RESEARCH ARTICLE

Approach to the Patterns of Navigability, Accidentality and Sinking in Courtwon Cays: contributions to the Inventory of the Underwater Cultural Heritage of the Archipelago of San Andres, Providencia y Santa Catalina (Colombia)

Aproximación a los patrones de navegabilidad, accidentalidad y hundimiento enislas Cayos del Este Sudeste: aportes para el inventario del patrimonio cultural sumergido del archipiélago de San Andrés, Providencia y Santa Catalina (Colombia)

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ABSTRACT

The development of interdisciplinary maritime and underwater archaeological research on Underwater Cultural Heritage in Colombian waters has seen considerable growth in recent years. In particular, studies in the Caribbean have been carried out not only off the coast of mainland Colombia but also around the Archipelago of San Andres, Providencia y Santa Catalina. We made scientific approaches there to inventory and characterize underwater cultural resources that can provide valuable historical and cultural information about the past of human societies. Under this premise, this article aims to present the interdisciplinary analyses made of Courtown Cays within the framework of the Seaflower Scientific Expedition during the year 2022, with the specific aim of understanding the patterns of navigability, accidents and sinkings in the region, in order to contribute to the national registry and inventory of the archipelago's Underwater Cultural Heritage. This was achieved by following the inter-institutional methodological proposals applied in recent years in different parts of the Colombian Caribbean.

KEYWORDS: Cultural Heritage, Accidents, Underwater Archaeology, Caribbean Sea, Colombia.

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Resumen

El desarrollo de las investigaciones de la arqueología marítima y subacuática interdisciplinaria sobre el patrimonio cultural sumergido depositado en aguas colombianas se ha visto expuesto a un crecimiento considerable en los años recientes. Particularmente, en el Caribe se han planteado estudios no solo hacia la porción continental de Colombia sino también hacia el archipiélago de San Andrés, Providencia y Santa Catalina. Allí se han adelantado aproximaciones científicas interesadas por inventariar y caracterizar los recursos culturales sumergidos que pueden brindar valiosa información histórica y cultural sobre el pasado de las sociedades humanas. Bajo esta premisa, el presente artículo pretende exponer los análisis interdisciplinarios planteados en islas Cayos del Este Sudeste, en el marco de la Expedición Científica Seaflower del año 2022, particularmente para comprender los patrones de navegabilidad, accidentalidad y hundimiento en la región, para así aportar al registro e inventario nacional de patrimonio cultural sumergido del Archipiélago. Lo anterior, aplicando propuestas metodológicas interinstitucionales aplicadas en los años recientes en distintas partes del Caribe colombiano.

Palabras clave: *patrimonio cultural, accidentes, arqueología subacuática, mar Caribe, Colombia.*

Introduction

This research was part of the scientific expedition known as Seaflower: Isla Cayos de Bolívar 2022, organized by the Colombian Ocean Commission (CCO), which sought to contribute to the study of the submerged cultural heritage of Courtwon Cays, an area of the Caribbean that has been little analyzed from an archaeological and historical perspective (Del Cairo *et al.*, 2024a). To this end, the team proposed a working methodology that integrated the previous research perspectives used in the studies 'Patterns of navigability, accidents and shipwrecks in the Colombian Caribbean' (Del Cairo *et al.*, 2019; Del Cairo*et al.*, 2024b); 'Social appropriation of the maritime cultural landscape in Old Providence and Ketlina: characterization of the nautical space from a historical perspective' (Del Cairo *et al.*, 2020; 2022; Moreno & Báez, 2021), and 'Methodological proposal for registering Underwater Cultural Heritage assets in the bay of Cartagena de Indias and its surroundings' (Del Cairo *et al.*, 2021; Moreno, 2021).

To this end, the project brought together an interdisciplinary team of archaeologists, historians, conservators, oceanographers, hydrographers, technical divers, and social communicators to answer the research question: What natural and cultural elements have shaped the historical maritime cultural landscape of Courtown Cays, and which areas have high potential for submerged cultural heritage? (Del Cairo *et al.*, 2024a).

Therefore, the overall objective of this study was to characterise the various components that make up the maritime cultural landscape of the area around Courtown Cays through a collaborative historical and archaeological approach (Del Cairo *et al.*, 2024a). For their part, the specific objectives were: to establish the relationship between the different human and non-human actors that shape the maritime cultural landscape in the Courtown Cays area; to determine the areas of high archaeological potential that are likely to be declared as assets and environments on the list of submerged cultural heritage from the 16th to the 20th century; and to establish mechanisms for community participation and the strengthening of local capacities in relation to submerged maritime cultural heritage (Del Cairo *et al.*, 2024a).

This article aims to show the preliminary results of the research, mainly in terms of methodological developments, the archaeological sites identified, and the community engagement outcomesas part of the project. In this way, it aims to provide an initial approach to the study of human interactions in the Colombian Caribbean cays throughout history.

Study area

The region of the Archipelago of San Andrés, Providencia and Santa Catalina is characterized by a series of oceanic islands, atolls and coral banks stretching in a north-easterly direction, which constitute the largest expanse of coral reefs in Colombia. Notable among these are the islands of San Andrés, Providencia and Santa Catalina, the shoals and banks of Quitasueño, Serrana, Alicia, Roncador and Bajo Nuevo, as well as Serranilla, Alburquerque and Courtown cays (Gamboa *et al.*, 2012). From an oceanographic perspective, the average sea surface temperatures around the archipelago vary between 26 and 29.5°C, with salinities below 35.5 and dissolved oxygen of around 6.4 mg/l in the surface layer (González & Hurtado, 2012).

Specifically, Bolívar Cay, also known as Courttown Cays or East Southeast Cays, is located 25 km southeast of the island of San Andrés, separated from it by the Nutibara depression. The atoll is characterized by its kidney shape, and has a length of 11.7 km and a width of 5.1 km (Andrade-Amaya, 2010). One part has a SE-NW orientation and another is oriented NNW-SSE, and has three permanently emerged cays, although its shape has changed over the years. This atoll is surrounded by deep waters reaching 1,000 m in depth, and forms a lagoon with an opening to the west and southwest (Geister & Díaz, 2007). This atoll is made up of three cays: East Cay and Sand Cay, which currently form a single arch-shaped island; Middle Cay, which has disappeared; and West Cay, where the lighthouse and military post are located. The waves measured at the latter tend to come from an east northeast direction, so its west and southeast shores are the most sheltered (Andrade-Amaya, 2010). In addition, there is sediment, mainly sand and coral, although in some areas there are sediments with calcareous algae, rocky areas or seagrass vegetation (Geister & Díaz, 2007).

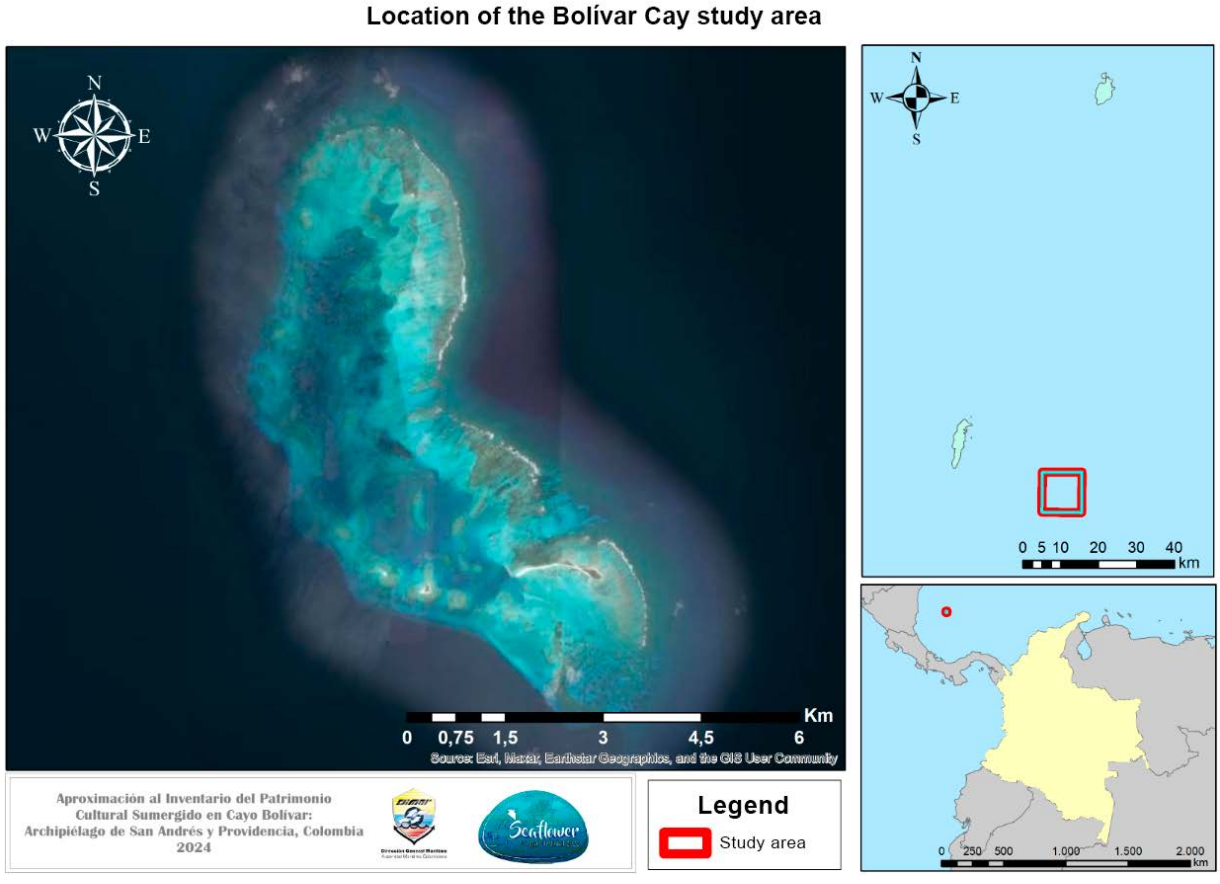

Figure 1. Location of the interdisciplinary archaeological study area around Courtown Cays.

Methodology

The methodology for this research was carried out in four phases. It was based on the theoretical and conceptual proposals for the maritime cultural landscape (Westerdahl, 2011; Duncan & Gibbs, 2015). This concept refers to all the constituent parts of the activities, objects and infrastructures related to the sea, which can be found both on land or in water (Westerdahl, 2011; Duncan & Gibbs, 2015). It therefore includes sailing routes, unoccupied spaces, landscapes of power and resistance, and sensory perceptions (sight, hearing and smell). The maritime cultural landscape also takes into account elements of landscape transformation such as technology, historical events, ecological change, complex social relations, gender differences, migration and associated cultural practices (Westerdahl, 2011; Duncan & Gibbs, 2015).

The methodology of this study included several components from the fields of archaeology, history and oceanography, among others (Fig. 2). Firstly, cartographic and historical documentary sources were compiled from national and international archives. Based on these, the aim was to identify patterns of navigation, accidents and shipwrecks, with an analysis of primary and secondary written sources as well as graphic sources (cartography and engravings), bearing in mind the proposal made by Del Cairo *et al.* (2019). To this aim, we carried out a discourse analysis —where possible— and a graphic analysis of the images, with the aim of determining oceanographic variables, changes in coastlines, navigation routes, possible locations of shipwrecks, landscape units, and toponymy and bathymetry, among other categories.

This methodology was complemented by the collection of oral sources, especially testimonies from co-researchers on the working team and local fishermen. In this regard, the aim was to construct a collaborative discussion of the phenomena of navigability and accidents, but also of the sinkings that occurred. Thus, through a co-participatory approach, the aim was to value the knowledge of local residents about past human relations with the sea.

Secondly, a field trip was made to carry out geophysical prospecting and collect field-based oral testimonies. The prospecting was carried out using a Side Imaging Dual Beam echo sounder, which offers the possibility to map the seabed and identify anomalies in shallow water conditions. This was done taking into account that the study area has a large number of sandbanks and coral reefs that prevent the use of towed torpedo sensors (Del Cairo *et al.*, 2024a).

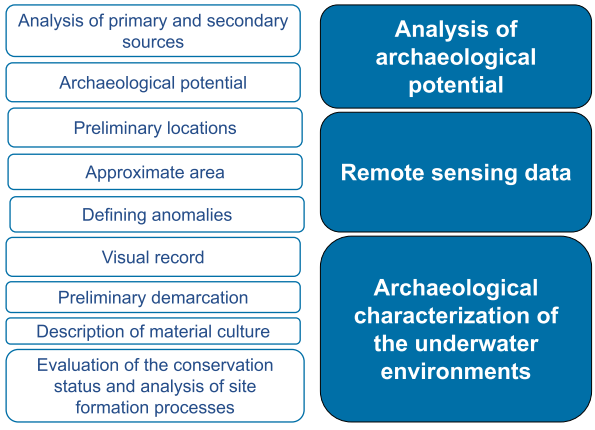

Figure 2. Obtaining interdisciplinary information from different information sources to carry out the different phases of the recording of the underwater cultural heritage landscape (Del Cairo *et al.*, 2021).

Thirdly, we attempted to strengthen local capacities in submerged cultural heritage, and maritime and underwater archaeology, aimed at students from the National University of Colombia-Caribbean Campus, thanks to the support of Professor Ana Isabel Márquez and the coordinating group of the CCO scientific expedition. This was due to the social and cultural nature of this research, which makes it essential to integrate and disseminate the research proposals and analytical perspectives put forward in this study in local communities. Finally, the information obtained from various sources, both at the office and in the field, was analysed and interpreted. These sources included historical cartography and engravings, oral tradition, raw sensor data, field findings, integration of local interpretative perspectives, and underwater and aerial audiovisual recordings, among others (Del Cairo *et al.*, 2024a) (Fig. 3).

Results and discussion

The configuration of the maritime cultural landscape of navigability and accidents in Bolívar Cay

The settlement of the Archipelago of San Andrés, Providencia and Santa Catalina may have begun in pre-Hispanic times, although evidence is limited. The Miskitos, settled around the Caribbean, may have used these islands for fishing and gathering (Márquez, 2014). The first written records date back to 1529 and Diego Ribero's map, reflecting the early importance of the area for navigation and that it attracted Dutch privateers and smugglers (Parsons, 1985). In the early 17th century, the English Company of Adventurers attempted to establish a colony on Providencia, highlighting its defensive value, and introduced slaves in 1633 to build public works. This happened after exploring Henrietta Island, which did not offer the necessary conditions for the colony (Parsons, 1985; Archibold Núñez, 2014).

Throughout the 17th century, there were conflicts to control the islands of the archipelago. One example of this is the capture of Old Providencia and Ketlina by the privateers Edward Mansfield and Henry Morgan. This marked a period of conflict between the Spanish and privateers for control of the territory, which even led to the destruction or reconstruction of the islands' fortifications (Rowland, 1935). Consequenly, the landscape was transformed by the different power relations that were exercised on the islands.

Throughout the maritime territory of the archipelago, the waters not only became important for subsistence activities such as fishing, but also became strategic points for the navigation of ships from different European empires. The routes through the cays and islands served both as a reference for navigators and as a warning of the risks they posed. For example, Herrera and Tordesilla describes in detail the dangers and geographical characteristics of the region:

> *"and 5 leagues from that coast, the ants, a dangerous reef and at 7 leagues various islets surrounded by reefs, and to the south of them the Serrana and a small island surrounded by shoals, with another four or five nearby, and to the northeast of it, La Serranilla and to the west, El Roncador, another shoal, and to the southwest of Santandres, an island surrounded by shoals, north-south, named after God, about forty leagues from it, and near there another called Santa Catalina"* (De Herrera, 1601, p. 12).

The geographical complexity of certain areas of the Caribbean made the areas around these cays places that sailors preferred to avoid due to the high risk of being shipwrecked or getting lost at sea. For example, the area of Quitasueño and Roncador was described as: "two dangerous shoals and, following the Cape, the Gulf of Nicuesa where I got lost in 1510" (De Herrera, 1601, p. 56).

For this reason, the cays of the archipelago are frequently depicted in historical maps of this area. However, Bolívar Cay is not shown until the end of the 18th century, under the name "ESE Keys" (Fig. 3). This map shows the presence of boat traffic in the archipelago, especially in the area around the islands. Therefore, these boats would be found mainly to the northeast and east, given the typical Caribbean traffic both offshore and onshore.

Figure 3. Detail of the map "The Isthmus of Panama with the coast from Great River on the Moskito Shore to Cartagena", in which it is possible to see Bolívar Cay (ESE Keys) in 1775 (David Rumsey Historical Map Collection).

Another important event for the archipelago was the declaration of San Andrés as a minor port in 1798. This influenced sailing in the area by increasing the passage of legal and illegal commercial vessels. San Andrés thus functioned as a warehouse for English products awaiting

transport to the mainland, especially to places such as León in Nicaragua (Meisel-Roca, 2003; 2016; Parsons, 1985). Later, in 1803, the archipelago once again became subordinate to the port of Cartagena de Indias, marking a new commercial dynamic for the area (Parsons, 1985). At the beginning of the 19th century, the archipelago continued to be an important location for piracy and privateering. For this reason, there were still some privateer attacks and occupations, such as that of Captain John Bligh of the HMS Surveillante on the island of San Andrés in 1806 (Parsons, 1985).

Another important aspect in the history of the archipelago is its significance as a center for ships of the Colombian independence movement. In 1818, Luis Aury took over the islands of Providencia and Santa Catalina, making them one of the first settlements free from the control of the Spanish Crown (Cumming, 2017). However, after Aury's death, Louis Perú de Lacroix arrived to secure control and the island's support for Colombian independence, seeking to sign its accession to the Republic through the Constitution of Cúcuta. Following this event, it was established that the archipelago's government headquarters would be located on the island of San Andrés, under the command of Juan Bautista Faiquere. Thus, from 1822 to 1868, the province of Cartagena de Indias had the archipelago as its sixth canton.

At the same time, industry began to develop throughout the 19th century, which is another key element in understanding the different interactions of human beings with these maritime territories and the development of this maritime cultural landscape. For this reason, accurately locating the cays became a necessary activity. In this regard, in 1804 the Spanish mapped the area and, subsequently, HMS Shearwater made a correction, stating that the cay was further east, and established some bathymetric measurements with low accuracy (Gómez Pretel &Jeong, 2021). For example, the United States Hydrographic Service surveyed the area in 1885 and described Courtown Bank (with its Courtown Cays or E.S.E. cays, currently Bolívar Cay) as follows:

> *"This coral bank is irregular in shape and has a deep inlet on the east side. It is 7 miles long from NW to SSE, 1 to 2 miles wide, and its north and south ends terminate in points. Approximately 1 mile inside the northern point, a barrier reef convex to the northeast extends across the bank and along the eastern side for approximately 4 miles to the end of the curve, where it is very steep until it is beyond the range of soundings, barely a mile away"* (United States. Hydrographic Office, 1885).

Thus, the trade in hawksbill sea turtles and turtle hunting became important, particularly in the northern cays (Parsons, 1985). For example, Roncador was a key point where boats of between 10 and 15 tonnes anchored in winter to "flip" the turtles on the beach and catch them with nets (Meisel-Roca, 2016; Parsons, 1985). These cays were frequently visited by fishermen from the Cayman Islands, who sometimes even spent a few days in the area (Parsons, 1985).

At the same time, the northern cays began to see significant guano extraction. This led to geopolitical problems with the United States, which had established the Guano Islands Act of 1856, which stipulated that US citizens could take possession of uninhabited islands that were not in the territorial waters of another country and that could be used for guano exploitation (Parsons, 1985). This is how James W Jennett obtained a licence between 1868 and 1869 to exploit Serrano and adjacent cays, as well as Roncador, Quitasueño and Serranilla. Guano exploitation on the cays continued until the end of the 19th century, although they were never inhabited (Gómez Pretel & Jeong, 2021).

Similarly, on the other cays, the island government occasionally leased land to fishermen or turtle hunters, and even for the cultivation of coconut palms. Edward Blunt (1867), in the twenty-first edition of the American Coast Pilot, a publication that had been in production since 1796, also mentions that Bolívar Cay is made up of three small cays, composed of sand and coral stones, which have different types of vegetation, including coconut trees:

> *"The most easterly is one mile away from the shoal and two miles from the southern end; it is a quarter of a mile long and a cable length wide, is four feet above sea level, and is covered with dwarf bushes and cacti. The middle cay is located one and a half miles to the south west; it is six feet high and in addition to shrubs has a*

grove of coconut trees. This cay is located at lat 120 24 N long 81 28 27 W, and lies sixteen miles SE from the southern tip of San Andrés. The western islet lies four cable lengths NW from the middle Cay and about the same distance from the limit of the soundings. It is very small and low and covered with dwarf bushes. One and a quarter miles WNW from the easternmost of the aforementioned Cays there is a small dry sand hole" (Blunt, 1867).

Bolívar Cay has also been an important point for navigation, especially due to its proximity to the larger islands in the area. Thus, it "has traditionally helped the navigation of cabotage schooners arriving in San Andrés from the south" (Parsons, 1985). Reports for navigators mention that it is possible to anchor at the edge of the Courtown Bank, although precautions must be taken to "not lower more than one cable" (Blunt, 1867).

For these reasons, resources such as water supplies were an important factor for ships. In this regard, Blunt (1867) mentions that it is possible to obtain water by digging wells, especially in the central and eastern cays. These characteristics made the cays a destination for fishermen and turtle hunters, who set up "temporary huts [...] during the turtle fishing months, from March to August" (Blunt, 1867).

Due to geographical conditions, the cay area of the archipelago was the site of many accidents. Between the 1950s and 2012, there were tropical and extratropical storms near Bolívar Cay, especially to the east of the cay, as well as a hurricane in the south of the study area (González & Hurtado, 2012). On a larger scale, Gómez Pretel & Jeong (2021) identified 36 hurricanes that affected, among others, the Roncador, Serranilla, Bajo Nuevo, and Serrana cays, as well as the shipping routes to Honduras, Cartagena, and Nicaragua. In addition, there were 23 shipwrecks that are possibly located near the Roncador Cays Islands, based on an analysis of the period between 1531 and 1920. However, it should be noted that the number of accidents identified as being caused by hurricanes was relatively low, so there is no clear correlation between these factors and the accident rate in the area (Gómez Pretel & Jeong, 2021).

In particular, it is worth highlighting some sinkings and accidents that occurred in the vicinity of Bolívar Cay, especially towards the southeast. The first was the HMS Wolverine, which sank on 11 August 1855 in the southeast part of Courtown Bank, off the Mosquito coast, 160 miles from Greytown. This vessel, built in 1836, was a 428-ton brig sloop measuring 101x32 ½ feet. Its commander was John Corbett, from North America and the West Indies, and its entire crew was saved (Colledge & Warlow, 2010; Maritime Archaeological Sea Trust, 2017). Similarly, the Tyne Built Ships website mentions that the cargo ship called 'Energía' was wrecked in the Courtown Cays, off the coast of Nicaragua, in 1918. This ship had been built by the Tyne Iron Shipbuilding Company at Willington Quay in 1883. It was a metal vessel with the following dimensions: 3177 GRT, 2064 NRT, 337.0 x 41.2 x 26.5 feet (Robinson & Wall, n. d..). However, no archaeological evidence of this vessel has yet been found.

Similarly, in 1938, there was an accident involving the Norwegian freighter Newsome, which ran aground off Courtown Keys, 225 miles northwest of Panama. However, it was rescued by the United Fruit ocean liner Veragua. The Newsome weighed 1,605 tonnes and was carrying ballast cargo (Lloyd's Register Foundation, 1838; The New York Times, 1938). Later, in 1964, the frigate Almirante Padilla sank while en route to San Andrés. This vessel ran aground on the coral reef on the western side of Bolívar Cay. However, due to the strong waves and despite the arrival of two vessels (Antioquia and Pedro de Heredia) and, later, a US vessel (US County) to tow it, it was concluded that the maneuver was too dangerous. The ship was abandoned and then blown up with explosives so that it would not remain in sight (Caro Triana, 2012).

Historical sources show that sailing in the cay areas, particularly around Bolívar Cay, was strongly influenced by its proximity to San Andrés, so the ships that sailed there may have been searching for this piece of land. Additionally, it was observed that the southern part of the cay might be highly accident-prone due to environmental conditions (the direction of currents, the presence of hurricanes and tropical storms), which coincides with the

presence there of some shipwrecks such as the aforementioned Wolverine. Oral sources also identified areas with the possible existence of submerged archaeological sites and areas whose environmental conditions made navigation difficult, which could be of great importance for the study of accidents in the area.

Characterisation of areas of high archaeological potential associated with local underwater cultural heritage

Taking into account the historical information gathered, oral sources, and the different oceanographic and hydrographic characteristics of the area, we identified certain areas of archaeological potential that could be linked to navigability or accidents. Consequently, a geophysical survey was carried out using a Side Imaging Dual Beam Sonar (Humminbird Helix 15) (Fig. 4) in the vicinity of the coral reefs. This was done based on the hypothesis that these areas could present a greater risk to navigation and, therefore, may constitute an area with a high accident rate. A total of four (4) areas of interest were reviewed, two (2) of which were associated with anomalies, and six (6) visual verifications were carried out by snorkelling and scuba dive.

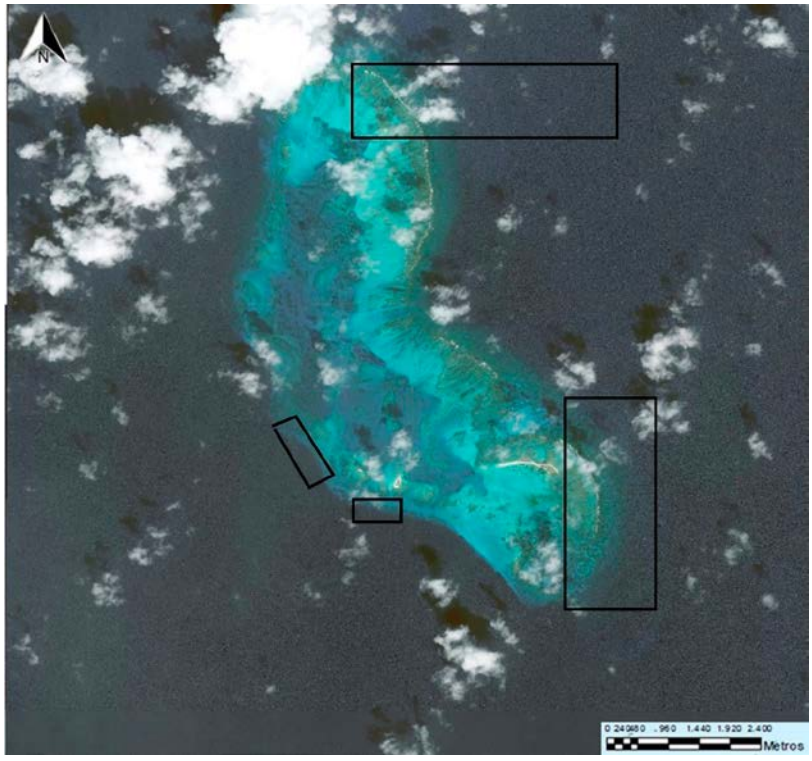

Figure 4. Areas surveyed during the field work.

Later, with the sonar data obtained during the field trip, raw data post-processing was carried out in the office using ReefMaster software to identify possible anomalies of archaeological interest and characterize the sites identified, to be subsequently corroborated *in situ*.

During two of the visual inspections, the team found two shipwrecks at shallow depths. The team and members of the expedition carried out a couple of SCUBA dives there with the aim of obtaining a photographic and film record of the site for subsequent analysis in the office, which would allow it to be studied in greater detail and hopefully determine its spatio-temporal origin, eventually allowing for its possible identification.

"Lampa" Wrecksite

During the first visual inspection of one of the sites, an iron vessel measuring almost 70 m in length and 10 m in beam was identified, which we

named the "Lampa" Site (after the captain of the boat, navigator, diver and fisherman who allowed us to access to the site: Peter Betancur), which had multiple pieces of evidence throughout the site, including the possible engine, a structure, possibly from the bow, and structural elements yet to be identified (Figs. 5 and 6).

Given its characteristics, it is possible that this wreck is that of the Colombian Navy frigate ARC Almirante Padilla, a vessel originally from the United States that served in the Second World War and was later acquired by Colombia, and also participated in the Korean War. In the 1950s or 1960s, it was dynamited near Bolívar Cay (Ardila Pinilla, 1964) (Fig.), probably leaving the artefactual evidence seen today.

Figure 5. Underwater photographic record of the "Lampa" wrecksite (Photo: Santiago Estrada-Dimar).

"San-Thiago" wrecksite

At another site, a shipwrecked vessel approximately 50 m long and 15 m wide was found, which we named the "San-Thiago" site (also associated with the boat captain, navigator, diver and fisherman who observed it exposed in the distance: Santiago Arango). As at the previous site, large iron onjects can be seen throughout the entire site; however, in this case, evidence suggests a greater age than the "Lampa" shipwreck (approximately the late 19th and early 20th centuries).

The site contains part of the engine room, two well-preserved boilers, a complete propeller, structures associated with the hull of the vessel (which delimit the outline of the site in the shape of the bow of a possibly steam-powered ship), the helm, a windlass, the stern fin where a propeller was attached with several blades missing, two anchors with their chains deployed, an isolated anchor of a different type, as well as multiple and diverse structures that are yet to be identified. Despite all this information, the possible identity of the ship has not yet been determined.

Figure 6. Underwater photographic record of the "San-Thiago" wrecksite (Photo: Santiago Estrada-Dimar).

Local capacity-building workshops

During the field season, outreach activities were carried out with students from the National University of Colombia-Caribbean Campus, with the aim of strengthening local capacities in underwater cultural heritage and maritime and underwater archaeology. The students came from programmes such as Anthropology, Sociology, Social Work, Law, Nutrition, Electrical Engineering and Nursing. On the one hand, a workshop was held at the University to familiarize students with the topics of study and the disciplines that made up the project. Topics such as the following were addressed: a) research objectives; b) study methodology; c) technologies to be implemented; d) basic principles and concepts of archaeology and cultural heritage; e) the universe and diversity of submerged cultural heritage.

On the other hand, a second session was held at Bolívar Cay, addressing in this case the progress of research within the framework of the entire expedition. In particular, this project addressed several topics, including: a) a summary of the introductory session; b) the general questions that guided the development of field activities, such as what happened at Courtown Cays in the past? and what is its place in the history of the Archipelago?; c) the corroboration of the existence not only of patterns of navigability and accidents, but also of corroborated shipwrecks around the cay (given the presence of submerged archaeological finds); d) presentations by the two boat captains who located the sites (namely, Peter "Lampa" Betancur and Santiago "Tiago" Arango) and their description of the research methodology, methods and techniques implemented, the discovery of the two shipwrecks, the possible causes of their sinking, and the possible past navigational occurrences that may have occurred around the island based on environmental factors and Caribbean naval traffic in recent centuries; e) the presentation of the first underwater and

aerial photographs (courtesy of Santiago Estrada and Esteban Herrera) of the two main sites for the young students to see; f) the recognition of these sites as possible historical shipwrecks given the presence of materials, the distribution and dispersion of the objects, and the evidence of the sinking event. In short, the aim was to discuss and present the different skills taught, the principles of maritime and underwater archaeology, as well as the techniques, methods, methodologies and technologies of recording and documentation.

Conclusions

Throughout the research, it was possible to study the components that make up the maritime cultural landscape of the Archipelago of San Andrés, Providencia and Santa Catalina, with a particular focus on Courtwon Cays. These cays have historically been strategic for both navigation and the extraction of natural resources, but they are also dangerous due to complex environmental conditions that make maritime maneuvers difficult. Based on primary sources, it was possible to identify some areas (especially to the south and southeast) where there is a greater possibility of accidents or shipwrecks.

During the field trip, it was possible to identify two archaeological shipwreck sites around Bolívar Cay. Although this research has focused on the initial identification and documentation of these sites, we recommend that more detailed studies be carried out to gain a more accurate understanding of the causes of the sinkings and their historical context. Therefore, the recognition of these sites is a first step toward supplementing the national registry of underwater cultural heritage in the island areas of the Colombian Caribbean.

The participation of local communities has been key to carrying out the research, integrating their knowledge with interdisciplinary and community-based maritime archaeology, under in their role as of co-researchers. Activities with the region's inhabitants have made it possible to generate a broader interpretative framework for the phenomena related to sailing in this area.

In addition, interaction with the various local actors involved in the scientific expedition revealed concern about the vulnerability of underwater cultural heritage, especially due to looting and the illegal extraction of artefacts. The public imagination of underwater heritage being linked to 'treasures' and goods that could be sold as antiques has led to these sites of common interest being subject to looting and illegal extraction of artefacts, resulting in the loss of valuable historical and cultural information that can help in understanding the past. For this reason, it is essential to create spaces for the appreciation and ownership of these archaeological elements aimed at those who are in the Courtwon Cays area on a daily basis (fishermen, sailors, divers, boatmen, etc.).

This shared history can be interpreted and studied in greater depth if the archaeological sites continue, as far as possible, to be preserved as they have been until now. Consequently, we also propose that a space for dialogue be created with the Bolívar Cay military post (in coordination with the Port Authority of San Andrés), so that military personnel on duty in the area for surveillance purposes can learn about the existence of these sites and recognize the cultural potential of the region. All this is intended to contribute to the long-term surveillance, control, security and monitoring of the sites, preventing their irreparable loss to possible looting.

Finally, it is crucial to implement conservation measures for the underwater archaeological sites around Courtwon Cays, not only because of their historical value, but also because of their role in marine biodiversity. To this end, it will be necessary to connect the inter-institutional and inter-sectoral competences of each of the entities responsible for the protection of these assets and the natural environments that surround them, recognising their interdependence.

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Authors' contributions

Conceptualization, C.D.C.H., J.A.A.M., M.M.C., L.V.B.S., J.C.J., G.L.H., C.R.A., A.C.S., L.L.B.T.; methodology, C. D.C.H., J.A.A.M., M.M.C., L.V.B.S., J.C.J., G.L.H., C.R.A., A.C.S., L.L.B.T..; software, J.A.A.M..; analysis and research, C. D.C.H., J.A.A.M., M.M.C., L.V.B.S., C.R.A., L.L.B.T. J.C.J.; resources, A.C.S., M.M.C., G.L.H.; data curation, C. D.C.H., J.A.A.M., M.M.C., L.V.B.S., C.R.A., L.L.B.T. J.C.J; writing – original draft, C.D.C.H., J.A.A.M.,; writing – review & editing, C.D.C.H., J.A.A.M., L.V.B.S..; visualization, C.D.C.H., J.A.A.M., L.V.B.S.; supervision, A.C.S., M.M.C., G.L.H.; project administration, A.C.S., M.M.C., G.L.H.; funding acquisition, A.C.S., M.M.C., G.L.H. All the authors have read and accepted the published version of the manuscript.

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