caribbean Sea.
- García, C. and Trujillo, F. 2004. 'Preliminary observations on habitat use patterns of the Marine tucuxi, *Sotalia fluviatilis*, in Cispatá Bay, Colombian Caribbean Coast'. *Latin American Journal of Aquatic Mammals*, 3(1):53–59.
- Mignucci-Giannoni, A.A., Aguirre-González, A.M., Caballero-Gaitán, S., Cabrias-Contreras, L.J., Cabrera-Pallares, J.A., Dennis, M.M., ... and Trujillo, F. 2021. 'Rescue, veterinary care, and necropsy of a stranded Clymene dolphin (*Stenella clymene*) from the Caribbean Coast of Colombia'. *Caribbean Naturalist*, 81:1-18.
- Mignucci-Giannoni, A.A., González-Socoloske, D., Álvarez-Alemán, A., Aquino, J., Caicedo-Herrera, D., Castelblanco-Martínez, D.N., Claridge, D., Corona-Figueroa, M.F., Debrot, A.O., de Thoisy, B., Espinoza-Marín, C., Galves, J.A., García-Alfonso, E., Guzmán, H.M., Khan, J.A., Kiszka, J.J., de Oliveira Luna, F., Marmontel, M., Olivera-Gómez, L.D., O'Sullivan, C., Powell, J.A., Pugibet-Bobea, E., Roopsind, I., and Silva, C.J. 2024. 'What's in a name? Standardization of vernacular names for *Trichechus manatus*'. *Caribbean Naturalist*, 98:1-17.
- Morales-Vela, B., Quintana-Rizzo, E. and Mignucci-Giannoni, A. 2024. '*Trichechus manatus* ssp. *manatus*'. *The IUCN Red List of Threatened Species* 2024: e.T22105A43793924. (Accessed: 18 November 2024).
- Muñoz-Hincapié, M.F., Mora-Pinto, D.M., Palacios, D.M., Secchi, E.R., and Mignucci-Giannoni, A.A. 1998. 'First osteological record of the dwarf sperm whale in Colombia, with notes on the zoogeography of *Kogia* in South America'. *Revista de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales* 22(84):433-444.

OCENSA y Fundación Omacha. 2024. Informe Técnico. Monitoreo Biológico de Delfines en el golfo de Morrosquillo durante la época seca - enero de 2024. Proyecto Delfines y Aves de Morrosquillo. Convenio 3600012. 58 p.

Pardo, M., Mejía-Fajardo, A., Beltrán-Pedrerros, S., Trujillo, F., Kerr, I., and Palacios, D. 2009. 'Odontocete sightings collected during offshore cruises in the western and Southwestern Caribbean Sea'. *Lat. Am. J. Aquat. Mamm.*, 7(1-2):57-62.

Palacios, D.M., Gärtner, A., Caicedo, D., Farías, N., Jiménez-Pinedo, C., Curcio-Valencia, J., Aldana-Domínguez, J., Trujillo, F., and Moná-Sanabria, Y. 2013. 'Mamíferos acuáticos de la región de los Andes colombianos'. In: Trujillo, F., A. Gärtner, D. Caicedo y M.C. Diazgranados (Eds.). 2013. Diagnóstico del estado de conocimiento y conservación de los mamíferos acuáticos en Colombia. Ministerio de Ambiente y Desarrollo Sostenible, Fundación Omacha, Conservación Internacional y WWF. Bogotá, 312 pp.

Patiño, J. 2011. *Comportamiento y uso de hábitat de Sotalia guianensis en la Bahía El Roto, Golfo de Urabá*. BSc Thesis. Universidad de Antioquia. 61 pp.

Rosso Londoño, M.C. 2022. Delfines en el golfo de Urabá Caribe Colombiano: Implicaciones para su conservación y el manejo costero. PhD Thesis. Universidad de Antioquia.

Rosso-Londoño, M.C., de Moura, S.P.G., Palencia, J.D., Cattani, P.E., Caicedo-Herrera, D., Portocarrero-Aya, M., Crespo, E., Diaz, S., Sasaki, G., and Trujillo, F. 2024. 'Abundance, Distribution, and Habitat Suitability Prediction of the Guiana Dolphin and Common Bottlenose Dolphin in the Gulf of Urabá'. *Colombian Caribbean*, 50(5):383-401.

Secchi, E., Santos, M.C., de, O., and Reeves, R. 2018.

'*Sotalia guianensis* (errata version published in 2019)'. The IUCN Red List of Threatened Species 2018: e.T181359A144232542. Available at: <https://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T181359A144232542.en>. (Accessed: 19 April 2024).

Taylor, B.L., Baird, R., Barlow, J., Dawson, S.M., Ford, J., Mead, J.G., Notarbartolo di Sciara, G., Wade, P., and Pitman, R.L. 2019. '*Physeter macrocephalus* (amended version of 2008 assessment)'. *The IUCN Red List of Threatened Species* 2019: Available at: e.T41755A160983555. <https://dx.doi.org/10.2305/IUCN.UK.2008.RLTS.T41755A160983555.en>. (Accessed: 18 November 2024).

Urrego, L., Correa-Metrio, A. and González-Arango, C. 2018. 'Colombian Caribbean mangrove dynamics: anthropogenic and environmental drivers'. *Boletín de la Sociedad Geológica Mexicana*, 1(70):133-145. Available at: <http://dx.doi.org/10.18268/BSGM2018v70n1a8>.

Wells, R.S., Natoli, A. and Braulik, G. 2019. '*Tursiops truncatus* (errata version published in 2019)'. The IUCN Red List of Threatened Species 2019: Available at: e.T22563A156932432. <https://dx.doi.org/10.2305/IUCN.UK.2019-1.RLTS.T22563A156932432.en>. (Accessed: 17 May 2024).

Acknowledgements

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