

First record of the critically endangered great hammerhead shark (*Sphyrna mokarran*) in its natural habitat in the coast of Paraíba, Northeastern Brazil

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Abstract - The Great Hammerhead Shark, *Sphyrna mokarran*, is critically endangered around the world. The overwhelming majority of their records are of animals killed, quartered or captured by fishermen, which limit our understanding on its biology and conservation. For the first time, we report on the *S. mokarran* occurrence in the State of Paraíba, Northeastern Brazil, in its natural habitat. On 21 March 2021 a 2-m sub-adult male was captured by two Baited Remote Underwater Video Surveys (BRUVS) at 55-59 m depth, 30 km off João Pessoa, within the Queimado Shipwreck Marine Protected Area (MPA). Our findings suggest that *S. mokarran* is rare in the region and might be threatened by unmonitored and unregulated fishing activities. There is an urgent need for effective management and conservation actions for the species in the State of Paraíba. This record has the potential to serve as baseline data for future implementation of non-take zones within the Queimado Shipwreck MPA.

Keywords: Baited Remote Underwater Video Surveys. BRUVS. Conservation. Elasmobranch. Marine Protected Area. Overfishing. Southwestern Atlantic.

Primeiro registro do tubarão-martelo (*Sphyrna mokarran*), criticamente ameaçado, em seu habitat natural no litoral da Paraíba, Nordeste do Brasil

Resumo - O grande tubarão-martelo, *Sphyrna mokarran*, está criticamente ameaçado em todo o mundo. A esmagadora maioria de seus registros são de animais mortos, esquartejados ou capturados por pescadores, o que limita nosso entendimento sobre sua biologia e conservação. Pela primeira vez, relatamos a ocorrência de *S. mokarran* no Estado da Paraíba, Nordeste do Brasil, em seu habitat natural. Em 21 de março de 2021, um macho subadulto de 2 m foi capturado por

duas estações remotas de vídeo subaquáticos com isca (sigla *BRUVS* em inglês) a 55-59 m de profundidade, a 30 km de João Pessoa, dentro da Área de Proteção Ambiental (APA) Naufrágio Queimado. Nossos achados sugerem que *S. mokarran* é rara na região e pode estar ameaçada por atividades pesqueiras não monitoradas e não regulamentadas. Há uma necessidade urgente de ações efetivas de manejo e conservação da espécie no Estado da Paraíba. Este registro tem potencial para servir de linha de base para a futura implementação de zonas de exclusão de pesca no interior da APA Naufrágio Queimado.

Palavras-chave: BRUVS. Conservação. Elasmobrânquio. Área Marinha Protegida. Sobrepesca. Atlântico Sudoeste.

Primer registro del gran tiburón martillo (*Sphyrna mokarran*) en peligro crítico de extinción en su hábitat natural en la costa de Paraíba, Nordeste de Brasil

Resumen - El gran tiburón martillo, *Sphyrna mokarran*, se encuentra en peligro crítico de extinción en todo el mundo. La gran mayoría de sus registros son de animales asesinados, descuartizados o capturados por pescadores, lo que limita nuestra comprensión de su biología y conservación. Por primera vez reportamos la ocurrencia de *S. mokarran* en el Estado de Paraíba, Nordeste de Brasil, en su hábitat natural. El 21 de marzo de 2021, un macho subadulto de 2 m fue capturado por dos estaciones remotas de video submarino con cebo (*BRUVS* em inglês) a una profundidad de 55-59 m, a 30 km de João Pessoa, dentro del Área de Protección Ambiental (APA) Naufragio Quemado. Nuestros hallazgos sugieren que *S. mokarran* es rara en la región y puede estar amenazada por actividades pesqueras no controladas ni reglamentadas. Existe una necesidad urgente de acciones efectivas de manejo y conservación de la especie en el Estado de Paraíba. Este registro tiene el potencial de servir como línea de base para la futura implementación de zonas de exclusión de pesca dentro del APA Naufragio Quemado.

Palabras clave: BRUVS. Conservación. Elasmobranquio. Área marina protegida. Sobrepesca. Atlántico sudoccidental.

Introduction

Sightings of threatened shark species have become increasingly rare in most marine ecosystems globally. Many shark species are facing severe populations declines due to fishing pressure and other anthropogenic disturbances (Dulvy et al. 2014; Pacoureau et al. 2021; Queiroz et al. 2019) especially in developing countries, which often lack appropriate fisheries data and effective legislation to protect sharks (Barreto et al. 2017; Feitosa et al. 2018). Brazil is the biggest shark meat importer globally and the 11th producer worldwide (Dent and Clarke 2015). Hammerhead sharks (Sphyrnidae) are particularly susceptible to overfishing, with a low overall survival rate

after capture (Gallagher *et al.* 2014), and high demands for their fins in the international fin trade (Dent and Clarke 2015).

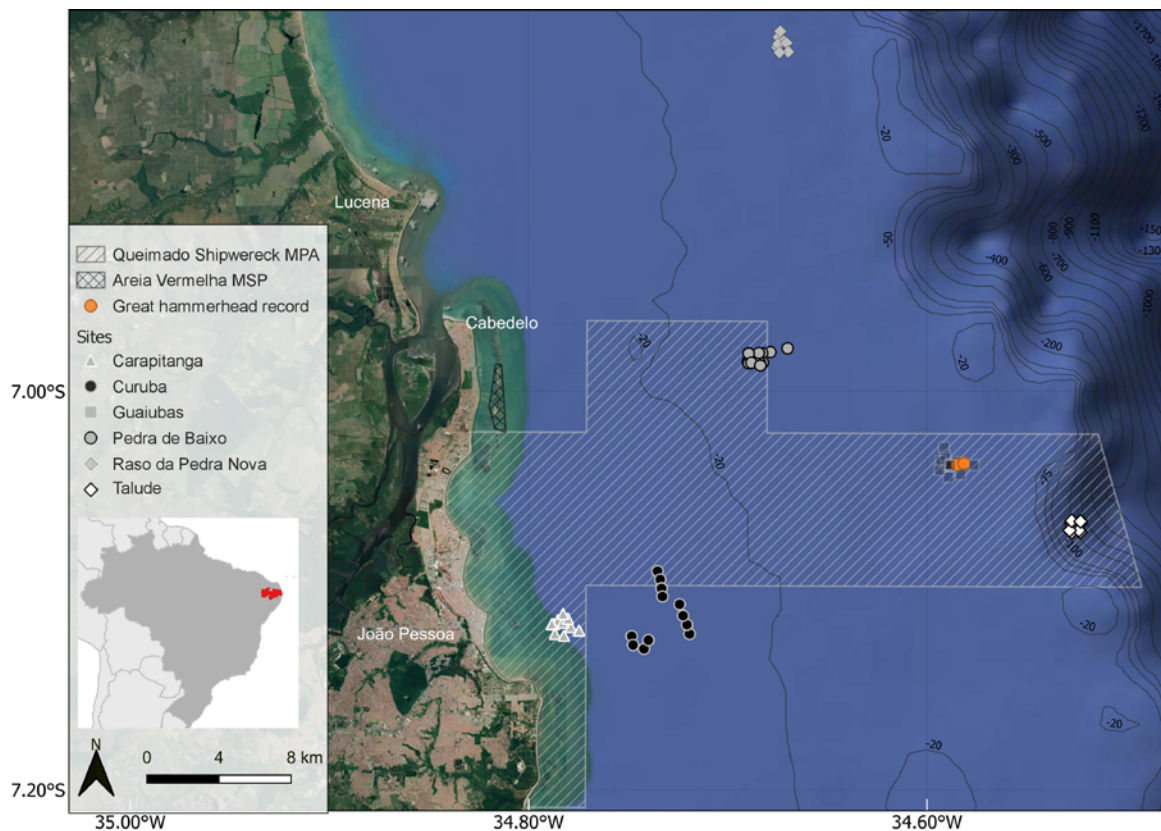
The Great Hammerhead Shark, *Sphyrna mokarran* (Rüppell 1837) is the largest (up to 610 cm total length) of the 11 recognized species of hammerhead sharks; it is a migratory species that utilizes nearshore and oceanic waters and is globally distributed in tropical and warm temperate seas (Compagno *et al.* 2005; Ebert *et al.* 2013; Rigby *et al.* 2019). The species has been recorded along the entire coast of Brazil (Afonso *et al.* 2014; Bezerra *et al.* 1990; Gadig *et al.* 2000; Lessa *et al.* 1998; Machado and Antunes 1975; Meneses *et al.* 2005; Yokota and Lessa 2006), and has historically been caught by both small-scale and commercial fisheries, leading to severe population declines in the region (Kotas *et al.* 2005; Vooren and Klippel 2005). In the Atlantic Ocean, *S. mokarran* populations are estimated to have declined by more than 50% over three generation lengths (74.4 years) (Rigby *et al.* 2019). The global population of *S. mokarran* is classified as Critically Endangered by International Union for Conservation of Nature Red List criteria (Rigby *et al.* 2019).

In order to establish effective management strategies, it is necessary to obtain relevant ecological data on shark distribution and abundance. An efficient and popular technique used to assess sharks assemblages are Baited Remote Underwater Video Surveys – BRUVS (Cappo *et al.* 2003). BRUVS offer an alternative, low-cost, and minimally invasive approach to study sharks (Espinoza *et al.* 2020; Jabado *et al.* 2018), and have provided relevant data on rare, cryptic and, threatened species worldwide (Devine *et al.* 2018; Pimentel *et al.* 2020; Pinte *et al.* 2020). Here we report on an underwater video recording of *S. mokarran* on the coast of Paraíba, Northeastern Brazil. To our knowledge, this is the first video-based record of this species in the region in its natural habitat. This record can contribute to future management and conservation strategies focusing on the protection of the species in the region.

Material and Methods

We deployed the BRUVS in the coastal areas near the capital João Pessoa and the municipalities of Cabedelo and Lucena situated 16 and 24 km respectively from the capital (Figure 1). The continental shelf in the state of Paraíba is relatively short (35 km wide); most of the area is situated in depths smaller than 40 m and the continental slope occurs at 75 m (Morais and Santos 2018). Water temperature is relatively constant around 28-29°C up to 50 m and between 23-24°C in deeper areas (Feitoza *et al.* 2005).

Figure 1. Map of the state of Paraíba (NE Brazil) showing the Queimado Shipwreck Marine Protected Area, the Areia Vermelha Marine State Park, the locations where the BRUVS were deployed, and the two locations (orange dots) where the Great Hammerhead Shark, *Sphyrna mokarran*, was sighted.



The BRUVS followed a pyramid design constructed from stainless steel rebar, fitted with a video camera (GoPro Hero 7 Black GoPro Inc. USA; settings: wide, 1080p, 30 fps) in a horizontal position (Figure 1a). A stainless-steel bait arm held a stainless-steel bait canister placed 1.5 m from the structure. For each deployment, the bait canister was filled mostly with 500 g of Brazilian sardine, *Sardinella brasiliensis* (Steindachner 1879), and barracuda viscera, *Sphyrna barracuda* (Walbaum 1792). Video analysis started when the BRUVS landed on the seafloor and ended when the BRUVS was pulled out of the seabed. The structures were left to film for than 90 min on the seafloor. Capture per unit effort (CPUE) estimates were calculated from the catch data per deployment time (sharks h⁻¹).

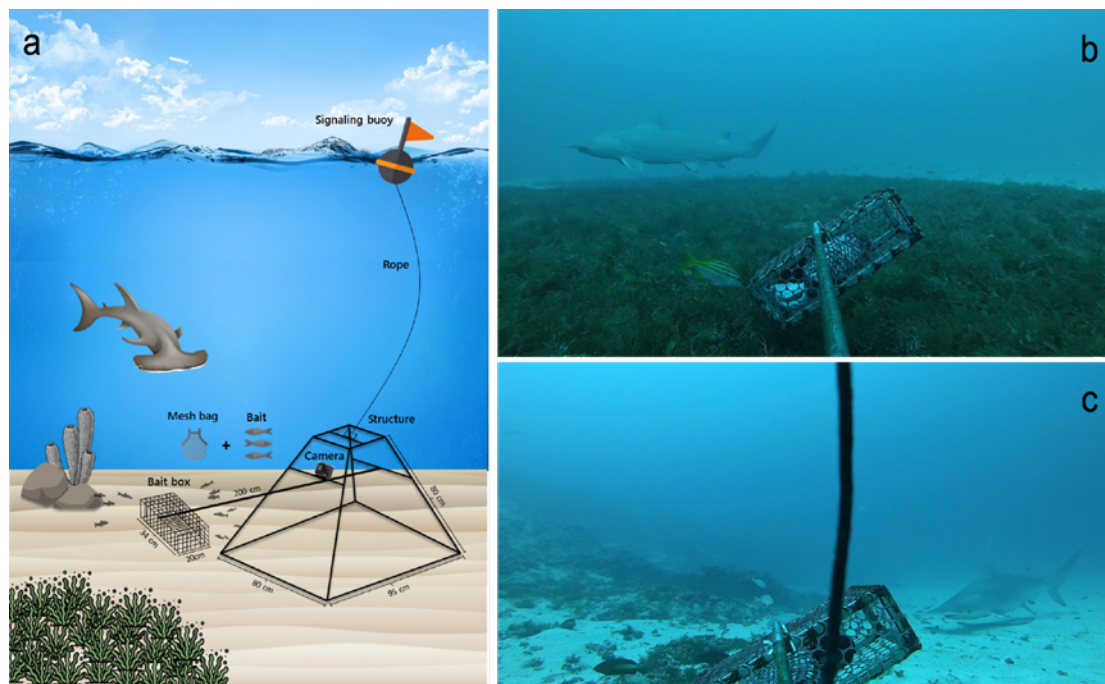
The entire deployment and retrieval operation of the BRUVS was carried out with the collaboration of an artisanal fisher that provided a small-scale vessel. A total of 67 deployments was obtained over 13 trips. Data were collected opportunistically and when weather permitted from 20 August 2020 to 04 May 2021, during daylight hours, between 06:00 and 16:00 hrs. The mean ocean surface temperature was 27.6 °C. At the sampling sites, deployments occurred from a wide depth range, from 7 m to about 100 m, between 3 km to 31 km offshore (Figure 1).

Results and Discussion

On 21 March 2021, a male *S. mokarran* was captured on video by two BRUVS stations (Figure 2b, c) within the Queimado Shipwreck MPA (State Decree No. 38,931, 28 December 2018), which encompasses 422 km² of various ecosystems along the continental shelf of Paraíba (Figure 1). The two

stations were deployed 365 m apart from each other, at depths of 55 m (S 07° 02.211' W 034° 35.080') and 59 m (S 07° 02.175' W 034° 34.885'), respectively. During the deployment, the current direction was S/SE, tide was at ebb phase (1.4 m) and sea surface temperature was 27.8 °C.

Figure 2. Illustration of the BRUVS used in this research (a) and two video frames (b and c) of the Great Hammerhead Shark, *Sphyrna mokarran*, extracted from the underwater video recordings in the coast of Paraíba, Northeastern Brazil. The video recordings are available as supplementary material.



The shark was first captured on video at 12:24 PM (deployment time: 12:06 PM), over sand-macroalgae habitat (video available at https://drive.google.com/file/d/1OXfY_HyR-flIyHve-WgYBx6aX67mbDpO/view?usp=sharing). The shark seemed to be attracted to the bait but acted cautiously (Bruns and Henderson 2020) staying at distance (ca. 10 m) to the BRUVS station. The same individual was recorded 12 minutes later on the 2nd station, which was deployed over a rocky reef habitat (deployment time: 12:00 pm) (video available at https://drive.google.com/file/d/1OsbF37y72_7qGnM9dlKyICVCDJjunWUv/view?usp=sharing). This time the individual demonstrated exploratory behaviors and closely approached the station. The identification of the two sightings as the same individual was based on the presence of claspers (male reproductive organ), body and fin markings as well as size estimations. By comparing the length of the animal with the bait cage width (34 cm) of the 2nd station, we estimated a total length of 190 cm. Based on size classifications by Piercy et al. (2010), this corresponds to a subadult. It should be noted that the records reported here were achieved after 67 BRUVS deployments and over 112 h of underwater footage, resulting in a CPUE of only 0.009 shark h⁻¹. This CPUE level is alarmingly low compared to CPUE values from fished and unfished regions globally, and in range with CPUE values of regions that have faced decades of unregulated overfishing of not only sharks, but marine resources in general (Bruns and Henderson 2020; Spaet et al. 2016; Yon et al. 2020).

Implications for conservation

Anecdotal records of *S. mokarran* in the state of Paraíba were previously based on either dead or captured individuals in poor physical condition. Between November 1997 and November 2016, local newspapers reported on a total of six adult specimens including two pregnant females with full-term embryos caught in August 2012 (Figure 3a-f; Appendix S1). Catch location information was lacking in these reports, preventing inferences on habitat and depth preferences of the sharks. It has been suggested that females of *S. mokarran* use coastal habitats as nursery areas in Brazil (Soto 2001), the fact that pregnant females were caught along the coast of Paraíba support this assumption.

Figure 3. Pictures and media records of Great Hammerhead Sharks, *Sphyrna mokarran*, captured by fishers along the coast of Paraíba, Northeastern Brazil. (a, - source: Pesca Armadora, link: <https://www.pescamadora.com.br/2013/06/tubarao-martelo-de-600-kg-e-capturado-em-jacuma/>; b, - image courtesy of Alberto Sobreira; c, - image courtesy of Antonio de Padua de Moura; d, - source: ClickPB, link: <https://www.clickpb.com.br/paraiba/pescador-captura-tubarao-martelo-na-praia-de-lucena-213775.html>; e, - image courtesy of Silvio Barreto; f, - source: PBAgora, link: <https://www.pbagora.com.br/noticia/paraiba/tubarao-martelo-com-risco-de-extincao-e-capturado-no-litoral-sul-paraibano/>).



Video records of rare species provide a means of raising awareness on shark conservation and legislation. Hammerhead sharks are one of the most popular sharks among citizens due to their distinguishing morphological features (Gallagher et al. 2014). Therefore, our observation can potentially promote conservation ethics among the local population. The video attracted much local and national attention in social media, newspapers, radio, and television (57 reports, Appendix S2). By disseminating our findings, through traditional and digital media, we expect positive responses towards the marine ecosystem and encourage better management actions for threatened species, which is aligned with the United Nations Decade of Ocean Science for Sustainable Development (2021-2030).

In Brazilian waters, *S. mokarran* is protected by various legal instruments such as ordinances, decrees, and laws. For example, Federal law No. 9,605/1997 – the environmental crimes law – establishes clear penalties and sanctions for illegal fishing practices. A national plan based on local Ministry of Environment Ordinance No. 125/2014, known as *PAN Tubarões*, was established in 2014 to mitigate the impacts on Endangered marine elasmobranchs, including *S. mokarran*. The inception of protected areas through federal, national, or municipal decrees also protects the species. In addition, international instruments such as CITES and ICAAT provide guidelines for shark conservation in Brazilian waters (Haas et al. 2017). Nevertheless, non-compliance of legal instruments and shark by-catch are still common in Brazil due to cultural, political, and economic reasons that go beyond the scope of this work.

Given the effort necessary to record one individual, i.e., 112 hrs of video recording, and supported by the historical records, we conclude that *S. mokarran* is rare in the State of Paraíba. Historical records suggest that the observed low abundance of *S. mokarran* is at least partially anthropogenic, but further scientific investigation is needed to infer the population size and structure in the Queimado Shipwreck MPA and surrounding zones (see Medeiros et al. 2022). We recommend the development of education programs involving artisanal fishers to stimulate the adoption of good fishing practices, such as releasing individuals captured alive, utilization of circle hooks, and reducing the use of gillnets in coastal areas to minimize the capture of pregnant females and neonates. Our observation highlights the urgent need to monitor and study population trends of this critically endangered shark. In addition, our record can serve as baseline information for the future establishment of no-fishing zones in the Queimado Shipwreck MPA.

Authors' contribution: WMOJ, RSR and BAS - conceived the project; WMOJ - performed data collection and analysis; BAS and JLYS - acted as research advisors, performed data reviews and interpretation. All authors discussed the results and contributed to the final manuscript.

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Data availability statement: The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Conflict of interest: The authors have no conflicts of interest to declare.

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Appendix S1: Date, municipality, reported sex, cause of death, available observational information, and links to the original articles of media coverage on great hammerhead sharks, *Sphyrna mokarran*, in the state of Paraíba, Northeastern Brazil.

Date	Municipality	Sex	Cause of death	Available observational information	Link
2000-02-25	João Pessoa	n/a	Fishing	Approximately 4 m and 250 kg Capture location: 8 km offshore	O Norte Newspaper (Fig. 3)
2012-08-30	João Pessoa	n/a	By-catch	Two individuals were captured in a week. Weight and size information is only available for one individual: 4.5 m; 500 kg Capture location: 2 km offshore	https://glo.bo/3yA0HFG
2013-06-04	Conde	Female	Fishing	600 kg, pregnant with 20 neonates	https://bit.ly/34bR16h
2016-11-25	Lucena	Possible Male	Fishing	Capture location: 56.2 km offshore	https://bit.ly/2QI1kfk
2019-10-10	João Pessoa	Female	By-catch	n/a	https://bit.ly/349BST3

Appendix S2: Date, state, media outlet, scope, media type, and corresponding links to 57 reports on the great hammerhead shark, *Sphyrna mokarran* in the state of Paraíba, Northeastern Brazil based on a Google search using the keywords “tubarão martelo Paraíba”.

Date	State	Media Outlet	Scope	Media Type	Link
2021-04-12	Distrito Federal	Agência Brasil	National	Online newspaper	https://agenciabrasil.ebc.com.br/geral/noticia/2021-04/especie-rara-de-tubarao-martelo-e-avistada-no-litoral-da-paraiba
2021-04-12	Espírito Santo	Expresso do Amanhã	National	Online newspaper	https://expressodamanha.com.br/brasil/especie-rara-de-tubarao-martelo-e-avistada-no-litoral-da-paraiba/
2021-04-12	Goiás	Viver Goiás	Regional	Online newspaper	https://www.vivergoias.com.br/noticia/especie-rara-de-tubarao-martelo-e-avistada-no-litoral-da-paraiba

Date	State	Media Outlet	Scope	Media Type	Link
2021-04-12	Mato Grosso do Sul	A Crítica	National	Online newspaper	https://www.acritica.net/editorias/geral/especie-rara-de-tubarao-martelo-e-avistada-no-lito-1616d15f177f60f935b/518724/
2021-04-12	Mato Grosso do Sul	Jornal Maracaju Hoje	Regional	Online newspaper	https://www.jornalmaracajuhoje.com.br/veja-o-video-especie-rara-de-tubarao-martelo-e-avistada-no-litoral-da-paraiba/
2021-04-12	Paraíba	Polemica Paraíba	Regional	Blog	https://www.polemicaparaiba.com.br/brasil/especie-rara-de-tubarao-martelo-e-avistada-no-litoral-da-paraiba-veja-video/
2021-04-12	Paraíba	Portal Diário	Regional	Online newspaper	https://www.portaldiario.com.br/noticias/523371/video-especie-rara-de-tubarao-martelo-e-avistada-no-litoral-da-paraiba.html
2021-04-12	Pernambuco	LeiaJá	National	Online newspaper	https://m.leiaja.com/noticias/2021/04/12/especie-rara-de-tubarao-martelo-e-avistada-na-paraiba/
2021-04-12	Pernambuco	Diário de Pernambuco	Regional	Online newspaper	https://www.diariodepernambuco.com.br/noticia/brasil/2021/04/especie-rara-de-tubarao-martelo-e-avistada-no-litoral-da-paraiba.html
2021-04-12	Rio de Janeiro	O Dia	Regional	Online newspaper	https://odia.ig.com.br/brasil/2021/04/6124614-especie-rara-de-tubarao-martelo-e-avistada-no-litoral-brasileiro.html
2021-04-12	Rio Grande do Norte	Portal da Abelhinha: BZNotícias	National	Online newspaper	https://www.bznoticias.com.br/noticia/especie-rara-de-tubarao-martelo-e-avistada-no-litoral-da-paraiba
2021-04-12	Rondônia	News Rondônia	Regional	Online newspaper	https://www.newsrondonia.com.br/noticia/169644-video-especie-rara-de-tubarao-martelo-e-avistada-no-litoral-da-paraiba
2021-04-12	São Paulo	Gazeta de Rio Preto	Regional	Online newspaper	https://www.gazetaderiopreto.com.br/nacional/noticia/2021/04/especie-rara-de-tubarao-martelo-e-avistada-no-litoral-brasileiro.html
2021-04-13	Alagoas	Alagoas 24 horas	Regional	Online newspaper	https://www.alagoas24horas.com.br/1352780/especie-rara-de-tubarao-martelo-e-avistada-no-litoral/

First record of the critically endangered great hammerhead shark (*Sphyrna mokarran*) in its natural habitat in the coast of Paraíba, Northeastern Brazil

Date	State	Media Outlet	Scope	Media Type	Link
2021-04-13	Distrito Federal	Metrópoles	National	Online newspaper	https://www.metropoles.com/brasil/video-especie-rara-de-tubarao-martelo-e-avistada-em-joao-pessoa
2021-04-13	Mato Grosso	Cidade Nova Jauru	Regional	Radio	https://www.cidadenovajauru.com.br/site/noticias/especie-rara-de-tubarao-martelo-e-avistada-no-litoral-da-paraiba
2021-04-13	Mato Grosso do Sul	O Vigilante MS	National	Online newspaper	https://ovigilantems.com.br/noticias/ver/13-04-2021/no-litoral-de-jo%C3%A3o-pessoa-um-tubar%C3%A3o-martelo-pan%C3%A3-%C3%A9-avistado
2021-04-13	Minas Gerais	Redação Hypeness	National	Online newspaper	https://www.hypeness.com.br/2021/04/tubarao-martelo-raro-e-visto-nadando-nas-aguas-de-joao-pessoa/
2021-04-13	Paraíba	Cariri Ligado	Regional	Blog	https://www.caririligado.com.br/especie-rara-de-tubarao-martelo-e-vista-no-litoral-da-paraiba/
2021-04-13	Paraíba	Blog do Márcio Rangel	Regional	Blog	https://blogdomarciorangel.com.br/2021/04/13/especie-rara-de-tubarao-martelo-e-avistada-no-litoral-da-paraiba/
2021-04-13	Paraíba	Blog do Didi	Regional	Blog	http://www.blogdodidi.com.br/ciencia/especie-rara-de-tubarao-martelo-e-vista-no-litoral-da-paraiba/
2021-04-13	Paraíba	Tribuna 10	Regional	Blog	https://www.tribuna10.com.br/noticia/932/video-mostra-tubarao-martelo-em-praia-do-litoral-da-paraiba
2021-04-13	Paraíba	G1 Paraíba	Regional	Online newspaper	https://g1.globo.com/pb/paraiba/noticia/2021/04/13/especie-rara-de-tubarao-martelo-e-avistada-no-litoral-da-paraiba-video.ghtml
2021-04-13	Paraíba	Jornal da Paraíba	Regional	Online newspaper	https://www.jornaldaparaiba.com.br/noticias/especie-rara-de-tubarao-martelo-e-avistada-no-litoral-da-paraiba-veja-video.html
2021-04-13	Paraíba	Termômetro da Política	Regional	Online newspaper	https://www.termometrodapolitica.com.br/2021/04/13/biologos-paraibanos-registram-especie-rara-de-tubarao-martelo-na-costa-da-paraiba/

Date	State	Media Outlet	Scope	Media Type	Link
2021-04-13	Paraíba	PBHoje	Regional	Online newspaper	https://www.pbhoje.com.br/noticias/94934/especie-rara-de-tubarao-martelo-e-avistada-no-litoral-da-paraiba.html
2021-04-13	Paraíba	Folha Patoense	Regional	Online newspaper	http://www.folhapatoense.com/2021/04/13/especie-rara-de-tubarao-martelo-e-avistada-no-litoral-da-paraiba-video/
2021-04-13	Paraíba	Paraíba Já	Regional	Online newspaper	https://paraibaja.com.br/especie-rara-de-tubarao-martelo-e-avistada-no-litoral-da-paraiba-assista/
2021-04-13	Paraíba	Conceição Verdade	Regional	Online newspaper	https://conceicaoverdade.com.br/noticia/29304/especie-rara-de-tubarao-martelo-e-avistada-no-litoral-da-paraiba-video.html
2021-04-13	Paraíba	Portal Mangabeira	Regional	Online newspaper	https://portalmangabeira.com.br/especie-rara-de-tubarao-e-avistada-no-litoral-da-paraiba/
2021-04-13	Paraíba	Paraíba Debate	Regional	Online newspaper	https://paraibadebate.com.br/especie-rara-de-tubarao-martelo-e-avistada-no-litoral-paraibano/
2021-04-13	Paraíba	TV Correio	Regional	TV Channel	https://www.youtube.com/watch?v=bYlhkYMmZ-w
2021-04-13	Paraíba	TV Cabo Branco	Regional	TV Channel	https://www.youtube.com/watch?v=x-ksxe_k7-U
2021-04-13	Paraná	Ambiente Brasil	National	Online newspaper	https://noticias.ambientebrasil.com.br/clipping/2021/04/13/169095-especie-rara-de-tubarao-martelo-e-avistada-no-litoral-da-paraiba-video.html
2021-04-13	Pernambuco	NE10 Interior	Regional	Online newspaper	https://interior.ne10.uol.com.br/noticias/2021/04/13/especie-rara-de-tubaraomartelo-e-flagrada-em-praia-do-nordeste-veja-o-video-207367
2021-04-13	Pernambuco	TV Jornal	Regional	Online newspaper	https://tvjornal.ne10.uol.com.br/noticias/2021/04/13/tubaraomartelopana-especie-rara-e-avistada-no-litoral-da-paraiba-veja-video-207361
2021-04-13	Rio Grande do Sul	O Republicano	National	Online newspaper	https://www.orepublicano.com.br/noticias/95/video-em-praia-da-paraiba-especie-rarissima-de-tubarao-martelo-e-avistada

First record of the critically endangered great hammerhead shark (*Sphyrna mokarran*) in its natural habitat in the coast of Paraíba, Northeastern Brazil

Date	State	Media Outlet	Scope	Media Type	Link
2021-04-13	São Paulo	Brasil 247	National	Online newspaper	https://www.brasil247.com/regionais/nordeste/especie-rara-de-tubarao-martelo-e-vista-na-paraiba-video
2021-04-13	São Paulo	Guarulhos Hoje	Regional	Online newspaper	https://www.guarulhoshoje.com.br/2021/04/13/especie-rara-de-tubarao-martelo-e-avistada-no-litoral-da-paraiba/
2021-04-13	São Paulo	ID News	Regional	Online newspaper	https://www.idnews.com.br/especie-rara-de-tubarao-martelo-e-avistada-no-litoral-da-paraiba/
2021-04-14	Paraíba	Click PB	Regional	Online newspaper	https://www.clickpb.com.br/paraiba/registro-de-especie-em-extincao-de-tubarao-encontrado-no-mar-de-joao-pessoa-pode-ajudar-projetos-de-preservacao-marinha-305160.html
2021-04-14	Paraíba	Vale do Piancó	Regional	Online newspaper	https://www.valedopianconoticias.com.br/noticia/geral/2021/04/14/registro-de-especie-em-extincao-de-tubarao-encontrado-no-mar-de-joao-pessoa-pode-ajudar-projetos-de-preservacao-marinha/63035.html
2021-04-14	Paraíba	Paraíba Online	Regional	Online newspaper	https://paraibaonline.com.br/2021/04/especie-rara-de-tubarao-martelo-e-registrada-pela-1a-vez-na-paraiba/
2021-04-14	Pernambuco	Correio Notícias	Regional	Online newspaper	https://correionoticias.com/2021/04/14/tubarao-martelo-e-avistado-no-litoral-de-joao-pessoa/
2021-04-14	São Paulo	CicloVivo	National	Online newspaper	https://ciclovivo.com.br/planeta/meio-ambiente/especie-rara-tubarao-martelo-paraiba/
2021-04-15	Rio de Janeiro	Meio ambiente UERJ	Regional	Online newspaper	http://www.meioambienteuerj.com/noticias.asp?codigo_area=7&codigo_conteudo=10526
2021-04-16	Bahia	Farol da Bahia	Regional	Online newspaper	https://www.faroldabahia.com.br/noticia/especie-rara-de-tubarao-martelo-e-avistada-no-litoral-da-paraiba
2021-05-10	Bahia	Bahia Jornal	Regional	Online newspaper	https://www.bahiajornal.com.br/noticia/14471/registro-raro-de-tubarao-martelo-deve-contribuir-para-a-criacao-de-politicas-publicas-de-conservacao

Date	State	Media Outlet	Scope	Media Type	Link
2021-05-10	São Paulo	Grupo Climatempo	National	Online newspaper	https://www.climatempo.com.br/noticia/2021/05/10/rara-especie-de-tubarao-martelo-e-filmada-no-litoral-da-paraiba-9731
2021-05-11	N/A	MSN	National	Web portal	https://www.msn.com/pt-br/noticias/ciencia-e-tecnologia/registro-raro-de-tubar%C3%A3o-na-para%C3%ADba-pode-impulsionar-conserva%C3%A7%C3%A3o/ar-BB1gCjfx
2021-05-11	Rio de Janeiro	Solidários notícias	Regional	Online newspaper	https://solidarionoticias.com/2021/05/11/tubarao-martelo-aparece-na-costa-da-paraiba-e-anima-pesquisadores/
2021-05-11	São Paulo	VEJA	National	Online newspaper	https://veja.abril.com.br/ciencia/registro-raro-de-tubarao-na-paraiba-pode-impulsionar-conservacao/
2021-05-11	São Paulo	SEGS	National	Online newspaper	https://www.segs.com.br/demais/289338-registro-raro-de-tubarao-martelo-deve-contribuir-para-a-criacao-de-politicas-publicas-de-conservacao
2021-05-12	N/A	Head Topics	National	Web portal	https://headtopics.com/br/registro-raro-de-tubar-o-na-para-ba-pode-impulsionar-conservac-o-20078109
2021-05-13	São Paulo	Conexão Planeta	National	Online newspaper	https://conexaoplaneta.com.br/blog/especie-rara-de-tubarao-martelo-em-risco-de-extincao-e-avistada-no-litoral-da-paraiba/especie-rara-tubarao-martelo-avistada-paraiba-conexao-planeta/
2021-05-20	Minas Gerais	Portal Ponto Terra	Regional	Online newspaper	http://www.pontoterra.org.br/especie-rara-de-tubarao-martelo-e-avistada-no-litoral-paraibano/
2021-06-07	Minas Gerais	Aconteceu no Vale	Regional	Online newspaper	https://aconteceunovale.com.br/portal/?p=177085



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