

# West Indies Humpback Whale Breeding Ground IMMA

## Summary, continued.

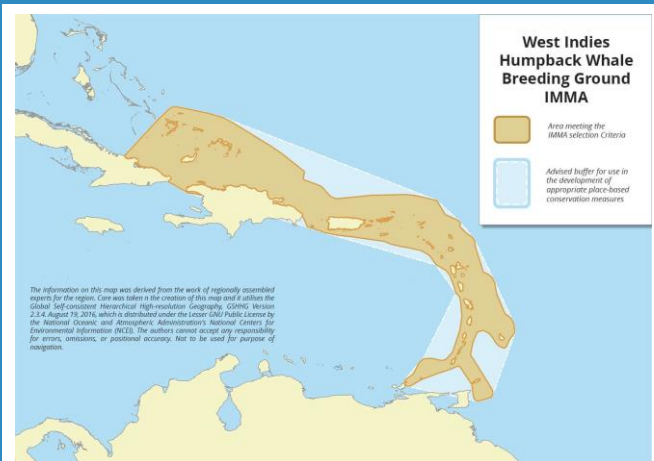
marine mammal species occur in the area, this IMMA is designed to encompass the main breeding grounds for the North Atlantic humpback whale (*Megaptera novaeangliae*). The area includes several marine mammal sanctuaries such as Banco de la plata y Navida, Sanctuary for the Marine Mammals of the Dominican Republic, the Yarari Sanctuary and the Agoa Sanctuary, as well as several other MPAs. Humpback whales are still hunted off the island of Bequia for aboriginal subsistence.

## Description:

The habitat of the IMMA is made up of three archipelagos (Greater Antilles, Lesser Antilles, and Lucayan Archipelago) that consist of islands with varying depths and multiple drop-offs. It includes several bank systems with shallow water as well as deep-water canyons and many drop-offs out to the 2,000 m and 3,000 m (Lucayan Archipelago only) isobath. The water is relatively warm, with a predominant current from the east to the west. It includes several sanctuaries and other MPAs.

## Criterion C: Key Life Cycle Activities Sub-criterion C1: Reproductive Areas

During the Boreal winter months, humpback whales (*Megaptera novaeangliae*) from the North Atlantic migrate from feeding grounds of the Eastern coasts of Canada, and the United States, west Greenland, or the Northeastern Atlantic waters around Iceland and Norway, to this IMMA, to mate, give birth, and nurse



## Area Size

502,105 km<sup>2</sup>

## Qualifying Species and Criteria

Humpback Whale – *Megaptera Novaeangliae*

Criterion C (1)

## Other Marine Mammal Species Documented

*Balaenoptera acutorostrata*, *Balaenoptera borealis*, *Balaenoptera edeni brydei*, *Balaenoptera physalus*, *Delphinus delphis*, *Feresa attenuata*, *Globicephala macrorhynchus*, *Grampus griseus*, *Kogia breviceps*, *Kogia sima*, *Lagenodelphis hosei*, *Mesoplodon densirostris*, *Mesoplodon europaeus*, *Orcinus orca*, *Peponocephala electra*, *Physeter macrocephalus*, *Pseudorca crassidens*, *Stenella attenuata*, *Stenella clymene*, *Stenella coeruleoalba*, *Stenella frontalis*, *Stenella longirostris*, *Steno bredanensis*, *Trichechus manatus*, *Tursiops truncatus*, *Ziphius cavirostris*

## Summary

The IMMA is located in the Caribbean and includes the Lucayan Archipelago, the northern part of the islands of the Greater Antilles and the surrounding waters of the Lesser Antilles islands down to Margarita, Venezuela. It includes the shallow water coastal area around the islands, multiple carbonate banks, drop offs, canyons and channels between the islands. Although over 20



Figure 1: North Atlantic humpback whales (*Megaptera novaeangliae*) in this IMMA. Photo credit: Caribbean Cetacean Society.





Figure 2: North Atlantic humpback whales (*Megaptera novaeangliae*) mother and calf pair. Photo credit: Caribbean Cetacean Society.

their young. Peak densities occur between February and March. They use the southern portion of the Lucayan Archipelago, especially the Turks Bank off the Turks and Caicos Islands, the Greater Antilles, and the Lesser Antilles. Many research groups and studies have shown that humpback whales can be found in the coastal areas, cays, canyons, and on the banks (Katona et al., 1984; Sanders et al., 2005; Caribbean Cetacean Society, 2023; Bacon et al., 2023, 2024; Hart & Bacon, 2022, 2024; Juredin & Berna, 2024).

The majority of research on these breeding grounds has been carried out in the high-density areas in the Greater Antilles, mainly the Dominican Republic (Silver Bank, Samaná Bay, and Navidad Bank) (Winn et al., 1975; Balcomb & Nichols, 1982; Whitehead & Moore, 1982; Mattila et al., 1989, 1994; Robbins et al., 2001; Betancourt et al., 2012) and Puerto Rico (Martin et al., 1984; Mattila, 1984; Mignucci-Giannoni, 1998; Swartz et al., 2002;

Sanders et al., 2005; MacKay et al., 2016, 2019).

Contrarily, small-scale studies have been carried out (partly due to little to no sighting effort in certain regions) in the Lucayan Archipelago (Winn et al., 1975; Balcomb & Nichols, 1978; Winn & Winn, 1978; Clapham & Mattila, 1990; Smith et al., 1999; Swartz et al., 2002) and the Lesser Antilles (Winn et al., 1975; Levenson & Leaply, 1978; Mattila & Clapham, 1989; Swartz et al., 2003; Clapham et al., 2005; Rinaldi et al., 2009; Gandilhon, 2012; Fossette et al., 2014, 2017; Kennedy et al., 2014; Stevick et al., 2016, 2018).

Recently, humpback whale survey effort has increased in portions of the lower-density areas of the Lucayan Archipelago, mainly the Turks Bank, Turks and Caicos Islands, by the Turks and Caicos Islands Humpback Whale Project (Bacon et al., 2023, 2024; Hart & Bacon, 2022, 2024), and in the Lesser Antilles by Beyond the Reef and the Caribbean Cetacean Society (Campos Cuellar, 2023; Caribbean Cetacean Society, 2023, 2024; Juredin & Berna, 2024; Bernus et al., 2024).



Figure 3: North Atlantic humpback whales (*Megaptera novaeangliae*) mother and calf pair on the Turks Bank. Photo credit: Katharine Hart of the Turks and Caicos Islands Whale Project and Deep Blue Charters.

## Supporting Information

Balcomb, K.C. and Nichols, G. 1982. 'Humpback whale censuses in the West Indies'. Reports of the International Whaling Commission, 32:401–406.

Bacon, C.E., Hart, K.A., Cheeseman, T., Munson, L., Rasmussen, M.H., Chosson, V., and Basran, C.J. 2023. 'First-documented humpback whale (*Megaptera novaeangliae*) photo-identification match and round-trip migration between Iceland and the Turks and Caicos Islands'. Journal of Cetacean Research and Management, 24(1):161–68 [online]. Available at: <https://doi.org/10.47536/jcrm.v24i1.405>.

Bacon, C.E., Hart, K.A., Cheeseman, T., Munson, L., Rasmussen, M.H., Chosson, V., and Basran, C.J. 2024. 'First-documented humpback whale (*Megaptera novaeangliae*) photo-identification match and round-trip migration between Iceland and the Turks and Caicos Islands'. Paper presented to the Northern Hemisphere Subcommittee at the 58<sup>th</sup> Annual Meeting of the International Whaling Commission Scientific Committee (SC/69B/ForInfo/22).

Basran, C., Chosson, V., Williams, A., Simpson, N., Long, S.A., Dodds, F., Rasmussen, M.H., and Horrocks, J.A. 2023. 'First documented migration of an Icelandic humpback whale mother and calf pair from the West Indies breeding grounds'. J. Cetacean Res. Manage.



Betancourt, L., Herrera-Moreno, A., and Beddall, K. 2012. 'Spatial distribution of humpback whales (*Megaptera novaeangliae*) in Samaná Bay, Dominican Republic'. Paper SC/64/O12 presented to the IWC Scientific Committee, July 2012 (unpublished). 10pp.

Berna, K. and Juredin, C. 2022. Pilot Whale Stranding Report, prepared by the Beyond The Reef Team in the British Virgin islands and submitted to the Ministry of Environment, Natural Resources and Climate Change. Unpublished Report, available upon request. July 2022.

Bernus, J., Mac Donald, S. and The CCS Team. 2024. 'Ti Whale An Nou: Preliminary results from standardised cetacean monitoring in the highly geopolitically complex Lesser Antilles demonstrating the need for harmonised marine governance'. Paper presented to the Small Cetacean Subcommittee at the 58<sup>th</sup> Annual Meeting of the International Whaling Commission Scientific Committee (SC/69B/SM/13).

Bolaños-Jiménez, J., Mignucci-Giannoni, A.A., Blumenthal, J., Bogomolni, A., Casas, J.J., Henriquez, A., Iniguez Bessega, M., Khan, J., Landrau-Giovannetti, N., Rinaldi, C., and Rinaldi, R. 2014. 'Distribution, feeding habits and morphology of killer whales *Orcinus orca* in the Caribbean Sea'. *Mammal Review*, 44(3-4):177–189.

Campos Cuellar, R. 2023. *Preliminary study of the distribution, movements, and habitat use of the humpback whale (Megaptera novaeangliae) in the Lesser Antilles*. Unpublished Master's Thesis. Sorbonne Université, Paris, France.

Caribbean Cetacean Society. 2023. Scientific Expedition Report, Ti Whale An Nou program 2023. Accessed 10 November 2023. Available at:

<https://www.ccs-ngo.com/reports-publications>.

Caribbean Cetacean Society. 2024. Scientific Expedition Report, Ti Whale An Nou program 2023. Accessed 10 November 2023. Available at: <https://www.ccs-ngo.com/reports-publications>.

Clapham, P.J., Barco, S., Jann, G., Martinez, A., Mattila, D., Nelson, M., and Wenzel, F. 2005. Update on a new assessment of North Atlantic humpback whales. Paper SC/57/AWMPg submitted to the Scientific Committee of the International Whaling Commission, June 2005.

Clapham, P.J. and Mattila, D.K. 1990. 'Humpback whale songs as indicators of migration routes'. *Mar. Mamm. Sci.*, 6(2):155–60.

Clapham, P.J., Palsbøll, P.J., Mattila, D.K., and Vasquez, O. 1992. 'Composition and dynamics of humpback whale competitive groups in the West Indies'. *Behaviour*, 122(3–4):182–194 [online]. Available at: <https://doi.org/10.1163/156853992X00507>.

Coché, L., Arnaud, E., Bouveret, L., David, R., Foulquier, E., Gandilhon, N., Jeannesson, E., Le Bras, Y., Lerigoleur, E., Lopez, P.J., and Madon, B. 2021. 'Kakila database: Towards a FAIR community approved database of cetacean presence in the waters of the Guadeloupe Archipelago, based on citizen science'. *Biodiversity Data Journal*, 9.

Dunn, C. and Claridge, D. 2014. 'Killer whale (*Orcinus orca*) occurrence and predation in the Bahamas'. *Journal of the Marine Biological Association of the United Kingdom*, 94(6):1305–1309.

Fossette, S., Heide-Jorgensen, M-P., Jensen, M.V., Vaslet, A., Chalifour, J., Maslach, N., and Vely, M. 2017. Humpback whale satellite-tracking reveals the connectivity between the Northern Lesser Antilles

and the importance of regional collaboration to conserve marine biodiversity. Abstract: 2<sup>nd</sup> edition Humpback Whale World Congress, 3–10 July 2017. Reunion Island, France.

Fossette, S., Heide-Jorgensen, M-P., Jensen, M.V., Kiszka, J., Bérubé, M., Bertrand, N., and Vély, M. 2014. 'Humpback whale (*Megaptera novaeangliae*) post breeding dispersal and southward migration in the western Indian Ocean'. *Journal of Experimental Marine Biology and Ecology*, 450:6–14 [online]. Available at: <https://doi.org/10.1016/j.jembe.2013.10.014>.

Fossette, S., Vely, M., Maslach, N., and Souan, H. 2014. Mission déploiement de balises satellites sans les aires de reproduction baleines à bosse (*Megaptera novaeangliae*) du nord des petites Antilles. Rapport interne, Réserve Naturelle de Saint Martin.

Gandilhon, N. 2012. *Contribution au recensement des cétacés dans l'archipel de Guadeloupe*. Ph.D., Université des Antilles et de la Guyane, Guadeloupe, 418 pp. [Available at: [https://www.researchgate.net/publication/259475841\\_Contribution\\_au\\_recensement\\_des\\_cetaces\\_dans\\_l\\_archipel\\_de\\_Guadeloupe](https://www.researchgate.net/publication/259475841_Contribution_au_recensement_des_cetaces_dans_l_archipel_de_Guadeloupe)].

Hart, K.A. and Bacon, C.E. 2022. Field Research to Monitor Presence, Distribution, and Behaviour of Cetaceans in the Turks and Caicos Islands with Particular Focus on Humpback Whales (*Megaptera novaeangliae*) – 2022 Season Results. Prepared by the Turks and Caicos Island Whale Project, South Base, Grand Turk, Turks and Caicos Islands, British West Indies. Submitted to the Department of Environment and Coastal Resources, Ministry of Tourism, Environment, Culture, Heritage and Disaster Management, Lower Bight Road, Providenciales, Turks and Caicos Islands. Unpublished Report. October 2022. Available upon request.

Hart, K.A. and Bacon, C.E. 2024. Field Research to Monitor Presence, Distribution, and Behaviour of Cetaceans in the Turks and Caicos Islands with Particular Focus on Humpback Whales (*Megaptera novaeangliae*) – 2023 Season Results. Prepared by the Turks and Caicos Island Whale Project, South Base, Grand Turk, Turks and Caicos Islands, British West Indies. Submitted to the Department of Environment and Coastal Resources, Ministry of Tourism, Environment, Culture, Heritage and Disaster Management, Lower Bight Road, Providenciales, Turks and Caicos Islands. Unpublished Report. January 2024. Available upon request.

Hart, K.A., Prieto Gonzalez, R., Campos-Cuellar, R., Bernus, J., Beddall, K., Betancourt Fernandez, L., Jones, L., Vely, M., and Bacon, C.E. Forthcoming. Inter-island movements in the breeding range of a humpback whale (*Megaptera novaeangliae*) between the Turks and Caicos Islands, Anguilla, Saint Barthélemy, and the Dominican Republic.

Joyce, T.W., Durban, J.W., Claridge, D.E., Dunn, C.A., Fearnbach, H., Parsons, K.M., Andrews, R.D., and Ballance, L.T., 2017. 'Physiological, morphological, and ecological tradeoffs influence vertical habitat use of deep-diving toothed-whales in the Bahamas'. *PLoS One*, 12(10):e0185113.

Juredin, C. and Berna, K. 2024. Beyond The Reef Cetacean Research 2023 - 2024 Report, prepared by the Beyond The Reef Team in the British Virgin islands and submitted to the Ministry of Environment, Natural Resources and Climate Change. Unpublished Report, available upon request. March 2024.

Martin, A.R., Katona, S.K., Matilla, D., Hembree, D., and Waters, T.D. 1984. 'Migration of humpback whales between the Caribbean and Iceland'. *Journal of Mammalogy*, 65(2):330–333.

Kennedy A.S. and Clapham, P.J. 2017. 'From whaling to tagging: The evolution of North Atlantic humpback whale research in the West Indies'. *Marine Fisheries Review*, 79:23–37.

Kennedy, A.S., Zerbini, A.N., Vásquez, N., Gandilhon, N., Clapham, P.J., and Adam, O. 2014. 'Local and migratory movements of humpback whales (*Megaptera novaeangliae*) satellite-tagged in the North Atlantic Ocean'. *Can J. Zool.* 92(1): 8–17. [Available at: <https://doi.org/10.1139/cjz-2013-0161>].

Levenson, C. and Leapley, W.T. 1978. 'Distribution of humpback whales (*Megaptera novaeangliae*) in the Caribbean by a rapid acoustic method'. *Journal of the Fisheries Research Board of Canada*, 35(8):1150–1152 [online]. Available at: <https://doi.org/10.1139/f78-180>.

MacKay, M.M., Bacon, C.E., Bouveret, L., Fossette, S., and Stevick, P.T. 2019. 'Humpback whale (*Megaptera novaeangliae*) intra/inter-seasonal exchanges between Puerto Rico and the southeastern Caribbean'. *Animal Behavior and Cognition*, 6(2):98–104 [online]. Available at: <https://doi.org/10.26451/abc.06.02.02.2019>.

MacKay, M.M., Würsig, B., Bacon, C.E., and Selwyn, J.D. 2016. 'Humpback whale (*Megaptera novaeangliae*) hotspots defined by bathymetric features off western Puerto Rico'. *Canadian Journal of Zoology*, 94(7):517–527 [online]. Available at: <https://doi.org/10.1139/cjz-2015-0198>.

Mattila, D.K. 1984. Humpback whales in the Mona Passage, Puerto Rico: A summary. Provincetown, MA: Center for Coastal Studies.

Mattila, D.K. and Clapham, P.J. 1989. 'Humpback whales, *Megaptera novaeangliae*, and other cetaceans on Virgin Bank and in the northern Leeward Islands, 1985 and 1986'. *Canadian Journal of*

*Zoology*, 67(9):2201–2211 [online]. Available at: <https://doi.org/10.1139/z89-311>.

Mattila, D.K., Clapham, P.J., Katona, S.K., and Stone, G.S. 1989. 'Population composition of humpback whales, *Megaptera novaeangliae*, on Silver Bank, 1984'. *Canadian Journal of Zoology*, 67(2):281–285 [online]. Available at <https://doi.org/10.1139/z89-041>.

Mattila, D.K., Clapham, P.J., Vásquez, O., and Bowman, R.S. 1994. 'Occurrence, population composition, and habitat use of humpback whales in Samana Bay, Dominican Republic'. *Canadian Journal of Zoology*, 72(11):1898–1907. Available at: <https://doi.org/10.1139/z94-258>.

Mignucci-Giannoni, A.A. 1998. 'Zoogeography of cetaceans off Puerto Rico and the Virgin Islands'. *Caribbean Journal of Science*, 34:173–190.

Rinaldi, C., Rinaldi, R. and Sahagian, P. 2006. Report of surveys conducted on small cetaceans off Guadeloupe 1998–2005. Paper SC/58/SM17 submitted to the Scientific Committee of the International Whaling Commission, June 2006.

Rinaldi, C., Sears, R., Stevick, P.T., and Carlson, C. 2009. First resighting of a humpback whale between the French Lesser Antilles and the North Atlantic feeding grounds off Canada. Paper SC/61/013 presented to the Scientific Committee of the IWC, Madeira, 2009.

Robbins, J., Bérubé, M., Clapham, P., Palsbøll, P., Stevick, P., and Mattila, D. 2001. Group composition and social dynamics of North Atlantic humpback whales (*Megaptera novaeangliae*) on their West Indies breeding grounds. Paper SC/53/NAH4 submitted to the Scientific Committee of the International Whaling Commission, June 2001.

- Rodriguez-Ferrer, G., Reyes, R., Hammerman, N.M., and García-Hernández, J.E. 2019. 'Cetacean sightings in Puerto Rican waters: including the first underwater photographic documentation of a minke whale (*Balaenoptera acutorostrata*)'. *Latin American Journal of Aquatic Mammals*, 13(1-2):26–36. <https://doi.org/10.5597/00246>.
- Sanders, I.M., Barrios-Santiago, J.C. and Appeldoorn, R.S. 2005. 'Distribution and relative abundance of humpback whales off western Puerto Rico during 1995-1997'. *Caribbean Journal of Science*, 41(1):101–07.
- Silva, N., Acevedo, R. and Oviedo, L. 2006. 'Preliminary observations on the spatial distribution of humpback whales off the north coast of Margarita Island, Venezuela--southeast Caribbean'. *Mar. Biodivers. Rec.*, 1:23.
- Smith, T.D., Allen, J., Clapham, P.J., Hammond, P.S., Katona, S., Larsen, F., Lien, J., Mattila, D., Palsbøll, P.J., Sigurjónsson, J., Stevick, P.T., and Øien, N. 1999. 'An ocean-basin-wide mark-recapture study of the North Atlantic humpback whale (*Megaptera novaeangliae*)'. *Mar. Mamm. Sci.*, 15(1):1–32. [Available at: <https://doi.org/10.1111/j.1748-7692.1999.tb00779.x>].
- SPAW-RAC. 2021. Implementation of the Action Plan for Marine Mammals in the Wider Caribbean Region: A Scientific and Technical Analysis. Authored by Vail, C. and Borobia, M. UN Environment, Caribbean Environment Programme, Specially Protected Areas and Wildlife Regional Activity Centre. 165 pp.
- Stevick, P.T., Berrow, S.D., Bérubé, M., Bouvert, L., Broms, F., Jann, B., Kennedy, A., Suárez, P.L., Meunier, M., Ryan, C., and Wenzel, F. 2016. 'There and back again: Multiple and return exchange of humpback whales between breeding habitats separated by an ocean basin'. *J. Mar. Biol. Assoc. UK.*, 96(4):1–6.
- Stevick, P.T., Bouveret, L.A., Gandilhon, N.A., Rinaldi, C.A., Rinaldi, R.E., Broms, F.R., Carlson, C.A., Kennedy, A., Ward, N.A., and Wenzel, F.R. 2018. 'Migratory destinations and timing of humpback whales in the southeastern Caribbean differ from those off the Dominican Republic'. *Journal of Cetacean Research and Management*, 18(1):127–133 [online]. Available at: <https://doi.org/10.47536/jcrm.v18i1.442>.
- Swartz, S.L., Cole, T., McDonald, M.A., Hildebrand, J.A., Oleson, E.M., Martinez, A., Clapham, P.J., Barlow, J., and Jones, M.L. 2003. 'Acoustic and visual survey of humpback whale (*Megaptera novaeangliae*) distribution in the Eastern and Southeastern Caribbean Sea'. *Caribbean Journal of Science*, 39:195–208. Available at: <https://swfsc-publications.fisheries.noaa.gov/publications/CR/2003/2003Swartz.pdf>.
- Swartz, S.L., Martinez, A., Stamat, J., Burks, C., and Mignucci-Giannoni, A.A. 2002. Acoustic and visual survey of cetaceans in the waters of Puerto Rico and the Virgin Islands: February–March 2001. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-SEFSC-463.
- Whitehead, H. and Moore, M.J. 1982. 'Distribution and movements of West Indian humpback whales in winter'. *Canadian Journal of Zoology*, 60:2203–2211.
- Winn, H.E., Edel, R.K. and Taruski, A.G. 1975. 'Population estimate of the humpback whale (*Megaptera novaeangliae*) in the West Indies by visual and acoustic techniques'. *Journal of the Fisheries Research Board of Canada*, 32(4):499–506. Available at: <https://doi.org/10.1139/f75-061>.
- Winn, H.E. and Winn, L. 1978. 'The song of the humpback whale (*Megaptera novaeangliae*) in the West Indies'. *Marine Biology*, 47:97–114. Available at: <https://doi.org/10.1007/BF00395631>.



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