COMMUNITY MARITIME ARCHAEOLOGY IN COSTA RICA
CAHUITA NATIONAL PARK SITE REPORT 2017

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ABSTRACT

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INTRODUCTION

The Program in Maritime Studies at East Carolina University (ECU) collaborated with Costa Rica's Centro de Buceo Embajadores y Embajadoras del Mar (Centro) through a Memorandum of Agreement (MOA) to offer a field school in the fall of 2017 (31 August to 17 September). Initiated by Dr. María Suárez Toro and Frederick Wright in 2015, the Centro's mission is to promote SCUBA diving amongst local youth in order to develop opportunities and expertise in preserving the marine ecosystems, culture, and livelihood of the fishing communities in Costa Rica's southern Caribbean. Centro's activities include training young people to dive and engage with the sea by cleaning debris in reefs, extracting invasive lion fish, and learning to know, to appreciate, and to preserve underwater cultural heritage. The underwater cultural heritage aspect is a recent addition within lessons titled *Expedición galeones y otras embarcaciones 2016-2019* and successfully integrates hypotheses about the Punta Cahuita wrecks as a teaching opportunity. In 2017, two other members played a key leadership role in project organization, namely Gloriana Brenes and Alexandre Koblensky.

The ECU project was run in conjunction with the Nautical Archaeology Society (NAS) training program and offered Costa Rican students Introduction, Part I, and Part 2 lectures and workshops and used shipwreck and maritime infrastructure sites located in Cahuita National Park as case studies. One of the challenges ECU experienced working in Costa Rica was the language barrier; to address this issue, ECU faculty created Spanish language versions of all NAS PowerPoint lectures. A central purpose of this project was to *set up community infrastructure for future archaeological activities* (educational objectives). It involved capacity building at the local level and community engagement in both Puerto Viejo and Cahuita. The project team consisted of ECU faculty member Dr. Lynn Harris and staff archaeologist Dr. Jason

Raupp, Dive Safety Officer Mark Keusenkothen, and six graduate students: Anna D'Jernes, Ian Harrison, Stephen Lacey, Ryan Marr, Sara Parkin and Maddie Roth. This year Kim Kenyon, Underwater Archeologist and Conservator from the NC Office of State Archaeology's *Queen Anne's Revenge* Project joined the staff and proved to be an invaluable member of the educational team. Those who earned their NAS Introduction and Part I in 2017 included María Suárez Toro, Gloriana Brenes, Salvador Van Dyke Arias, Sangye Wang Brenes, Carlos Mairena, Ramón Ernesto Cruz Espinoza, José Francisco Saballo, and Giovani Sandoval. Giovani also served as the Centro's Dive Master, overseeing snorkeling and SCUBA activities for the Costa Rica team. Seven Centro students from the 2016 field school (Royer Coloner, Tygo Brederoo, Esteban Gallo, Alexandre Koblensky, Anderson Rodríguez, Kevin Rodríguez, and Pete Stevens) returned during the second week of training and participated in NAS Part II workshops and events. ECU faculty and graduate students mentored the Centro team as part of the local capacity building and stewardship initiative.

ECU's first maritime archaeological field school in Costa Rica was held in 2015. Its overarching goal was to introduce graduate students to the rich maritime culture in the towns of Puerto Viejo and Cahuita, whilst embracing an interdisciplinary approach to research. Diverse data sets included the two previously identified shipwrecks in Cahuita National Park, a former steel mud scow now transformed into a fishing pier at Puerto Viejo de Talamanca, locally-built watercraft utilized in subsistence fishing and lobster diving up and down the Talamanca coast, and maritime cultural manifestations like graffiti, artwork, and music. The two known shipwrecks referred to respectively as the "Brick Site" and "Cannon and Anchor Site" are thought to represent the remains of the Danish slave ships *Christianus Quintus* and *Fredericus Quartus*, both of which wrecked at Punta Cahuita in 1710. Methods for documenting and

interpreting data have ranged from traditional, inexpensive, and low-tech approaches to more advanced methods, like total station use and three-dimensional modeling. In 2015, ECU faculty and students worked with Costa Rican fishermen who served as boatmen and guides. During the 2017 field school, the team extended the duration of the semester and included multiple public events and presentations in Costa Rica, blogs, a website (blog.ecu.edu/sites/hist5530), a session at the Society for Historical Archaeology (SHA) conference in January 2016 (where both students and faculty delivered research papers), and written reports (in Spanish and English) provided to the management of Cahuita National Park (Harris et al. 2015a, 2015b).

Based on the precedent set by the 2015 project, in 2016 the Centro invited ECU to form a collaborative team to work primarily on the Brick Site with possible time dedicated to marine life studies on the Cannon and Anchor Site. The 2016 research objectives built upon the results of ECU's 2015 summer field school in Cahuita (Harris et al. 2015a, 2015b). A report produced from the data collected presented the preliminary results of work in progress, field methods, and research related to understanding the marine environment, cultural and non-cultural archaeological site formation processes, and the interpretation of artifacts recovered from the Brick Site to assist with identification. Additionally, new website and blog content from both ECU (http://blog.ecu.edu/sites/expeditioncostarica/) and Centro (http://escuelabuceocaribesur.blogspot.com/) represent the record of the 2016 field season. One aim of the Centro's sample collection and analysis strategy is to find evidence supporting the hypothesis about the shipwrecks since a link between artifacts reportedly recovered from the wrecks and held within the Cahuita community and the documented narrative regarding the Danish ships had not yet been established.

In September 2017, the ECU team combined teaching and mentoring with fieldwork in Cahuita National Park. The MOA between the two parties stipulated that ECU would train the local divers using the NAS curriculum (Appendix A) and provide archaeological expertise. This year ECU students played an integral role in Part II mini conferences, delivering six presentations on their thesis fieldwork and research to date (Appendix B). The Centro, in turn, organized the student participants and provided logistical support (housing, transport, boats, and SCUBA tanks). ECU faculty and students taught the Introduction and Part I NAS courses to the student divers of the Centro, with the classroom curriculum and dry practical sessions delivered at the beachside resort La Caracola in Playa Chiquita and wet practical sections conducted in the swimming pool of Atlantida Lodge in Cahuita. The NAS training covered a range of archaeological recording skills such as basic mapping (i.e. baseline offset and trilateration measurement), in-situ artifact recording, small boat recording, archaeological photography, artifact tagging, artifact illustration, artifact cataloging, and tow boarding. A week of diving and additional training in the field followed, in which students practiced newly acquired skills by mapping the local shipwreck known as the "Cannon and Anchor Site," the remains of the historic dock at Punta Cahuita, and the remains of the historic dock at Puerto Vargas. An important part of this year's project involved swim and tow board searches to identify any other sections of wreckage or artifacts that may have washed ashore from the Cannon and Anchor Site and/or the Brick Site. The team also expanded the search around Punta Cahuita and over to Puerto Vargas, where locals previously reported the location of a second large anchor removed from one of the shipwreck sites in the 1960s.

Among the most important elements of the project was outreach through public lectures. During the final week of the field school two local events were organized to share highlights of

the project teams' efforts . Students prepared PowerPoint presentations about the NAS training they received and the project's results and findings. Held in Puerto Viejo and in Cahuita, these events entertained audiences comprised of fellow students, parents, community members, tourists, journalists, and officials from the Ministry of Environment and Energy (MINAE). ECU faculty presented information relating to the historical background on the sites, as well as other research on maritime culture in the area.

The program had an observable impact on class enthusiasm. Puerto Viejo and Cahuita have the highest percentage of people of Afro-Caribbean descent and the Talamanca region is one of Costa Rica's most culturally diverse areas. Additionally, as a part of the province of Limón they are among the most impoverished communities in Costa Rica. This community project not only provided key support for the preservation of cultural heritage, it offered a renewed sense of purpose to many in the community – both the course participants and other members. Within a month of the conclusion of the project, the team's engagement efforts had already paid archaeological dividends, with participants identifying possible NAS Part II projects. In broader terms, the groundwork has been laid for further activities such as community monitoring of cultural resources, sustainable tourism, and engagement with local heritage.

The body of this report is divided into sections relating to surveys and investigations by area. Subjects include tow boarding and swim search surveys within the boundaries of the national park, investigations of the historic dock structures and shorelines at Cahuita Point and Puerto Vargas, and submerged historic artifacts recorded in the shallow reef flats near the Cannon and Anchor Site. Another substantive section of the report provides a description of observations from marine life surveys carried out on the Brick Site and Cannon and Anchor Site, as well as the two historic pier structures, which could offer interesting comparative data for

biologists. A concluding section includes recommendations for future community initiatives and research projects that the authors consider viable in the short, medium, and long-term.

With the conclusion of a third year of research, it is clear that the Talamanca coast – and the cultural resources adjacent to Cahuita and Puerto Viejo de Talamanca – are rich for many future collaborative educational and research projects.

HISTORICAL BACKGROUND

Cahuita Town and Cahuita Point

Documented historically as preferred fishing and turtling grounds for the Miskito Indians, Cahuita Point was settled in 1828 by William Smith (IDRC 1999:131). Smith, an Afro-Caribbean fisherman from Bocas del Toro, Panama, moved to the area to establish a permanent turtling camp. He was soon joined by other families so that by the 1880s, fifteen households were established at the point (Palmer 1993:74). Many of these residents migrated to the Talamanca coast from Jamaica to work as railway laborers and would continue to immigrate to the Limón area through the 1920s (IDRC 1999:133; Palmer 2009:237). When the United Fruit Company (and later Penshurt Banana Company) arrived in Costa Rica in the 1870s, it relied heavily on these same Afro-Caribbean laborers to cultivate and sell bananas (Colby 2011:66). By 1887, United Fruit established itself in Puerto Limón and became the driving force behind continued rail construction (Colby 2011:67). By the early 1900s, United Fruit banana plantations were established in Cahuita (Christian 2015:162).

Cahuita's early 20th century history was strongly divided along lines of race. The presence of Afro-Caribbean subsistence farmers on Cahuita Point indicated that large scale agriculture was feasible. Two land developers visiting the Point in 1895 suggested that an

agrarian settlement be established, if so they would deliver “15 families of white race” (Colby 2011:65). Early 20th century economic development from the United Fruit Company and Penshurt Fruit Company did little to ease tensions—Afro-Caribbean laborers were used by elite (often white) Costa Ricans as the primary banana cultivators. Marcus Garvey, founder of the Universal Negro Improvement Association (UNIA), came to Limón in 1921 to establish a Costa Rican UNIA branch. Garvey’s trip was met with encouragement, and the Cahuitan and Puerto Viejo UNIA branches “played a vital role in the life of these communities from the 1920s through the 1940s" (Palmer 2009:237). English education, cultural/social programs, and a grocery store operated by UNIA members in Cahuita provided a means of upward mobility for black Cahuitans (Palmer 2009:238, 242).

In 1915, the residents of Cahuita Point relocated to the northern side of the bay, having been given land by the president of Costa Rica (IDRC 1999:133). President Alfredo Gonzalez, a Costa Rican of Spanish descent, was visiting a United Fruit branch in Sixaola (near Panama) when, on his return to Limón, his ship was driven ashore near Cahuita Point. He was rescued by the community and in turn, granted them public lands to the north. Colby (2011:130, 221) suggests this action was significant to Gonzalez and the Cahuitans as the land was located within the ‘maritime mile’ (coastline required by law to remain public property). Following the resettlement of Cahuita on the bay’s northwest coast, the area outside town became home to Penshurt banana plantations.

From the 1930s through the 1970s, there was little inland development of the region. Major transportation between coastal cities was restricted to the railway and water (Pugh and Momsen 2006: 134). Pugh and Momsen (2006:135) report the Cahuita Point pier was constructed in the 1930s to facilitate trade and agricultural export. Cahuita would remain

physically isolated from Limón until the main connecting road was completed in 1976 (Pugh and Momsen 2006:134). United Fruit ended provincial banana production in the 1930s due to escalating tensions with the local community (Putnam 2003:68, 71). Cacao farmers moved onto the former banana plantations and continued farming and exporting cacao and copra (dried coconut for oil production) in the region through the 1970s (Lemieux 1969; Putnam 2003:68).

Establishment of Cahuita National Park

Cahuita Point's coral reef was designated a national monument in 1970 as part of a burgeoning national environmental movement (IDRC 1999:133; Evans 2010:125). The initial relationship between the park and local community was tense as long standing cultural traditions such as turtling and fishing were banned within the park boundary (IDRC 1999:133). When suggestions of monument expansion arose several years later, community officials worked with government representatives to guarantee rights to those who owned land within the new park boundary, however, following the monument expansion in 1978 (creating today's Cahuita National Park), many farmers were forced to relocate (IDRC 1999:134). Furthermore, the park land previously maintained by locals was never officially titled to the farmers. As such, locals whose land was seized were never compensated for their property loss (IDRC 1999:134; Maria Suarez Toro, pers. comm. 2017). In contrast, W.E. Belcher Lumber Company, Inc.

possessed official titles to the land around Puerto Vargas (see below), and were compensated for the land loss (Pugh and Momsen 2006:134-135). Locals who remained in the park soon faced devastating land value loss when a cacao blight in the 1970s and 1980s destroyed 95% of the cacao crop (IDRC 1999:134). By the early 1990s, the Cahuitan

community, formerly dependent on cacao farming and subsistence agriculture, became economically dependent on tourism alone (IDRC 1999:134).

In 1994, the Costa Rican government proposed an increase in national park entrance fees which threatened Cahuita's burgeoning tourism industry. Fearing economic instability, Cahuitans staged an occupation of the park, and were able to eventually work with the government to establish a co-management strategy (Weitzner 2000:i). Today, management of park resources rests with MINAE, who maintains a close relationship with the local community.

Environment and Tourism

As part of a campaign to protect native endangered species, Costa Rica established a system of state protected areas; these include National Parks, Wildlife Refuges, and Forest Reserves. Each of these areas follows strict environmental regulations, however many of the policies regarding logging are lenient (Miller 2011). Clearing, heavy thinning, and cutting of trees has been show to negatively impact biodiversity (Miller 2011). Furthermore, the removal of forests increases runoff and soil erosion, negatively impacting the regional banana and cacao plantations (Miller 2011). The destruction of forests can cause permanent economic change in the local communities, as biodiversity loss affects tourism. Fortunately, Cahuita National Park maintains strict environmental laws against deforestation.

The Cahuitan coral reef (extending both north and south of Cahuita Point) is the only major reef on the Costa Rican Caribbean coast (Cortés and Risk 1985:339). An environmental impact study conducted in the 1980s found that the Cahuitan reef had a significantly high coral mortality rate (live coral cover was 13%) due to increased siltation. It was suggested that increased agricultural activity and deforestation contribute to sediment load within the water column (Cortés and Risk 1985:339). Researchers conducting the study further reported local

fishermen had decreased catch numbers and noticed an increase in coral death (Cortés and Risk 1985:340). While no comparative analysis could be made at the time of the study, research is ongoing (Cortés and Risk 1985:339; Hands et al. 1993; Fonseca et al. 2006; Cortés et al. 2010). Recent reports (Fonseca et al. 2006; Cortés et al. 2010) indicate that live coral cover only increased by 5% over the past thirty years, while macroalgal density nearly doubled over a decade (36.6% to 61.3%).

Low coral coverage and increasing macroalgal biomass are warning signs for reef health and are linked to an overall decrease in site biodiversity (Lirman 2001; Bellwood et al. 2003; Alvarez-Filip et al. 2009). While visiting the cannon site during the 2017 fieldwork, students observed high coral mortality (estimated 80-90%) and sparse marine life. The prevailing coral species observed at Cahuita Point was *Millepora complanata* (blade fire coral). While fire coral species (*Millepora sp*.) demonstrate an increased resiliency to changing environments, they do not offer the same structural complexity as other corals. Termed 'reef flattening,' the dominance of fire coral species, is associated with declines in biodiversity (Alvarez-Filip et al. 2009; Newman et al. 2015). As Cahuita is economically dependent on tourist revenue, reef decimation and decreasing biodiversity present ongoing challenges to ecotourism. While snorkeling continues to draw tourists to the National Park (personal observation from 2017), there is no guarantee that Cahuita's reefs will continue to rebound, especially in the face of changing climatic conditions and ocean acidification. As such, the development of cultural heritage tourism within park waters will become increasingly important in coming years.

Cultural Heritage within the Park

Cahuita Point

In 1969, Gilles Lemieux conducted a feasibility study of establishing a National Park at Cahuita Point. Lemieux addressed the significance of the Brick Site and Cannon and Anchor Site (Harris et al. 2015 and Harris et al. 2016), stating that as a “unique” Atlantic site, “this shipwreck must be protected against scraping and destruction” (Lemieux 1969:160). Furthermore, the study (1969:162) suggested that the sites should be interpreted for the local community. Lemieux also documents five structures located on the shoreline (Lemieux 1969:110; Pugh and Momsen 2006:135). The structures were built of natural materials including wood and palm fronds (Figure 1). Lemieux (1969:110) believed that they exemplified unobtrusive architecture in the landscape, and should serve as models for ecotourist resorts in the region. The same structures are referenced in a 1991 cultural study of the area; the structures’ remaining inhabitants are noted as 'Cahuita Indians' (Pugh and Momsen 2006:152). Today, these structures are no longer present in the park.

Figure 1. One of five ‘rustic houses’ at Cahuita Point. Image from Lemieux 1969: 110

The Lemieux study also documented the remains of the Cahuita Pier built in the 1930s (Figure 2). Located in the ‘Bay of Monkeys,’ Lemieux (1969:156) states the pier’s location is

sheltered by Cahuita Point. As of 1969, the iron pier pilings were still standing, but had already fallen into disrepair. Today, some of the pilings remain visible above the waterline but have further degraded.

Puerto Vargas

Both the Alfa Lumber and Logging Company and the W.E. Belcher Lumber Company, Inc. relied on infrastructure at Puerto Vargas to export lumber during the 1960s (Lemieux 1969: 66). The W.E. Belcher Lumber Company, whose contract through Puerto Vargas began in 1966, targeted five main tree species living south of the port: cativo, cedar, espavel, maria, and favillo (Lemieux 1969: 69). As of 1969, Lemieux describes Puerto Vargas as "consisting of a large two-

Figure 2. The Cahuita pier as seen from Cahuita Point. Image is Figure 22 in Lemieux (1969:156).

-story house and several other houses and outbuildings… This village served as the headquarters for the Belcher Company who exploited the woods on part of the point. The natural port has no springs or other facilities" (Figure *3*).

Figure 3. The Belcher Lumber Company Headquarters at Puerto Vargas. Image is Figure 7 in Lemieux (1969: 79).

Today the cultural materials at Puerto Vargas and the pier at Cahuita point represent an important era of industry for the Talamanca Coast. These sites, along with the submerged Brick Site and Cannon and Anchor Site, are historically significant to the town of Cahuita. While the Brick Site and Cannon and Anchor Site have been the focus of past archaeological work in the park, the port and pier also represent the development of Cahuita. As such, the two areas are important foci during the 2017 fieldwork.

2017 ARCHEOLOGICAL INVESTIGATIONS

Archaeological investigations were undertaken in multiple areas within the boundaries of Cahuita National Park during the 2017 field season. Methods including tow boarding, swim search survey, and archaeological mapping were conducted at the historic dock structures and shorelines of Punta Cahuita and Puerto Vargas, as well as the Brick Site and Cannon and Anchor Site. Basic marine life surveys were conducted at the historic dock structures and shorelines at Punta Cahuita and Puerto Vargas. As one dock comprises wood pilings and the other iron,

cement and wood thus attracting different species on respective substrates, the data collected could offer interesting comparative data for biologists.

Tow Boarding

In an effort to locate additional archaeological remains around Cahuita Point, ECU team members and Costa Rican NAS participants conducted towed searches. Towed searches, also known as tow board surveys, employ a simple planing board system that is attached to the stern of a small vessel with a strong line. Commonly used by marine science researchers around the world, this method allows a snorkeler or SCUBA diver to not only survey the seabed while being pulled behind the boat, but also to dive down to investigate features by directing the leading edge of the board slightly downward. The system is configured by attaching a rope to either side of the stern of a vessel to create a bridle. The bridle incorporates a small float at its apex to the keep the line from fowling the propeller and from it the line extends approximately 50 feet before being securely attached to the board. This distance between the boat and the board ensures that the diver avoids any potential contact with the propeller, helps to keep wash generated by the vessel from affecting the diver's field of vision, and allows divers to plane toward the bottom when desired. Towboard surveys have immense advantages over other diver-based survey methods; for instance, large distances can be surveyed quickly during towed searches.

The boards used for such surveys can vary in complexity, from a simple plank of wood to a commercially produced design. The tow board utilized during the Cahuita Point survey consisted of a plastic board with handles that was connected to the boat via 3/ inch polypropylene rope. Although simple, this board design allowed the divers to maneuver the board to avoid obstacles and maintain a specific depth. Before the towboard searches were

conducted, NAS participants learned the associated safety risks and how to control the board while being towed. For safety reasons, divers used snorkels when towed, not scuba kits. During the towed searches, one or two divers were pulled on boards behind the vessel at a speed comfortable for the diver (about 1-2 knots). To ensure safety, a spotter situated on at the stern of the vessel maintained a constant view of the diver being towed and a safety diver was kept ready to deploy in case of any emergency.

While the divers were in the water, a crew member onboard the surface vessel used a GPS unit to track the vessel's path and the coordinates of the areas searched. In this particular situation, underwater obstructions in the form of reefs and coral heads prevented a systematic search of the area. The towboard searches were conducted over several days by snorkelers from both ECU and the Centro (Figure 4). At the end of each day, the teams analyzed the GPS points to determine the area visually searched, and to plan the vessel's path for the following day's towed search. Over the course of three days towboard surveys were conducted around the outer reef at Cahuita Point and in portions of the area reef area on the south side of the point known as Eduardo's. Figures one and two illustrate the extent of the surveys, with the red lines marking the survey tracks.

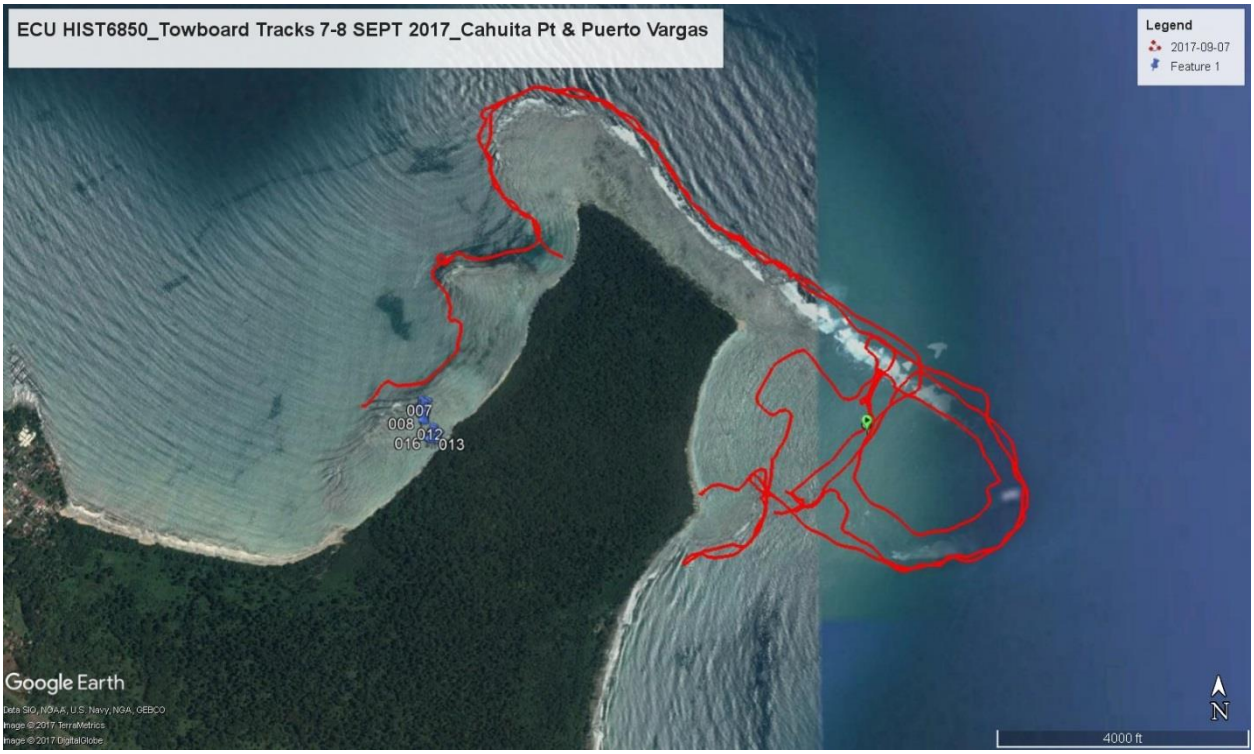

Figure 4. Close View of Cahuita Point Towboard Survey Track. Red line indicates tracks covered by towed searches. Map created utilizing Google Earth by Dr. Jason Raupp, 2017.

Although no cultural materials were identified during these the limited activities the method was well received by NAS participants. Due the undulating nature of the reefs around Cahuita National Park, remote sensing survey methods would be difficult to conduct without damaging expensive equipment. Thus, there is great potential for towboard surveys in this particular location. Upon completion of the NAS training course, Costa Rican team members Ramon Ernesto Cruz Espinoza and Jose Fransisco Saballo Lopez constructed a towboard using locally sourced materials (Figure 5) which is now used to conduct surveys of the underwater landscape in the region.

Figure 5. Ramon Ernesto Cruz Espinoza holding the towboard he helped to construct. Inset: Towboard constructed by Ramon Ernesto Cruz Espinoza and Jose Fransisco Saballo Lopez. Photographed by Dr. Lynn Harris, 2017.

Swim Line Searches

One of the primary survey methods used throughout the 2017 Cahuita field project was swim line survey. By assembling a team of two to six snorkelers (or divers) along a tape measure or rope with designated markings, it is possible to conduct a swimming survey along a precise corridor. With swimmers spaced along the line at intervals that are less than the maximum visibility distance, each will have a slightly overlapping field of view ensuring that there is complete coverage along the space of the line (Bowens 2009:98). While this method offers a simple and effective means of quickly surveying large corridors of shallow water, its major limitation is the lack of ability of swimmers to control position. A ground control line is

commonly laid beforehand, thus enabling surveyors to simply swim along it while maintaining the swim line at a 90 degree angle to the ground-control line (Figure 6)(Bowens 2009:99).

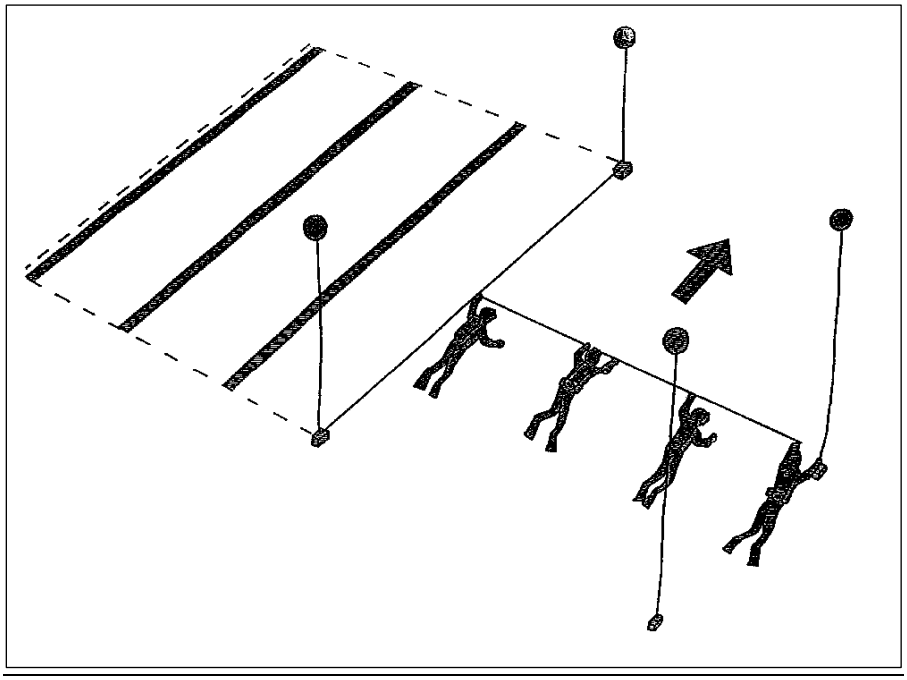

Figure 6. Bowens (2009:98) swimline (freeline) search based on original artwork by Ben Ferrari.

Although this method can result in greater position accuracy, it is relatively time consuming. As such, project staff in Costa Rica opted instead to control positional accuracy with the use of GPS points taken at the beginning and end of each swim line corridor. With proper labels, the GPS team was later able to plot this data into Google Earth and connect the dots to visualize the corridors covered by the swim line survey. Additionally, artifact finds were marked with small buoys and GPS points so that teams could return later to further inspect and document potentially significant cultural materials , as well as to add their positions to the Google Earth swim-line transect maps.

In total, swim line surveys were conducted on four separate occasions across two different sites (Figure 7). Beginning with Punta Cahuita, there were three swim line searches that

took place in the shallow waters off the northern shore. All were conducted by integrated teams of ECU students and staff, as well as Costa Rican NAS students. Survey area ‘A’ was begun at the southeastern most point of the Punta Cahuita survey area, with five swimmers spaced at intervals of 5 meters (m) for a total of 20 m coverage per line. The search was run in a zig-zag pattern between a series of four points on the coast and four points approximately 100 m offshore. No artifacts were found in this survey area.

Survey area ‘B’ was similarly conducted with five swimmers on a 20 m line spaced at even intervals of 5 m. Conducted in a ‘U’ shape, the team swam out to the terminal point approximately 200 m offshore, rotated one end around the other, and then swam back into shore creating a roughly 40 m contiguous coverage corridor. No artifacts were found in this survey area. Survey area ‘C’ was searched using five swimmers at 10 m intervals along a 40 m line. Similar to area ‘B’ the team swam out in a straight line, pivoted on one axis and then returned to shore along a reciprocal bearing. Several possible artifacts were located and marked using GPS and buoys; upon the later inspection each of these appeared to be natural formations.

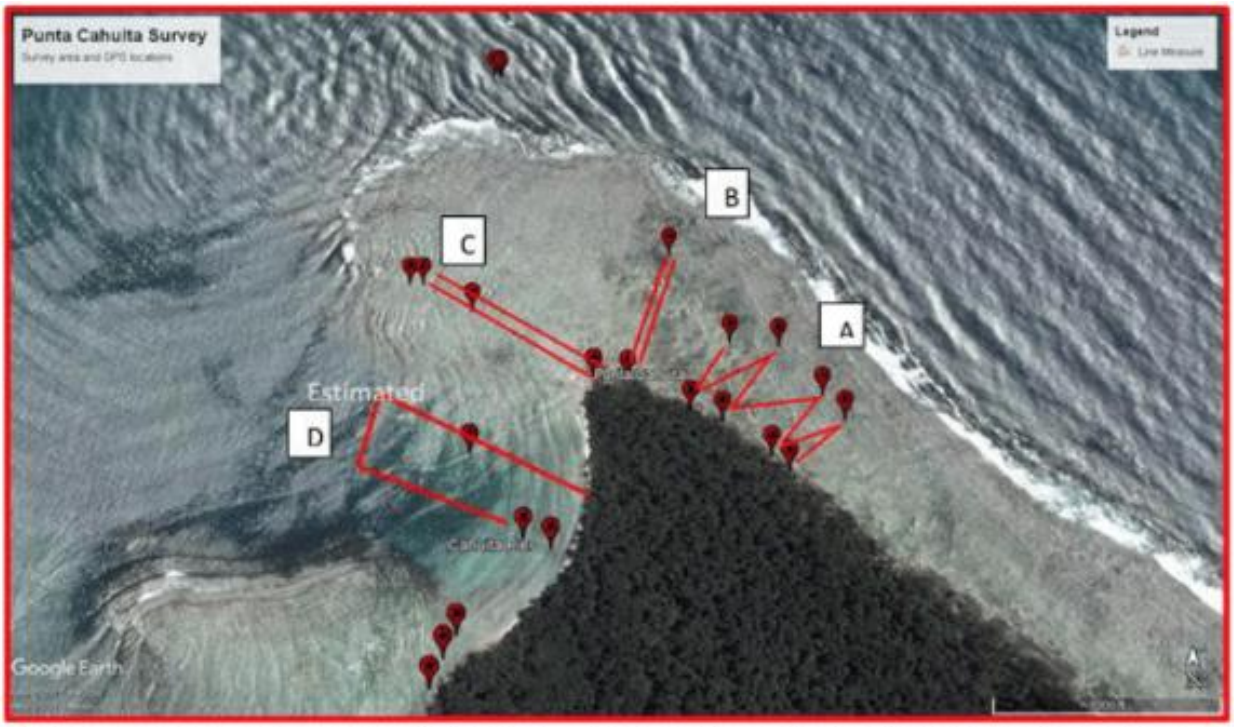

Figure 7. Google map image of Punta Cahuita and Cahuita Pier survey areas. Red lines indicate swim line search corridors. Red dots indicate GPS points of swim line position marks and/or artifacts. Search areas are separated into areas A-D. A (zig-zag) right, B (middle right), C (middle left) and D (left). Swim line transect D is in an estimated location positioning was conducted by sight. Map created by Ian Harrison. ECR 2017.

Survey area 'D' was positioned near the old Cahuita Pier directly south of Punta Cahuita. As GPS units were not available at the time the survey was conducted, positioning was estimated with relative locations to the shore. As such, the general bearing and distances of the survey path have been roughly approximated (Figure 7). On the northern segment of the path a possible iron object was identified and marked, but not specifically analyzed. Otherwise no artifacts were found in this survey area.

Overall, swim searches served as effective tools for both teaching NAS survey methods and reconnoitering areas of potential material culture scatters. Although total coverage of the areas surveyed is light, these transects do indicate a relative absence of cultural mater ~~(middle)~~

segment of the path a possible iron object was identified and marked, but not specifically analyzed. Otherwise no artifacts were found in this survey area.

Overall, swim line searches served as effective tools for both teaching NAS survey methods and reconnoitering areas of potential material culture scatters. Although total coverage of the areas surveyed is light, these transects do indicate a relative absence of cultural materials[RJ1]

within the nearshore coral shoals of Punta Cahuita. Although the area inshore of the brick site that lies inials between between transects C and D would surely have registered suchcontain cultural materials, these have been well documented in previous site reports. (REFS[RJ2]). Otherwise, more complete coverage of the areas surveyed, as well as the seabed just beyond the coral reef, may yet offer more fruitful results.

Figure 7. Google map image of Punta Cahuita and Cahuita Pier survey areas. Red lines indicate swim line search corridors. Red dots indicate GPS points of swim line position marks and/or artifacts. Search areas are separated into areas A-D. A (zig-zag) right, B (middle right), C (middle left) and D (left). Swim line transect D is in an estimated location positioning was conducted by sight. Map created by Ian Harrison. ECR 2017.

Punta Cahuita Dock and Shoreline Survey

On September 5 and 6, 2017, students mapped the remains of the Punta Cahuita Pier and conducted two swim--line survey near the remains of the pier. Located at the site of the first Cahuita settlement, today little of the dock's historic fabric remains. The first survey line measured approximately 300 m and ran perpendicular to the shoreline. Two transects spaced approximately 50 m apart were conducted to the north of the pier . No cultural materials or were identified in this area. The second swim line survey was conducted south of Cahuita Pier and resulted in the location of several artifacts. This shoreline survey involved lines spaced at 30 m intervals which started 10 m out from the shore and ran parallel to the beach in a southerly direction for approximately 800 m. Approximately 200 m of the nearshore environment was surveyed; results are discussed below.

Ceramics, wood, and multiple glass fragments were found during the survey south of Cahuita pier. The wood discovered offshore varied in appearance—while it was all heavily degraded, one piece had been cut as a plank while other pieces remained as logs. As there was noticeable treefall along the beachfront, it was hypothesized that much of the wood observed on the seabed was not associated with anthropogenic activity. One cut wood fragment measuring 41.3" by 20.47" (105 by 52 cm) was photographed and recorded in detail. Ceramics and glass were photographed *in situ.*

The Cahuita Pier was also documented using baseline-offset measurements. A single fiber-glass baseline was placed perpendicular to the shore and parallel to the pier remains. Offsets to individual pilings were then taken and recorded (Table 1). GPS coordinates for the beginning, middle, and end of the survey tape can be found in Appendix D. Other students recorded the distances between columns of pilings and rows (Figure 8).

6 Sept 2017
Ramon and Jose
Pia Cahuita, Rio Peresoso

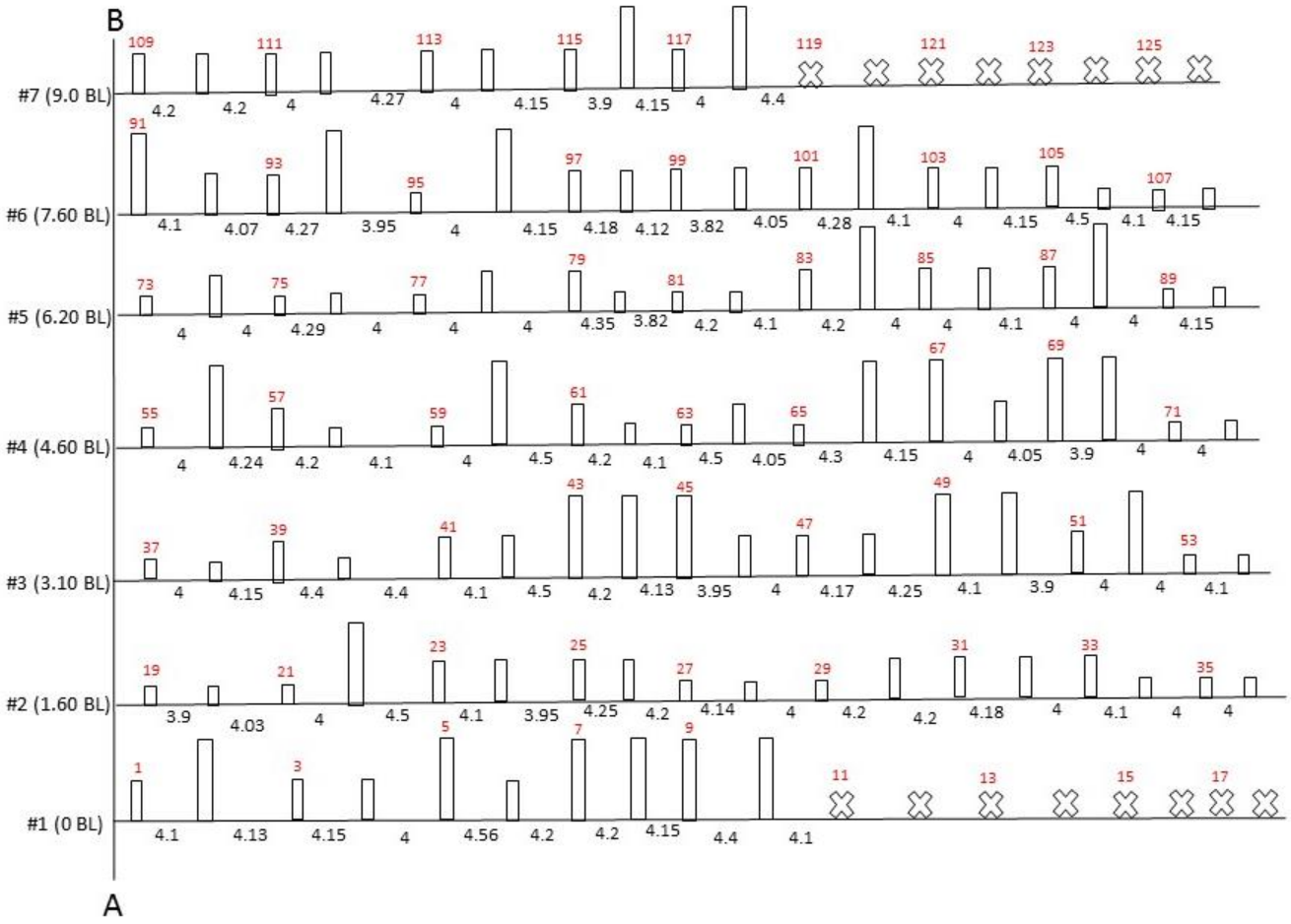

Figure 8. Remains of Cahuita Pier. Red numbers indicate piling while black numbers indicate spaces between pilings.

Despite the relatively short time spent recording, the historic Cahuita Pier survey produced extensive data (Table 1). Measuring 223.4' by 29.7' (68.1 by 9.05 meters), the site consists of 72 of the original 110 (or possibly 126) I-beam pilings. The pilings are placed in a grid extending 18 rows from shore (approximately 4 meters between each row). The first eight rows of the pier were built in five columns (spaced 150cm apart), with a column of pilings added on either side for rows 9-18 (7 columns in each row). The decking is no longer present and the remaining pilings are heavily corroded (**Error! Reference source not found.**).

Table 1. Baseline Offset Measurements to Cahuita Pier Pilings

		North Measurement (cm)			Baseline (cm)	South Measurement (cm)		
Piling Row	Baseline	Column A	Column B	Column C	Column D	Column E	Column F	Column G
1	0m		305	155	3	165	295	
2	4m		295	165	3	165	295	
3	8m		305	170	3	165	305	
4	12m		305	155	3	170	295	
5	16m		300	155	3	176	290	
6	20m		280	155	3	175	310	
7	24m				3			
8	28.2m							
9	32.1m	435	295	145	10	180		455
10	35.9m	485	265	170		175		430
11	40.1m							
12	44.25m	450	290	170	3	150	325	455
13	48.2m				3			465
14	52.4m							
15	56m	455						460
16	60.3m				3			
17	64.3m				3			
18	68.1m	450			3			465

Marine Life Survey

Students returned to the Cahuita Pier on 9 September to conduct a marine life survey. In teams of three, students recorded marine species present at the site (with count, if possible) on scuba over a fifteen-minute period. Students conducted two separate marine life surveys of the Cahuita Pier. Nineteen fish species were identified between the two groups. Table 2 presents counts of fish species observed around the pier, while Table 3 recorded species found on individual pilings. Each piling was numbered by the recorder as seen in **Error! Reference source not found.**.

Figure 9. Marine Life on Cahuita Pier Pilings. Image by ECU/Centro 2017.

Table 2. Fish Species Recorded at Cahuita Pier (including counts)

Fish Species	Count
Yellowtail Snapper	1
Ocean Surgeonfish	1
Atlantic Spadefish	5
Doctorfish	1
Mahogany Snapper	1
Wrasse	7
Sergeant Major	15
Sharpnose Puffer	4
Mutton Snapper	14
Stoplight Parrotfish	2
Queen Parrotfish	3
Dusky Damselfish	1
Grunt	4
Slipperydick	1
Princess Parrotfish	4

Discussion

The wood found on site did not show *Teredo* damage and may be associated with the dwellings located on the shoreline during the 1990s (see Historical Background). The ceramics and glass found south of the pier dated to the 19th and 20th centuries (Kim Kenyon personal observation 2017), but did not have any diagnostic features. As Punta Cahuita is known to have been inhabited from the 1820s through the 1990s, further survey of the coast may offer better insight into occupation and refuse disposal patterns on the point.

Table 3. Fish Species Found on Individual Pilings at Cahuita Pier

Piling Number	Fish (Spanish)	Fish (Best English Translation)
1	Pez Limpiador	Cleaner Fish
2	Sargentos	Sergeant Fish
3	Pez Pargo	Snapper Fish
4	Pez Coro, Pargo Punto Negro	Choir Fish, Black Spotted Snapper Fish
5	Pez Pargo Punto Negro	Black Spotted Snapper Fish
19	Sargentos	Sergeant Fish
20	Limpiadores	Cleaner Fish
21	Pez Coro	Choir Fish
22	Cirujano Amarillo	Yellow Surgeon Fish
23	Pez Sargentos	Sergeant Fish
37	Limpiadores	Cleaner Fish
38	Sargentos, Coros, Limpiadores	Sergeant Fish, Choir Fish, Cleaner Fish
39	Pez Jurel, Sargentos	Mackerel, Sergeant Fish
40	Pez Coro	Choir Fish
41	Pez Sargento	Sergeant Fish
55	Sergentros, Limpiadores	Sergeant Fish, Cleaner Fish
56	Sargentos	Sergeant Fish
57	Sargentos, Pargo Punto Negro	Sergeant Fish, Black Spotted Snapper
58	Pez Coro	Choir Fish
59	Damiselas	Damselfish
60	Pez Rencadores, Pargos, Angel, Sargentos, Pepino	Frogfish, Snapper Fish, Angel Fish, Sergeant Fish, and Seacucumber
73	Pez Globo	Pufferfish (Balloon Fish)
74	Pez Coro, Pargos	Choir Fish, Snapper Fish
75	Limpiadores	Cleaner Fish
76	Limpiadores	Cleaner Fish
91	Pargo, Damisela	Snapper Fish, Damselfish
92	Pez Globo	Pufferfish (Balloon Fish)
93	Pargo	Snapper
110	Cirujanos	Surgeon Fish
111	Pez Pargo	Snapper Fish
112	Sargentos	Sergeant Fish
113	Pez Sargento	Sergeant Fish

Puerto Vargas Dock and Shoreline Survey

One of the major sites surveyed as part of the NAS Part 1 and 2 training focused on the remains of a pier at Puerto Vargas. This area is known anecdotally among locals as a former lumber camp from the mid-20th century. Secondary sources reference a sizeable lumber industry throughout this stretch of the Talamanca coast, geared towards the exportation of cedar logs to

Limón (Palmer 1993). With the remains of semi-modern industrial activity apparent both on the beach and surrounding the pier, the location was formally surveyed in several capacities. Beginning on the shoreline, a team of Costa Rican students guided by their ECU counterparts conducted a walking survey of the Puerto Vargas shoreline. Marked by the red line in **Error! Reference source not found.**, the shoreline survey area stretched along the beach from the remains of the old pier in the north to the concrete pylons in the south. Artifacts discovered along this transect were marked with GPS points, photographed, and recorded with written descriptions. The beach was heavily populated with artifacts likely dating to the mid-20th century, with many of them identified as automotive parts. Aside from these, other artifact finds included: bottle glass, window glass, brass fittings, ceramics, iron stakes, and other miscellaneous/unidentified iron objects.

The following day, field teams returned to Puerto Vargas to more closely document the remains of the pier, as well as the partially submerged concrete structures. Notably, the remains of the pier are located roughly 15 m off shore. According to local fishermen the coastline receded approximately that same distance due to a major earthquake sometime during the previous decade. If true, the area of shallow sea bed and coral between the pier and shore may contain an even greater quantity of submerged artifacts than remain uncovered on what is now the shoreline. Nevertheless, a small team of Costa Rican and ECU students utilized measuring tapes, compass bearings, and mylar to create a sketch map of the overall site (Appendix H). The pier structure was built using wrought iron and is heavily corroded by seawater, creating a network of jagged iron edges interspersed with mostly fire coral (*Millepora sp.*).

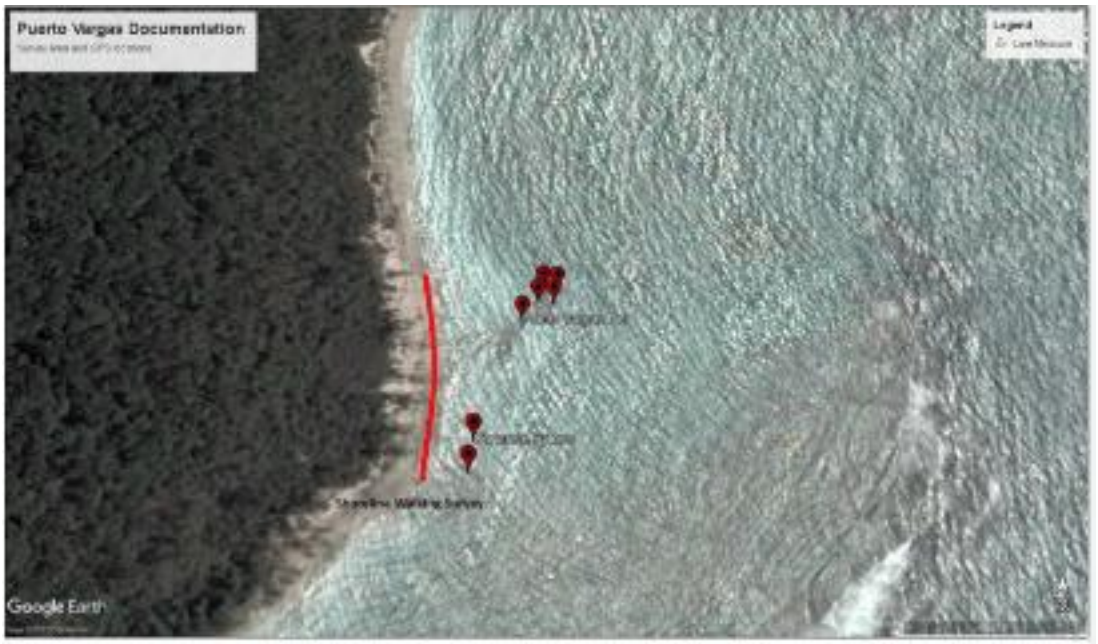

Figure 10. Puerto Vargas Survey Area. Red line indicates area covered by shoreline walking survey, while the red icons indicate the Puerto Vargas Pier and Concrete Pylons. Map created utilizing Google Earth by Ian Harrison 2017.

-Several of these iron pilings (on the ocean-facing side) had historic rubber tires lashed to them with rope, presumably utilized as boat bumpers. Aside from several stray pieces of iron, there was a notable lack of other artifacts within the pier site. The network of iron pylons appear to have been reinforced on the sea-bottom with a semi-circular mound of large rocks and boulders, with the most noticeable build-up on the ocean facing side of the pier. Finally, 7-9 m away from the main body of the pier, there is a large pile of submerged iron girders, many of which have iron sheeting attached to one or both sides. These could have comprised parts of the pier's walking platform or may have otherwise been used as structural materials within the rest of the logging operation.

In addition to the pier remains at Puerto Vargas, further down the shoreline, remnants of a concrete structure were located. Concrete pilings and blocks, along with iron pipes and fittings, are scattered over an area of approximately 25 m along the coast. As an extension of the NAS Part 2 workshop, a small team of Cost Rican NAS participants, led by an ECU crew member, documented the site. Together, the group snorkel searched the area, drew a site map of the

concrete pylons on mylar, photographed the site using a scale bar, recorded GPS points, and took rudimentary baseline measurements. The concrete site could possibly be associated with the lumber mill industry at Puerto Vargas, although its history remains unclear. Its proximity to the iron pier suggests an historic connection between the two sites. For now, anecdotal evidence provided by local Costa Ricans proves to be the best source of historic information for the site (Pers Comm?).

On site, the concrete and iron remains shelter a variety of marine life; however, the structures do not host coral growth. The iron pipes and fittings are heavily corroded, with some partially covered by sand and stone. The concrete piles lie on top of a wooden pulp surface, indicating that the marine substructure was once part of a wetland or forest bed. In conjunction, the site remains are intermixed with tree stumps and roots. Evidence of a submerged forest suggests that the concrete pylons and iron pipes constructed an edifice on what was dry-land. It is hypothesized that during the last decade, geological events, such as earthquakes, in the area contributed to the present state of the site and changes in the coastline's geography.

The remains of the pier and the concrete structures at Puerto Vargas provided NAS participants the opportunity to gain more experience conducting site surveys, documenting artifacts, and recording data using a variety of archaeological tools. Additionally, the Puerto Vargas sites prompted the ECU and Costa Rican teams to research the lumber mill industry which operated in the region during the mid-20th century. The data collected by the ECU team and Costa Rican NAS participants will contribute to future knowledge of the region's rich maritime history.

Cannon and Anchor Site and Shoreline Survey

The Cannon and Anchor Site was visited during the 2017 fieldwork to document any changes in site composition and better understand the surrounding artifact scatter (Figure 10). NAS and ECU students worked together to record cannon position and further survey of the reef flat area was conducted using swim line surveys.

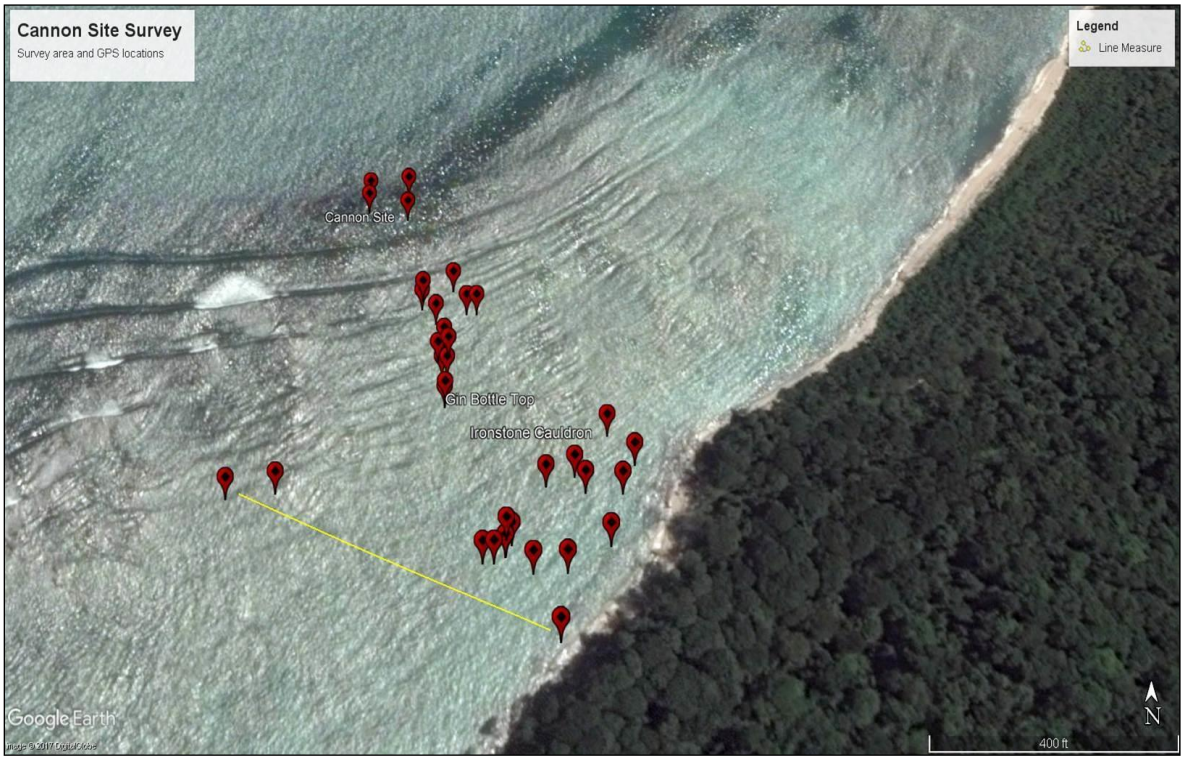

Figure 10. Cannon Site Artifact Survey Map (ECU and CCB Embajadores, 2017).

ECU students remapped the cannon groupings using trilateration while the Costa Rican students conducted swim reconnaissance of the surrounding reef crest. An initial reconnaissance suggested the cannon clusters remained within close proximity (150 m) to the shoreline as had been noted in previous surveys. Following this initial survey, all cannon positions were mapped via trilateration. Cannon position was measured from two control points—the bore and the cascabel of each gun. Each expedition team was assigned a different cannon cluster to record; every cannon was tagged with a reference number for mapping purposes. Finally, several of the

cannon were recorded in detail with specific attential paid to arine flora/fauna, concretion product, and measurement of cannon's major features were recorded. No anchor damage or deterioration of cannon was noted as coral growth on the cannon was unchanged from previous assessments.

After recording the cannons *in-situ*, students conducted swim line survey of the areas northwest and southeast of Cahuita Point. Any material culture identified was marked with weighted buoys, and recorded *in-situ* by scaled photograph. GPS coordinates of the artifacts were taken with above water photographs to aid in relocating the artifacts (see Appendix D).

The cannon recording provided an excellent practical application exercise for the NAS course. While the majority of the guns remained in a grouping of clusters, a few outliers were identified. The Costa Rican students identified four additional targets as possible exposed cannon, all of which were duly recorded and mapped. One of the ten original cannon appears to have suffered a catastrophic misfire, resulting in the charge detonating while still within the bore. The manner in which the piece is damaged could only have been caused by an extreme explosive force and it seems unlikely that any form of blunt force trauma could be responsible.

During the swim line survey, students encountered no cultural materials to the southeast of the cannon site. The swim line surveys to the west of the cannon site, however, located a plethora of artifacts dating to the 19th and 20th centuries. Scattered over a 200 m square survey area, the artifacts included a predominance of glassware and ceramics of varying origin and date of manufacture. All artifacts observed were exposed and oftentimes clustered together.

Material culture to the west of the cannon site includes ironware, case bottle glass, complete wine bottles, turtle shell remains, and various iron concretions. Iron plating of varying dimensions and cast-iron pots were also noted within 20 m of the shoreline. Diagnostic evidence

recovered from the artifacts included a glass bottle seal (Figure 11), maker's marks (Figure 12), and vessel form. The material evidence found during the initial swim line surveys of the Cannon and Anchor Site do not date to the time period of the wreck. Thus, they are likely associated with later use of the area. The sea turtle shell in particular may be indicative of early turtling communities working in the region. Finally, it should be noted that the coastline has undergone extensive change—hurricanes, earthquakes, and storm activity have all undoubtedly exposed previously hidden cultural material. Further investigation of the Cannon and Anchor Site is recommended.

Figure 11. Left: Ironware Cup Bottom, Inset: Detail of Maker's Mark (Ian Harrison/ECU and CCB Embajadores, 2017).

Figure 12. Bottle Seal Recovered from Cannon Site (Kim Kenyon/ECU and CCB Embajadores 2017).

The recommendations of this report encompass future fieldwork, artifact curation, and conservation recommendations. This season the team expanded the field survey beyond the Brick Site and Cannon and Anchor Site, mapping areas towards the shoreline to assess if any cargo washed towards the beaches. The Puerto Vargas and Punta Cahuita piers were recorded as part of the NAS training and research. It is likely that there might be artifact mingling in the areas which could provide more clues and understanding of the sites, as well as physical impacts of tides, waves and currents upon them.

Fieldwork Recommendation

During the 2017 season numerous artifact were encountered in the shallow reefs from the Cannon and Anchor Site towards the shoreline. Most of these materials dated to the 19th and 20th centuries, thus post-dating the wrecking of the two Danish slave ships and more likely indicating a shoreline refuse disposal pattern. It is recommended that a combination of snorkel and SCUBA teams conduct further survey work and *in situ* documentation in this area. Artifacts should be mapped, photographed, and drawn *in situ*. The team should pursue follow-up research to identify and date each item. Further investigation of the assemblage may reveal details about association with either the wreck or the shoreline community, or later engagement with the wreck by the community. It is suggested that each search and survey team snorkel volunteer be equipped with artifact photography scales, and cell phone with features such as a camera, voice recorder, free downloadable software to acquire locational data in a waterproof housing case.

Other areas for similar work include those surrounding the historic docks at Puerto Vargas and Punta Cahuita. Both of these may represent important maritime landscapes connected to the park and allow for an exploration of labor history themes such as the lumber

industry, turtle hunting, and other significant components of the community narrative. Particular fieldwork in the Puerto Vargas area includes the reefs seaward of the dock where shipwrecks may have run aground and remnants of hull structure and/or anchors could be embedded in the bottom substrates. It is recommended that tow boarding is a useful method for survey in these deeper areas further offshore, along with pedestrian surveys on the beach and adjacent path.

For continued work on the Brick Site and Cannon and Anchor Site, it is recommended that regular monitoring be conducted to identify changes such as: increased or decreased marine growth, fluvial and sedimentary processes, shore configuration, robustness of artifacts or movement on the site, water quality, and fish populations. For management purposes it would be useful to collect data on snorkel tourism visitation, diver behavior on site, and perceptions of the activity experience with Cahuita Park Service boats.

Further collaborative fieldwork planning, with participation and guidance of professionally trained underwater archaeologists, could explore options for limited excavation at the Brick Site. Archaeological investigations have identified the central portion of the shipwreck as a cargo hold area, as evidenced through exposed bricks that appear have been stacked. As such, a small trench across this this area could reveal a great deal about the cargo that was carried. Furthermore, this activity could potentially expose wooden hull remains that could help in determining an origin and possibly a date for the vessel's construction. The excavation could theoretically be conducted by systematically removing bricks from a defined area and positioned on the seabed so that they could be replaced in the exact positions when complete. Any mobile artifacts or timbers would be thoroughly recorded and then reburied securely under the brick backfill.

To date, the few artifacts documented on and near the two shipwreck sites are not sufficient to positively prove the hypothesis that they are the remains of slave ships. The bottles date to a later period. Objects like tea kettles, grindstones and manillas, although found slave shipwreck sites, or listed in historical records as cargo, are also documented on merchant ships. Complications with identifying these sites include the usual post depositional factors associated with shipwrecks located in close proximity to a foreshore community, such as easy salvage, artifact reuse, and site contamination. A more in-depth understanding of these events is an integral part of interpreting the sites as the project progresses. While the brick cargo seems to be the most likely evidence at present, excavation of the extensive pile is necessary to confirm the evidence of ship structure and artifacts dated to the time period of the wrecks in the strata below. Specific artifact or cargo items that might be anticipated and which could substantiate the identity of these vessels are large numbers slave shackles and other restraining devices, ivory, and an artifact assemblage with diagnostic evidence pre-dating 1710.

Artifact Recommendations

Three artifacts raised during the 2016 field season were examined in fall 2017. While observing the artifacts' current state, suggestions for immediate action were offered including possibilities for analysis and storage. Coupled with recent finds were additional artifacts purported to have been raised from the same two shipwrecks in Cahuita National Park over the course of several decades and having been held in private collections among the community. The Centro currently is raising awareness and interest in assembling these materials toward establishing a community museum dedicated to the wrecks. Several individuals in Cahuita have already recognized the importance of this endeavor and have graciously donated artifacts for the

cause. Recommendations were also made in regards to these dry objects for the sake of their long-term stability.

Wet Artifacts

Conservators consider the first few steps taken with objects recovered from archaeological sites as artifact triage. This may be even more critical with objects from marine environments. Artifacts become destabilized due to environmental factors and chemical reactions, but the immediate point of concern is the presence of water and salt. These two elements are extremely detrimental and lead to a host of issues if not addressed correctly from the beginning. To avoid imminent and irreparable damage, the minimum course of action to mitigate problems arising from the presence of both water and salt is to maintain the object in an environment as near to the burial environment as possible: in this case, keep it wet (Hamilton 1996:8). Below, the storage needs of each object is addressed, followed by a discussion of what technology may be at hand in helping identify and analyze the materials. Additionally, some discussion is offered on what further steps in conservation may be taken if deemed necessary.

Kettle

In 2016, a tea kettle of unidentified metal was raised from the Brick Site (Harris et. al 2016). Research has been undertaken to determine its age based on morphology, but no definite date or origin has been established. Further typological study may be informative, and scientific analysis may prove beneficial.

Currently, the kettle is stored in a salt water tank also containing live lobsters at a restaurant in Cahuita. To prevent further degradation and promote long-term stability, it is highly recommended that the kettle be isolated in its own tank of tap water (Hamilton 1996:89-90) and monitored weekly for evaporation and development of biological growth. The tank should be

protected from sunlight and kept as cool as possible to combat these common problems with wet storage (Cronyn 1990:78, Cronyn 1990:99). The tap water should be discarded and renewed at least bi-weekly to prevent growth. This will eliminate the need for a biocide, the use of which should generally be avoided. Care should be taken to prevent the spillage and loss of sediment in the kettle, avoiding the pouring out of water and thus the disturbance of sediment.

The kettle was previously x-rayed, but the resulting images offered no diagnostic information. Further radiography, with varying voltages and from different angles, may help to identify the metal as well as its state of preservation (Shearman and Dove 2005:155). The elemental makeup of the kettle is as yet unknown and can be superficially analyzed using portable x-ray fluorescence (pXRF). In order to obtain accurate readings, this should be done at a site on the kettle where the surface is exposed and not obscured by concretion (Shugar and Mass 2012:25-29). This technique is non-destructive and helpful when simply needing to identify the basic metals for guiding decision-making in conservation and long-term stability (Shugar and Mass 2012:17-21). Handling with bare hands should be minimized so as not to influence pXRF data since contaminants on skin can be easily transferred to the object's surface.

Depending upon the outcome of elemental analysis as well as long-term plans for maintenance or stewardship, the kettle may warrant active conservation. This should only be done by a qualified conservator, to prevent unintentional harm to the kettle, and in a controlled laboratory environment, as cleaning certain metals carries inherent risks to the conservator if not properly protected. Additionally, the kettle contains sediment which may be screened for further archaeological material (Price 2016:4-5) and sampled for possible palynological study (Gorham and Bryant 2001:289-291; Weinstein 1992:55-57). It should be stated however that cross-contamination from the live lobsters as well as degradation of pollen grains due to the

uncontrolled storage environment may negate any findings (Gorham and Bryant 2001:284-285, Gorhan and Bryant 2001:295), should intact pollen grains even be found.

Bricks

Bricks were recovered from the Brick Site in 2016 along with the kettle (Harris et. al. 2016). Several possibilities for identification (Dutch, Danish, and Spanish) have been explored based on physical characteristics (Borrelli and Harris 2017:12-13); however analytical techniques borrowed from geological studies may elucidate further microscopic clues to the origins of the brick. Comparative analysis of Brick Site bricks to other archaeological examples with known provenience of the raw material is essential in making that determination.

The bricks are also being stored along with the kettle in a salt water tank with lobsters at a restaurant in Cahuita. As described for the kettle, the bricks should be stored in an isolated tank of tap water and changed bi-weekly. The tank should be protected from light as much as possible to prevent biological growth. Although the base materials are chemically stable, damage due to physical forces must be combatted (Cronyn 1990:103). Low fired ceramics, such as bricks, are extremely susceptible to damage due to salt crystallization causing exfoliation of the ceramic surface (Hamilton 1996:19). To prevent this, it is essential the bricks be kept fully submerged in water and checked bi-weekly for evaporation of water, with tank top-ups as needed.

The key to successful analysis of undecorated coarsewares, outside of typographical study, is the identification of the mineral makeup. Different minerals may contain the same elements but are distinguishable by their physical characteristics. Elemental depletion may also occur due to diagenesis, or alteration of chemical makeup due to the conditions of the burial environment (Price and Burton 2011:49), thus, elemental analysis alone may be imprecise.

Several methods exist by which to analyze mineral composition (Weiner 2010:70-72), the most common of which are discussed below.

Petrographic analysis yields the particle size within the matrix of a ceramic or brick, as well as the identification of minerals in the temper of a clay. This may be relevant in determining a provenience for the bricks, if comparisons can be made to other known examples (Borrelli and Harris 2017, Table 1) and samples of clay from suspected sources. The physical characterization of ceramics may be more precise in determining origin as opposed to elemental analyses: the same elements may be present in many different types of rocks, whereas minerals may be linked to a specific region of origin for the parent materials (Price and Burton 2011:116-118, Price and Burton 2011:229-234, Weiner 2010:198-200, Shugar and Mass 2012:26-28). A petrographic study of tablets unearthed at Tel el Amarna in Egypt produced possibilities for locations of previously unknown cities in the 14th century BCE, by comparing the clay of the tablet to clays in southern Cyprus and other locations in the Levant (Goren et al 2002). Through similar successful comparisons of minerology, it may be possible to determine the origins of the bricks.

Another option for exploring the mineralogical makeup of the bricks is x-ray diffraction (XRD). An x-ray diffractometer observes distinctive patterns of x-ray scattering to measure mineral composition (Price and Burton 2011:274). XRD can reliably differentiate between thousands of minerals and calculate the sample's crystalline dimensions (Weiner 2010:71, Price and Burton 2011:120). Data for all known minerals are housed within searchable databases, and the computer compares XRD results to known data, returning the closest possible matches. Both petrography and XRD are destructive techniques, requiring thin-slicing and pulverization of a sample, respectively (Price and Burton 2011:119-120).

As with the kettle, and dependent upon a number of decisions, further work on the bricks may be undertaken by a qualified conservator in a controlled laboratory environment. If desired, desalination is vital to prevent disintegration of the clay upon drying. While unnecessary to the stability of the brick, mechanical cleaning may be undertaken to improve appearance only if there will be no negative impact to the artifact. Chemical cleaning should be avoided because the clay of ceramic artifacts is often too similar to the encrustation, and chemicals may target the artifact instead of the encrustation (Cronyn 1990:106).

Concretion

A concretion containing an iron artifact was also raised the same season. Concretion develops as a result of iron corroding in a marine environment and is composed of corrosion products, marine growth, and sediment (Crony 1990:181). Despite obscuring any underlying artifacts, a concretion may be able to provide more information than realized at initial inspection. Radiography may be helpful in determining the contents of a concretion as well as state of preservation, and it is the first step in assessing a conservation strategy.

The concretion is currently housed in the same lobster tank with the kettle and bricks. Ideally, concretions are stored in a basic solution to prevent further corrosion of the underlying iron (Hamilton 1996:49). However, due to safety concerns when handling highly alkaline chemicals and the lack of a laboratory equipped with health and safety protocols, it is advocated that the concretion remains in tap water. The encrustation if intact forms a protective layer which may help passivate underlying artifacts (Hamilton 1996:49) and should be left in situ until a conservation strategy is established.

Radiography was previously undertaken and offered no conclusive information regarding the identity of the encapsulated iron object. It may be beneficial to attempt further radiography,

at varying exposures and from different angles to offer a more three-dimensional view of the object (Cronyn 1990:60-61). A positive identification based on radiography alone, however, is never guaranteed. Additionally, there may be other materials present, such as glass or organics that will not be evident in x-ray. Without active conservation undertaken by a professional, no other information is available, and additional analytical techniques may not be helpful.

Depending on the contents, concretion-breakdown and the subsequent conservation of the artifacts within may be some of the most tedious and time-consuming work in the conservation field. Proper removal of concretion involves the gradual pulverization of the encasing encrustation using pneumatic tools and careful extraction of each artifact. This creates health hazards due to possible dust inhalation and exposure to high noise levels which must be taken into consideration. Therefore, concretion breakdown must only be undertaken in a highly-controlled environment with various forms of personal protection (dust extraction, eye and ear protection, particulate respirator, etc.) utilized by a trained professional. Until a long-term plan for this artifact is established, as previously noted for other excavated material, monitored wet storage should be utilized as a passive means of preservation.

Dry Artifacts

Thirteen objects previously raised from the two sites were examined, and recommendations for their safe handling, storage, and long-term care were provided. At this time, active conservation should be avoided, since the artifacts have been dry for an unknown period of time. Their current state should be preserved to ensure that the artifacts remain in stasis. Improper or uncontrolled humidity, and the effects thereof, is one of the most damaging factors influencing an artifact's stability (Cronyn 1990:70, Erhardt and Mecklenburg 2012). Humidity is expressed as relative humidity, or a specific water quantity in a given volume of air,

relative to the maximum amount of water in that volume of air at a given temperature (Pavlogeorgatos 2003:1458). The necessary relative humidity levels for stable dry storage of each material type are discussed below.

Archaeological objects should be handled with the greatest care. It is always best to assume that all artifacts are extremely fragile and irreplaceable, to combat inadvertent damage. Gloves should be worn at all times, so that acids and salts from skin do not contaminate the surface, which may induce corrosion or physical degradation. Protrusions, such as handles of jars or the trunnions of a cannon, should not be considered lifting points as they may be weakly attached and prone to breakage (Miles 2012:59-60). In general, archaeological material is never as strong as it was when first manufactured. Physical and chemical stresses due to the burial environment weaken artifacts through the centuries, so the utmost care should be exercised.

Currently, the dry objects are being stored in individual felt bags. Due to the tendency to snag on uneven surfaces, the fabric bags should be replaced by hard-sided protective containers which will not cause unintentional abrasion. This will also minimize negative direct impact or improper pressure, with containers being utilized particularly when the object must be moved. Ideally, each object will have its own independent housing, labelled with artifact information and protected from light, humidity fluctuation, pollution, insects and mishandling (Caple 2012:81). Padding should also be used within containers to limit friction and uncontrolled shifting (Miles 2012:57-58).

The type of storage container is also critical to an artifact's longevity. Exposure to unstable packaging materials can cause artifacts to further degrade. In general, packing material made of wood should be avoided due to its propensity to off-gas organic acids, which may cause deterioration. Any paper used for labeling or cushioning should be acid-free, with Tyvek being

an excellent alternative. Polyethylene foam and sheeting also performs well for both mount-making and cushioning. Ideal containers are made of high density polyethylene, which is inert and will not negatively impact archaeological material (Marcon 2012, Winsor 2012).

Metals

Depending on the age of a shipwreck, a variety of metals may be found. Several metallic artifacts have been raised from the two wrecks and the nearby areas through the years. Fortunately, those metals are limited to iron, in wrought, cast and concreted forms, as well as copper alloy. In the case of the latter, this is a general term since the exact composition, whether brass or bronze, of the copper-based artifacts is unknown.

Wrought iron implements used in the logging industry and cast iron cannon shot were examined, as well as small indeterminate iron fragments. Although the modes of manufacture differ, both types of iron benefit from the same manner of long-term care and storage conditions. Physical handling should be kept to a minimum, considering the friability of the outer layer of protective concretion still extant.

No cleaning of the iron objects should be undertaken. The removal of concretion may catalyze and exacerbate corrosion (Hamilton 1996:49), particularly since the artifacts have been dry for an undetermined length of time. Should active conservation be warranted, this must be performed by a qualified professional in an appropriately equipped laboratory. It is assumed that no desalination was attempted previously and that the iron is still impregnated with an appreciable amount of chlorides from the depositional environment. In order to halt chloride-driven corrosion, the storage environment should be kept as dry as possible. Experiments have shown that a relative humidity below 12% is sufficient to prevent further corrosion (Watkinson and Lewis 2005). This can be achieved through enclosing the artifact in a sealed environment

with color-indicating silica gel desiccant coupled with humidity strips or a digital data logger (Pavlogeorgatos 2003:1458, Winsor 2012:103). When the desiccant is saturated, it is simply renewed through heating in a lab oven (Winsor 2012:101). Since silica gel is toxic, this should not be done in an oven also used in food preparation. Small commercially available desiccators are inexpensive and can serve as housing to attain this level of environmental control. Another solution is a dehumidifier, but these can be expensive and can seldom maintain such a low relative humidity.

No mechanical or chemical cleaning of the small concretion should be performed, since the state and stability of the underlying metal is unknown. The enveloping encrustation remains fully intact, and it is this factor which best ensures the preservation of the object within it (Hamilton 1996:49). Should exploration be sought, a series of radiographs may illuminate the identity of the obscured artifact, along with any other materials the concretion contains.

The copper alloy manilla and manilla fragment showed no signs of active corrosion (Rimmer et al 2013:11), thus active conservation is unnecessary and may even cause the objects to become destabilized (Cronyn 1990:227-229). Copper and copper alloys can be distinguished by their tell-tale green corrosion products. In the case of the manilla and fragment, the corrosion product is present in the form of a patina with some corrosion crust attached (See Cronyn 1990:213-219). A fragment of concretion was found with the collection of artifacts that had clearly become detached from the intact manilla. Copper alloys benefit from a storage environment with a static relative humidity below 42% (Rimmer et al 2013:12). If the artifacts are stored in a stable environment and are routinely monitored, no foreseeable problems should arise.

Ceramics

Ceramics are some of the easiest objects to curate, and stability is ensured at a much wider range in relative humidity, as long as a static percentage is maintained (Cronyn 1990:159). Two different types of ceramic were examined: a small sherd of mulberry transferware and a brick fragment.

Transferware was a popular style of ceramic design that developed in England in the mid-18th century, with Staffordshire being the main center of production throughout the 19th century. Thousands of different patterns were produced. It is called transferware because of the mode of production: patterns are transfer printed onto the pottery instead of being hand-painted, enabling inexpensive mass production. The small sherd represented here has a dark purple pattern, often referred to as mulberry. More detailed analysis and research may reveal the pattern, date, and place of manufacture, since most patterns had a short production run (Samford 1997, MAC Lab 2002). The sherd is in remarkably good condition, with little crazing of the exterior glaze and no apparent salt damage, thus it needs no further cleaning.

The brick fragment has a small amount of marine encrustation attached, which for the safety of the brick should be left in place. Once brick is dry, it is very easy to unintentionally abrade the surface while attempting to clean (Cronyn 1990:148). As previously discussed for the wet brick, further analysis can be performed to attempt to determine the origin of the clay. Since both examples of dry ceramics from the site have been dry for some time and presumably not desalinated at the time of recovery, it is advisable that the relative humidity be kept stable to prevent recrystallization and expansion of salt crystals likely still within the clay (Hamilton 1996:19). A suitable range is between 40% and 60% relative humidity with little fluctuation

(Erhardt and Mecklenburg 2012:340). The most damaging hazard to avoid in this case is breakage through mishandling (Cronyn 1990:159), thus caution should be exercised during handling.

Organics

Organic material naturally contains moisture, thus a certain degree of humidity. When these materials are introduced to a low relative humidity, they can experience shrinkage; when humidity is reintroduced, a re-expansion occurs. Due to these physical forces, fluctuations in humidity may cause irreparable damage to the fabric of an object (Pavlogeorgatos 2003:1457).

Bone in particular may experience cracking if kept too dry. Inversely, if kept too humid, organic matter may serve as a natural host to mold (Pavlogeorgatos 2003:1457-1459). Two bones recovered from the shipwrecks were examined: the jaw bone from a parrot fish and an unidentified, but non-human tooth. Since both bones appear to be in excellent condition, no further conservation is necessary. For a long-term storage environment, both specimens would benefit from a stable relative humidity between 40% and 60% to prevent distortion or cracking and to prevent biological growth (Erhardt and Mecklenburg 2012:351-353).

Two small wood fragments were also studied. Both appear in stable condition and exhibit no characteristics of further degradation, i.e. shrinkage, cracking, or warping. Like the bone, the wood should be kept at a stable relative humidity between 40% and 60% to prevent mechanical damage due to physical forces effected by fluctuating humidity (Erhardt and Mecklenburg 2012). It cannot be understated that no matter what percentage of relative humidity is established, fluctuation from this baseline percentage must not be allowed, as it is fluctuation that causes the most damage (Erhardt and Mecklenburg 2012:340).

Artifact Recommendations Summary

Isolation from light, biological organisms and microorganisms, and prevention of fluctuating environmental conditions comprise the ideal storage environment for waterlogged finds. This will entail a designated responsible party to routinely monitor artifacts in wet storage. A suitable location to store and monitor wet artifacts is the isolated ranger station near Puerto Vargas. It is not open to the public, and security is assured. José Francisco Saballo López is the perfect candidate for helping monitor these objects, since he is employed by Cahuita National Park. Mr. López is also undertaking the completion of NAS Part II and has the skills, as an advanced NAS student, to exercise great caution in properly handling artifacts.

Many of the dry artifacts are more forgiving as far as storage conditions, excepting the cast iron and wrought iron. In order to maintain static preservation of dry artifacts, it is critical that the storage environment be tightly controlled and monitored. Fluctuation in humidity, temperature, and exposure to ultraviolet light in some cases may prove detrimental over time. These are all factors which can be corrected and controlled easily on such a small scale and relatively cheaply.

Should additional work be undertaken at the Cannon and Brick Sites, it is recommended that artifacts be documented in situ, or at the surface if necessary and redeposited. Without laboratory facilities, conservation staff, or immediate plans for a staffed museum (Cronyn 1990:95-101), further removal of artifacts from the sites should be avoided. One reason for controlled excavation is to preemptively combat loss of artifacts due to looting; however, with several members of the diving community having completed NAS instruction, there is a strong network of support and protection for the shipwrecks. These individuals are equipped to share

the importance of preserving cultural heritage sites with other community members and through this means serve as the front line in the prevention of undocumented artifact collection.

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APPENDIX A. NAS SCHEDULE

September 1 (NAS Part I Begins)

Morning	Afternoon
Group 1. Cannon and Anchor site	*NAS Introduction* lectures

September 2

Morning	Afternoon
Cannon and Anchor site	Group 1. *NAS Introduction* beach site mapping.

September 3

Morning	Afternoon
Group 1 and 2. Cannon and Anchor Site.	Group 1. *NAS Introduction* pool session

September 4

Morning	Afternoon
Group 1: Diver search and survey along the Cahuita Point reef line	Group 1: *NAS Part I* class.

September 5

Morning	Afternoon
Diver search and survey along the Cahuita Point reef line.	Group 1: *NAS Part I* class.

September 6 (NAS Part II begins)

Morning	
Anchor and cannon mapping. Experimental archaeology and site formation processes.	Group 1 and 2. Post processing.
Afternoon	*NAS Part II Mini-Conference:* Heritage Tourism and Underwater Archaeology (All ECU)

September 7

Morning	
Search and Survey around the Cannon and Anchor site. Experimental archaeology and site formation processes.	Group 1. Post processing Group 2. Small boat and maritime landscape recording.
Afternoon	*NAS Part II Mini-Conference:* Archaeology of Slave Ships, Pirate Ships

September 8

Morning	Afternoon
Diver searches patterns along the Cahuita Point reef line. Experimental archaeology and site formation processes.	Group 1: Post Processing Group 2. Small boat and maritime landscape recording

September 9

Morning

Cultural features as living museums (flora and fauna inventory) on the cannon and anchor site.

Afternoon

Group 1 and 2. Post processing the data. NAS Part II Students work with ECU mentors on their power point

September 10

Group 1 and Group 2 complete any necessary fieldwork and post-processing
Working with CCB students to create power point presentations on topics of choice.

September 11 – 16

- Writing the report
- Public Presentations by ECU and CCB

APPENDIX B. THESIS RESEARCH PRESENTATIONS AND WORKSHOPS

September 7, 2017

Stephen Lacey: Cast Iron Grenades of the Early Eighteenth Century

Ryan Marr: Vernacular Watercraft of the Pangani Region, Tanzania

Ian Harrison: South Africa, Heritage at Risk

September 8, 2017

Maddie Roth: Archaeological Investigation of Pacific Reef Wreck

Sara M Parkin: Reconstructing Buffalo City (1885-1986): Applying Archaeological Site Reconstruction Techniques to a North Carolina Maritime Entrepôt

September 9, 2017

Kim Kenyon: Kizilburun Column Wreck Excavation

Anna D'Jernes: ECU Summer Field School 2017, Bermuda

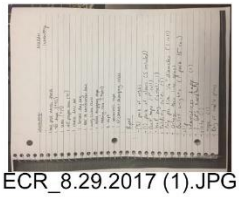
September 10, 2017

Kim Kenyon: The Recovery of Blackbeard's Queen Anne's Revenge

APPENDIX C. MYLAR LOG AND THUMBNAIL IMAGES

Mylar Number	Photo Number	Date	Author	Subject	Image Type	Site	Notes
1	ECR_Mylar_1	9/2/2017	Anna D'Jernes. Maddie Roth, Stephen Lacey	Cannon Trilat Data: Cannon 10-13, 15	Trilat Data	Cannon Site	
2	ECR_Mylar_2	9/2/2017	Sara Parkin	Cannon Trilat Data	Trilat Data	Cannon Site	
3	ECR_Mylar_3	9/4/2017	Ryan Marr and Stephen Lacey	Coral/Cannon Survey	Coral ID	Cannon Site	
4	ECR_Mylar_4	9/4/2017	No Name (NAS Student)	Cannon Sketch	Field Notes	Cannon Site	NAS Training
5	ECR_Mylar_5	9/4/2017	Antonio and Carlos	Cannon 3 Measurements	Field Notes	Cannon Site	NAS Training
6	ECR_Mylar_6	9/4/2017	Glorianna and Ramon	Cannon 8 Measurements	Field Notes	Cannon Site	NAS Training
7	ECR_Mylar_7	9/4/2017	Sara Parkin, Maddie Roth	Cannon 5 Measurements	Field Notes	Cannon Site	NAS Training
8	ECR_Mylar_8	9/4/2017	Jose and Giovanni	Cannon 2 Measurements	Field Notes	Cannon Site	NAS Training
9	ECR_Mylar_9	9/4/2017	No Name (NAS Student)	Cannon 4 Measurements	Field Notes	Cannon Site	NAS Training
10	ECR_Mylar_10	9/4/2017	Ryan Marr and Stephen Lacey	Cannon 7 Measurements	Field Notes	Cannon Site	NAS Training
11	ECR_Mylar_11	9/4/2017	Ian Harrison and Anna D'Jernes	Cannon 1 Measurements	Field Notes	Cannon Site	NAS Training
12	ECR_Mylar_12	9/4/2017	Thingley, Glorianna, Ramon	Cannon 8 Measurements	Field Notes	Cannon Site	NAS Training
13	ECR_Mylar_13	9/5/2017	Lynn Harris and Maddie Roth	Survey of Cahuita Point GPS	GPS	Cahuita Point	NAS Training
14	ECR_Mylar_14	9/6/2017	Stephen Lacey and Ian Harrison	Cahuita Point Pier GPS	GPS	Cahuita Point	NAS Training
15	ECR_Mylar_15	9/6/2017	Salvatore	Cahuita Point Dock Survey	Field Notes	Cahuita Point	NAS Training
16	ECR_Mylar_16	9/6/2017	Ramon and Jose	Cahuita Point Dock Survey	Field Notes	Cahuita Point	NAS Training
17	ECR_Mylar_17	9/6/2017	No Name (NAS Student)	Cahuita Point Dock Survey	Field Notes	Cahuita Point	NAS Training
18	ECR_Mylar_18	9/6/2017	Stephen Lacey and Ian Harrison	Cahuita Point Dock Survey	Field Notes	Cahuita Point	NAS Training
19	ECR_Mylar_19	9/6/2017	Stephen Lacey, Sara Parkin, and Ian Harrison	Cahuita Point Dock Survey	Offset Measurements	Cahuita Point	NAS Training
20	ECR_Mylar_20	9/6/2017	Maddie Roth and Ryan Marr	Cahuita Point Dock Survey	Artifact Sketch and GPS	Cahuita Point	NAS Training
21	ECR_Mylar_21	9/6/2017	Ryan Marr	Cahuita Point Dock Survey	Artifact Sketch and GPS	Cahuita Point	NAS Training
22	ECR_Mylar_22	9/7/2017	Anna D'Jernes	Puerto Vargas Dock Survey	Field Notes	Punta Vargas	NAS Training
23	ECR_Mylar_23	9/7/2017	Anna D'Jernes	Puerto Vargas Dock Survey	Field Notes	Punta Vargas	NAS Training

24	ECR_Mylar_24	9/7/2017	Maddie Roth	Puerto Vargas Dock Survey	Field Notes	Punta Vargas	NAS Training
25	ECR_Mylar_25	9/8/2017	Anna D'Jernes and Thingley	Puerto Vargas Dock Survey	Field Notes	Punta Vargas	NAS Training
26	ECR_Mylar_26	9/8/2017	Giovanni and Maria	Puerto Vargas Dock Survey	Field Notes	Punta Vargas	NAS Training
27	ECR_Mylar_27	9/8/2017	Ian Harrison	Puerto Vargas Dock Survey	GPS	Punta Vargas	NAS Training
28	ECR_Mylar_28	9/8/2017	Sangye	Anchor Measurements	Field Notes	Cannon Site	NAS Training
29	ECR_Mylar_29	9/9/2017	Ramon and Jose	Brick Site Fish ID	Fish ID	Brick Site	NAS Training
30	ECR_Mylar_30	9/9/2017	No Name (NAS Student)	Brick Site Fish ID	Fish ID	Brick Site	NAS Training
31	ECR_Mylar_31	9/9/2017	Ryan Marr	Brick Site Fish ID	Fish ID	Brick Site	NAS Training
32	ECR_Mylar_32	9/9/2017	Maddie Roth	Brick Site Fish ID	Fish ID	Brick Site	NAS Training
33	ECR_Mylar_33	9/9/2017	No Name (NAS Student)	Brick Site Fish ID	Fish ID	Brick Site	NAS Training
34	ECR_Mylar_34	9/9/2017	Maddie Roth	Cannon Site Artifact Search	GPS	Cannon Site	NAS Training
35	ECR_Mylar_35	9/9/2017	Ryan Marr, Maddie Roth, Stephen Lacey	Brick Site Fish ID	Fish ID	Brick Site	NAS Training
36	ECR_Mylar_36	9/9/2017	Anderson, Kevin, Roger, Esteban	Brick Site Fish ID	Fish ID	Brick Site	NAS Training
37	ECR_Mylar_37	9/9/2017	Kevin and Rob	Brick Site Fish ID and Anchor Measurements	Fish ID	Brick Site	NAS Training
38	ECR_Mylar_38	9/10/2017	Ian Harrison, Stephen Lacey	Cannon Site Artifact Search	GPS	Cannon Site	NAS Training
39	ECR_Mylar_39	9/10/2017	Ian Harrison, Stephen Lacey	Cannon Site Artifact Search	GPS	Cannon Site	NAS Training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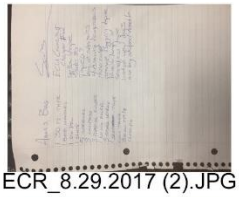
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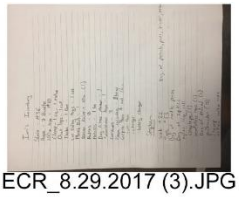
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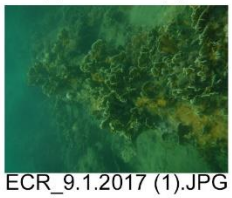
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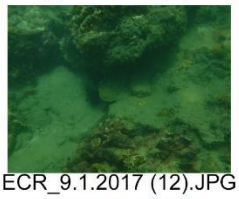
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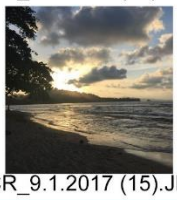
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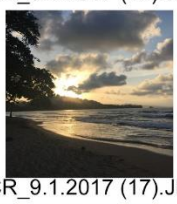
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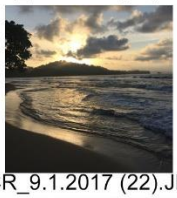
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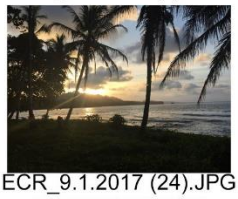
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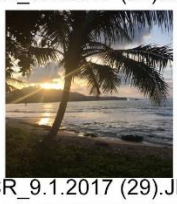
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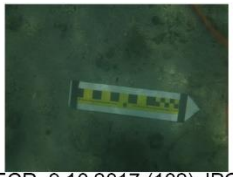
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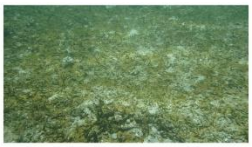
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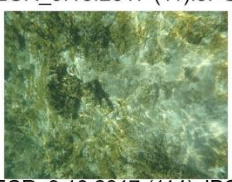
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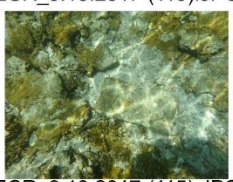
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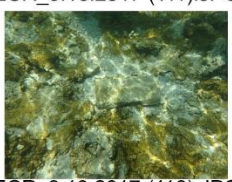
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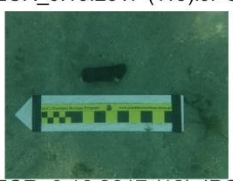
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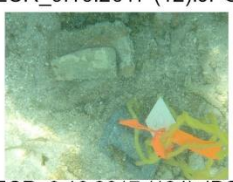
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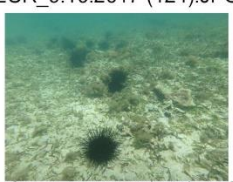
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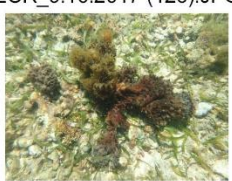
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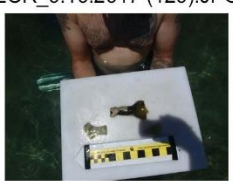
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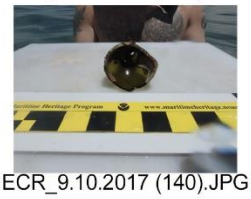
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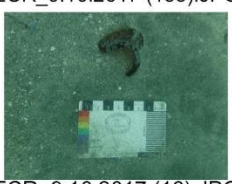
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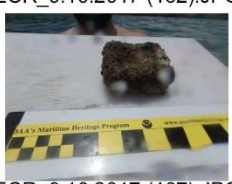
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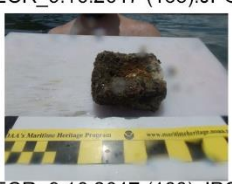
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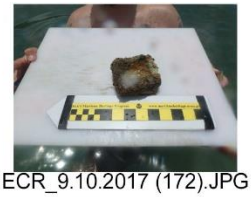
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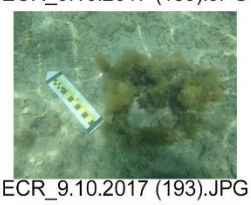
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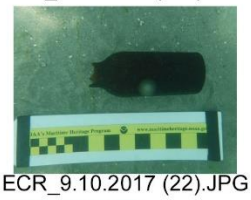
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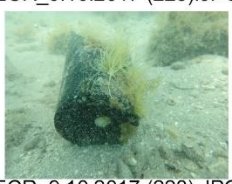
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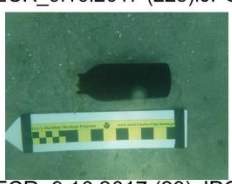
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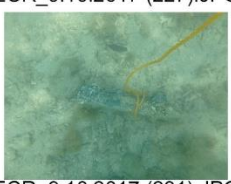
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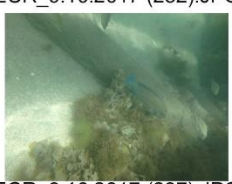
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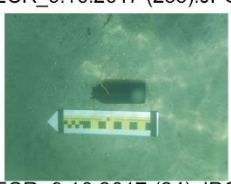
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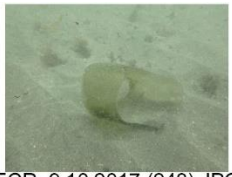
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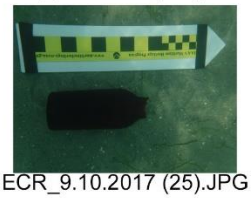
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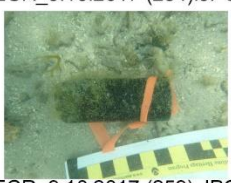
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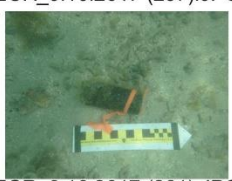
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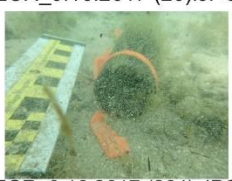
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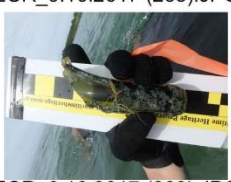
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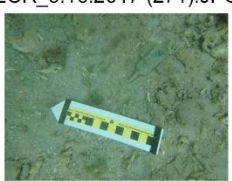
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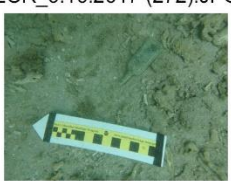
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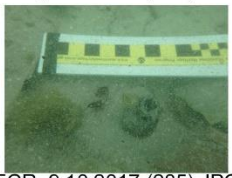
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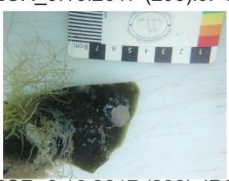
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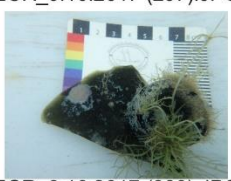
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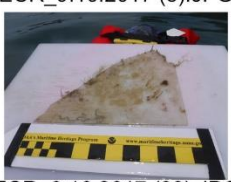
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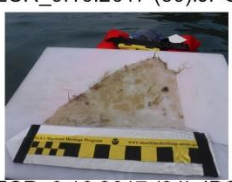
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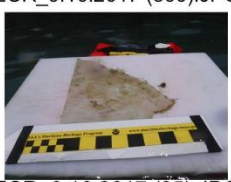
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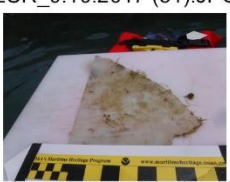
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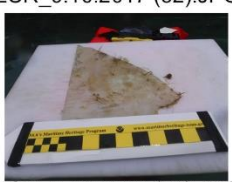
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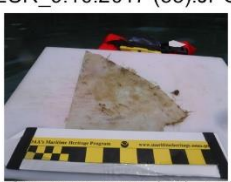
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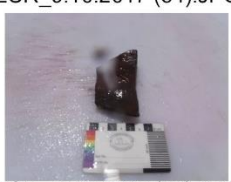
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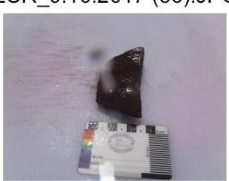
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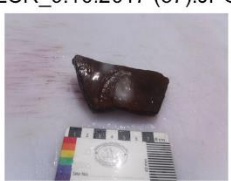
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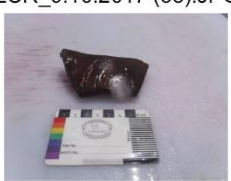
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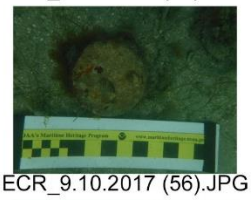
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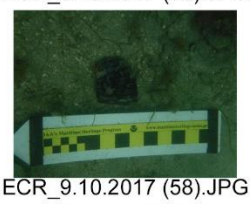
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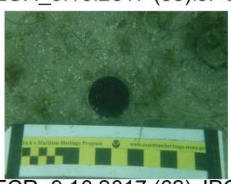
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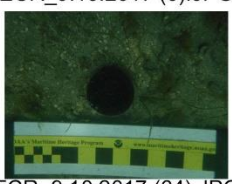
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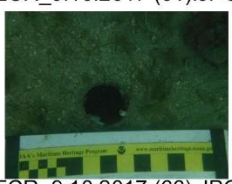
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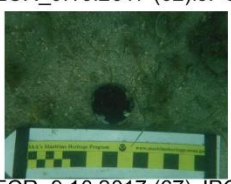
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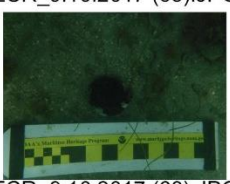
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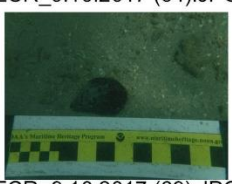
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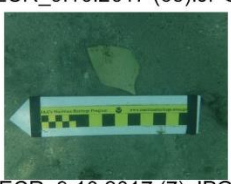
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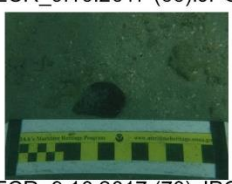
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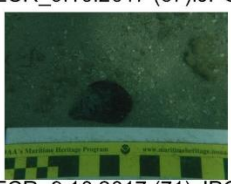
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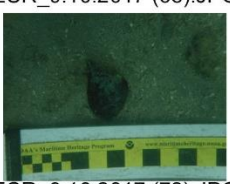
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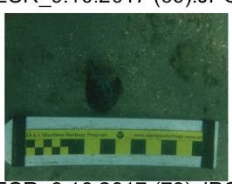
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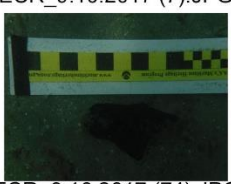
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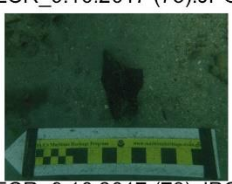
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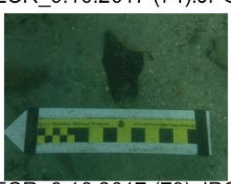
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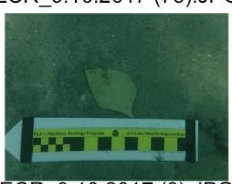
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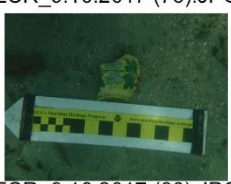
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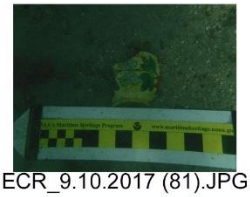
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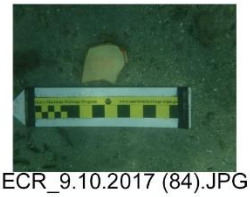
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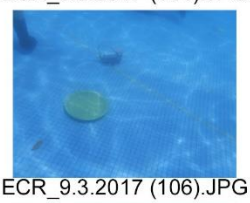
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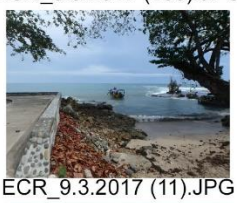
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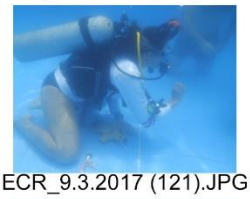
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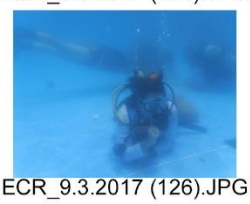
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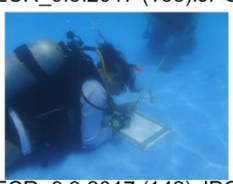
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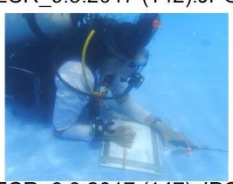
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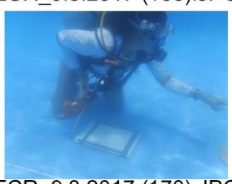
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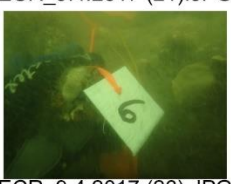

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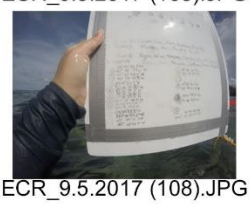
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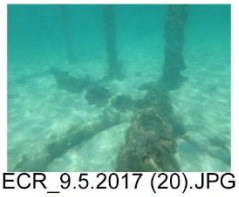
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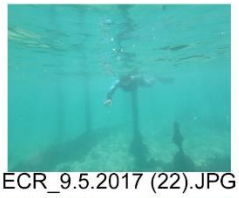
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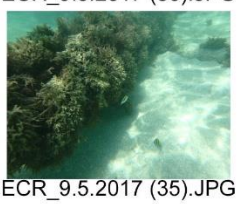
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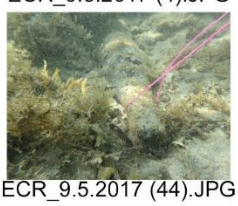
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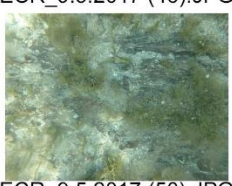
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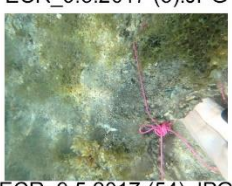
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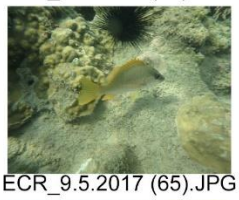
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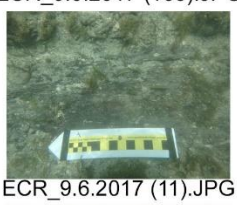
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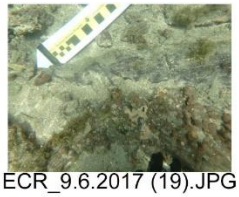
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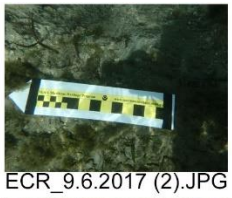
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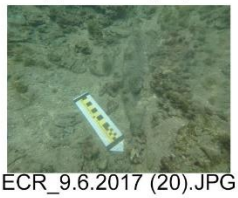
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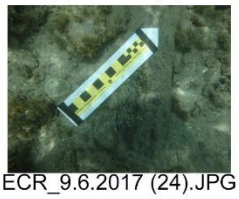
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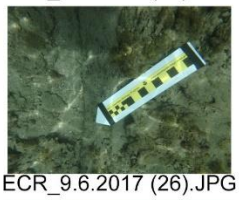
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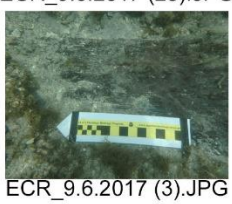
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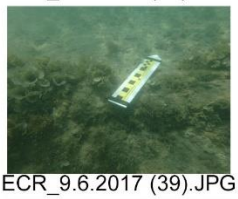
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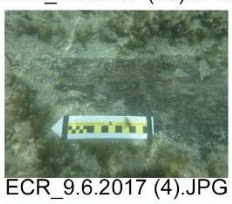
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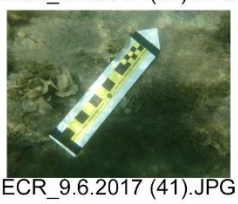
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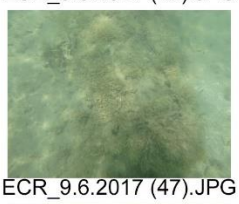
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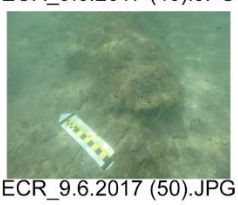
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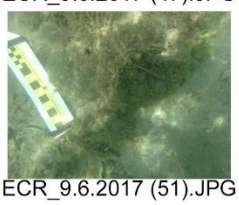
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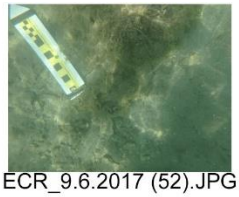
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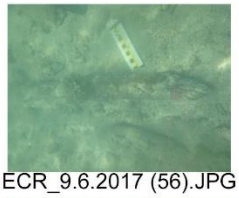
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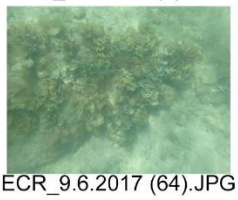
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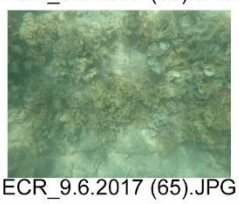
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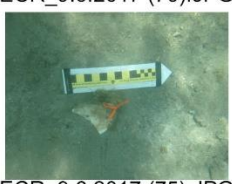
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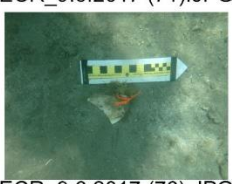
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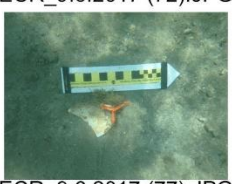
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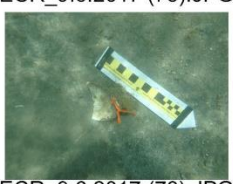
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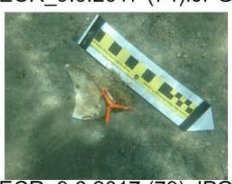
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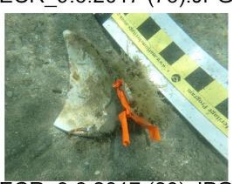
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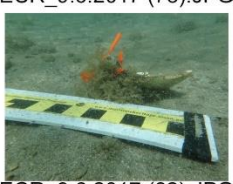
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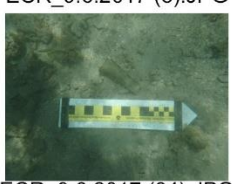
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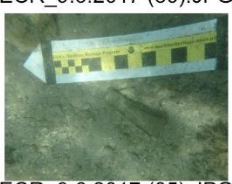
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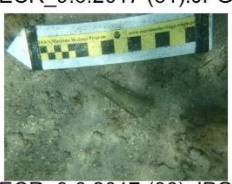
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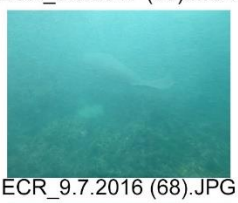
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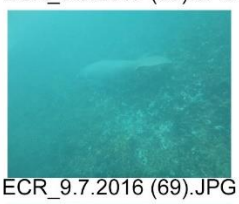
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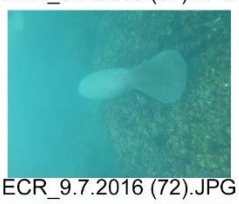
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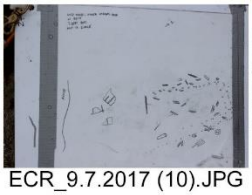
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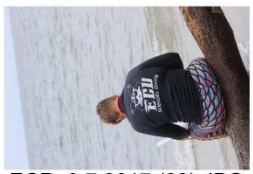
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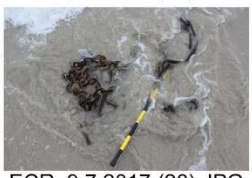
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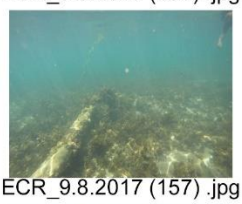
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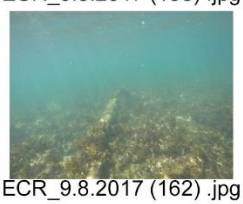
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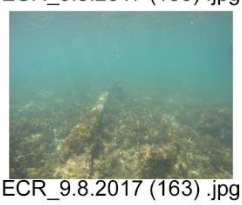
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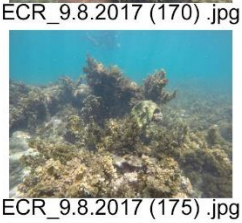
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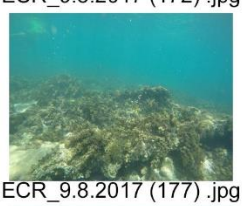
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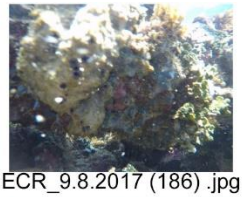
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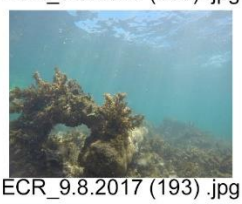
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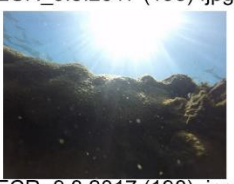
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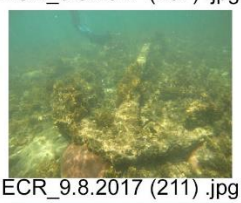
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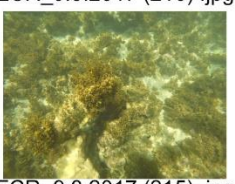
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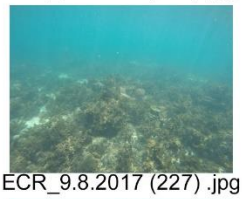
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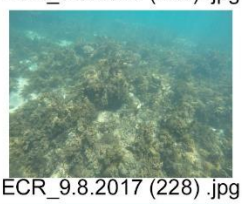
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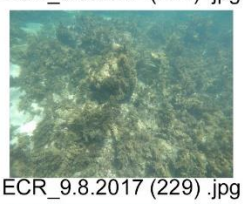
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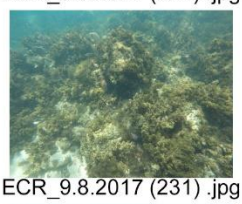
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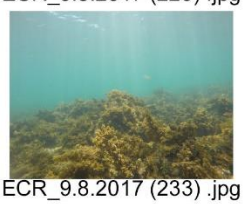
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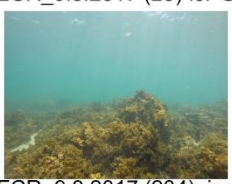
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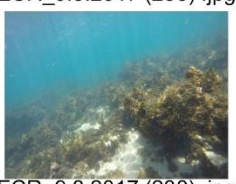
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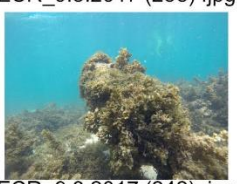
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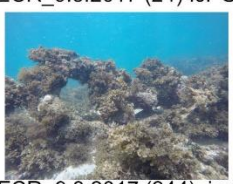
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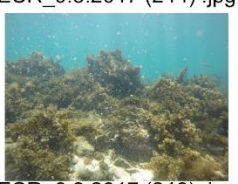
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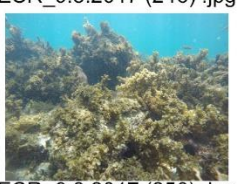
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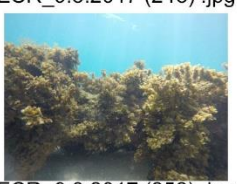
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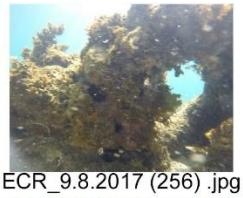
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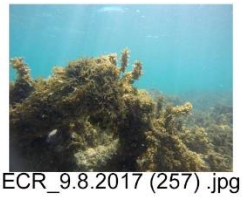
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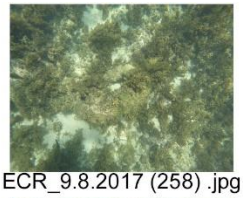
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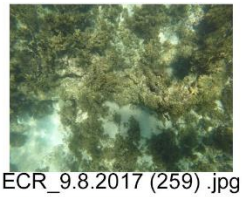
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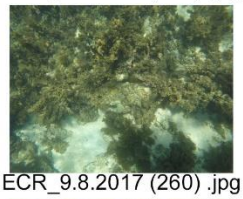
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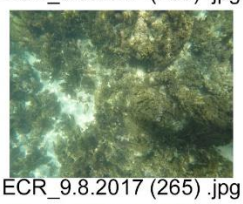
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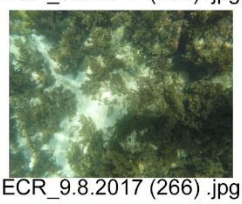
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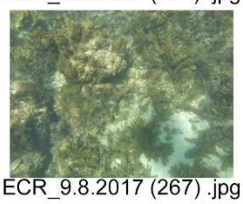
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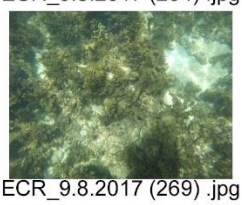
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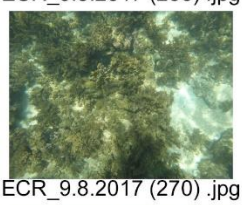
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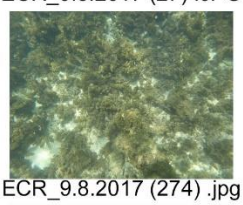
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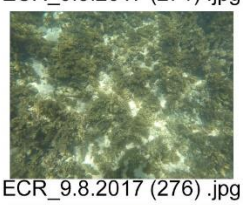
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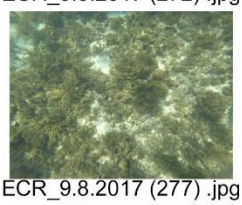
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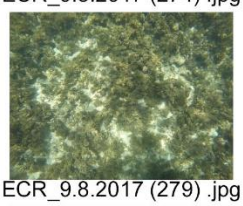
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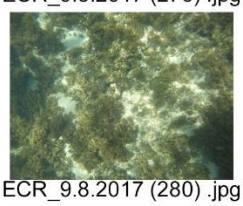
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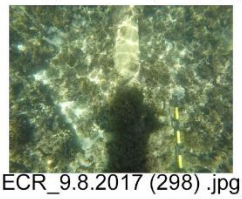
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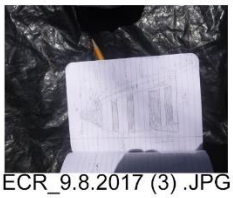
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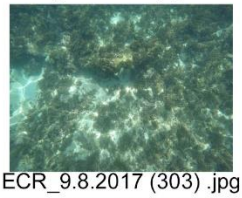
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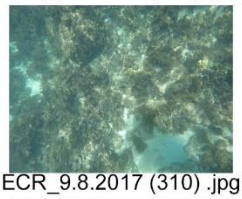
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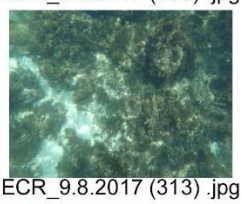
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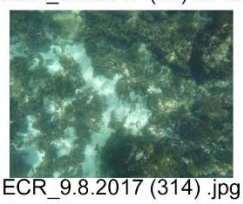
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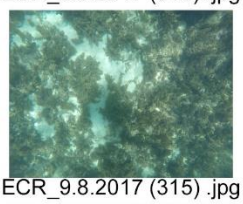
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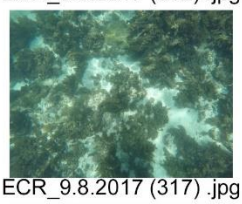
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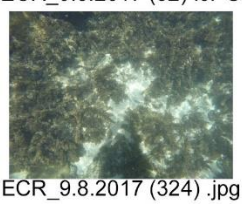
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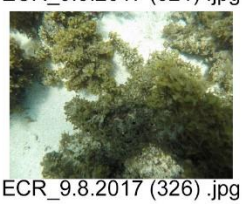
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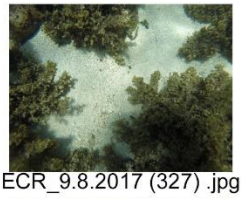
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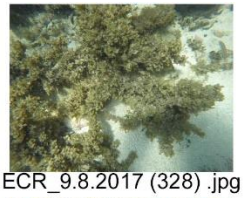
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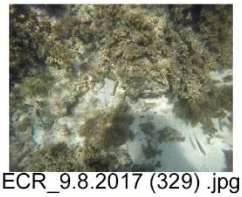
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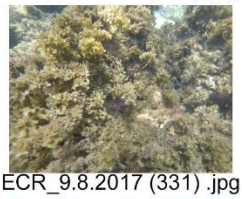
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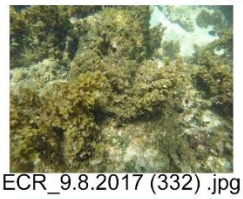
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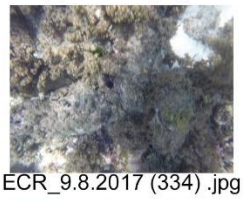
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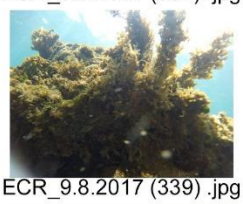
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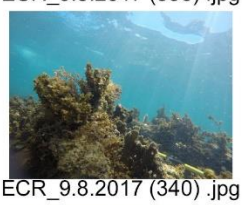
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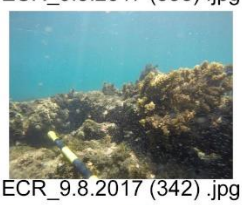
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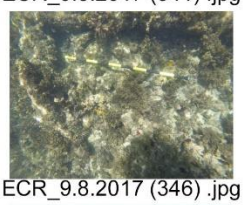
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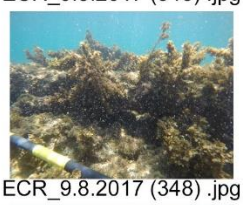
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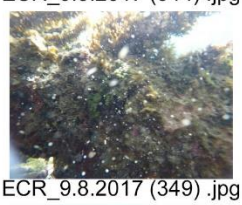
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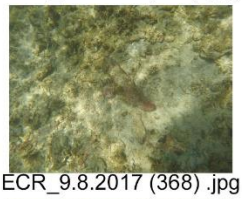
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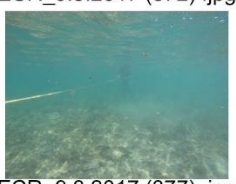
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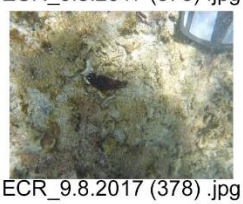
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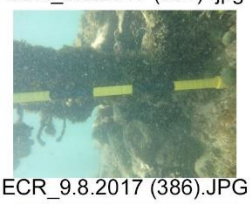
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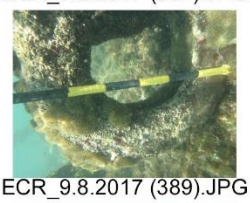
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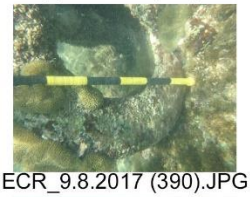
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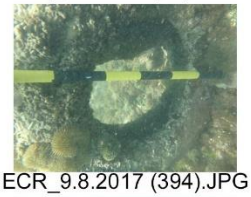
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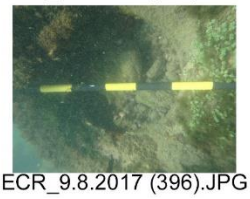
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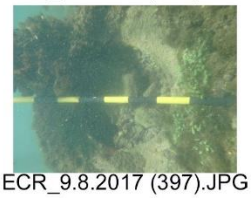
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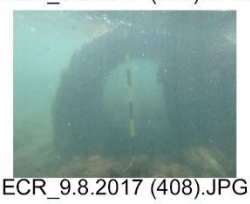
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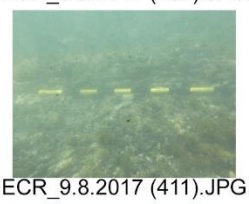
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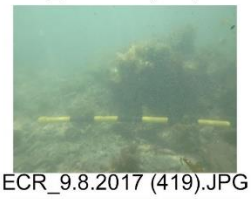
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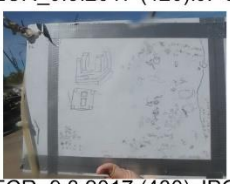
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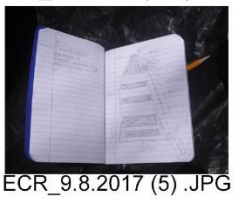
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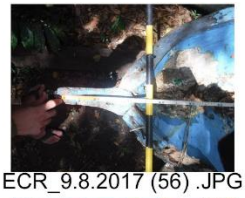
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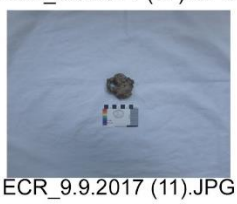
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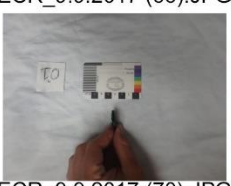
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APPENDIX D. GPS COORDINATE LOG

Name	Description	Latitude	Longitude	Elevation (m)	Facing Direction	Date
Maritime Location 1	Boat launch with fising boats, artisinal tour boats with outboards (1 or 2) with domestic dwelling and murals	09° 44' 41.5" N	82° 50' 51.2" W	5m	NW	9/3/2017
Mural 2	Miss Edith Restaurant Advert. w/ canoe	09° 44' 41.5" N	82° 50' 51.2" W	5m	NW	9/3/2017
Mural 3	Coral Reef at Cabinas Arrecife	09° 44' 41.5" N	82° 50' 51.2" W	5m	NW	9/3/2017
Mural 4	Ocean scene at Primary School Entrance	09° 44' 35.5" N	82° 50' 45.2" W	2m	SSW	9/3/2017
Mural 5	Ocean scene w/ 2 indigenous craft at Brisas del Mar	09° 44' 36.7" N	82° 50' 41.9" W	2m	SSW	9/3/2017
Mural 6	Ocean scene w/ 2 indigenous craft at Brisas del Mar	09° 44' 41.5" N	82° 50' 51.2" W	2m	SSW	9/3/2017
Mural 7	Cabinas Bobo Shanty and Iron Lion at Zion	09° 44' 33.1" N	82° 50' 42.5" W	10m	NE	9/3/2017
Mural 8	Cabinas Smith sign w/ sailboat and cabins	09° 44' 32.6" N	82° 50' 42.2" W	5m	NNW	9/3/2017
Mural 9	Carribean/Reggae colored stairs: Red/Green/Black/Yellow	09° 44' 32.3" N	82° 50' 40.6" W	13m	N	9/3/2017
Mural 10	Afro-Carib female on Christ cross with animals and nativity	09° 44' 34.1" N	82° 50' 37.8" W	9m	N	9/3/2017
Mural 11	Lion face carving at stall	09° 44' 19.0" N	82° 50' 35.5" W	3m	NE	9/3/2017
Mural 12	Hotel sign with fish	09° 44' 19.0" N	82° 50' 35.5" W	3m	NNW	9/3/2017
Mural 13	Observatory sign with ocean scene	09° 44' 19.0" N	82° 50' 35.5" W	3m	NE	9/3/2017
Mural 14	Surfboard with beach scene	09° 44' 19.0" N	82° 50' 35.5" W	3m	ESE	9/3/2017
Mural 15	National Park Sign: Corals of the Galleon	09° 44' 18.1" N	82° 50' 33.1" W	16m	NNW	9/3/2017
Mural 16	Cahuita Calipso Sign: Drum Player by palm tree	09° 44' 22.4" N	82° 50' 39.3" W	8m	ESE	9/3/2017
Mural 17	Roberto Restaraunte: Oceanic Murals, Afro-Carib females, Calipso band	09° 44' 24.0" N	82° 50' 41.8" W	11m	SE	9/3/2017
Mural 18	Irie Vibes: Ocean and Palm	09° 44' 25.3" N	82° 50' 42.6" W	11m	ENE	9/3/2017
Mural 19	Rickys Bar and Restaurant: Oceanic Mural w/ treasure chest and shark	09° 44' 25.9" N	82° 50' 44.2" W	9m	NNW	9/3/2017
Mural 20	Coco's Bar and Restaurant: Ocean view, Iron lion, Bob Marley	09° 44' 26.3" N	82° 50' 44.9" W	12m	ESE	9/3/2017
Artwork 21	Three Busts in the park at center of town inc. Smith	09° 44' 27.6" N	82° 50' 43.7" W	12m	S	9/3/2017
Mural 22	Mural of Christina wreck: President's vessel that wrecked on the point, was saved by the residents of Cahuita	09° 44' 27.6" N	82° 50' 43.7" W	12m	E	9/3/2017
Mural 23	Lobster at Super Parquesito	09° 44' 27.1" N	82° 50' 45.4" W	0m	NE	9/3/2017

Mural 24	Ocean w/ canoe and paddle at Rest La Fe	09° 44' 28.1" N	82° 50' 45.4" W	14m	S	9/3/2017
Mural 25	"Licorera Safari Liquor" on Building Side - Bottle, Ocean, Jaguar	09° 44' 28.6" N	82° 50' 45.7" W	Unknown	SE	9/3/2017
Mural 26	Tortuguer Baula sign	09° 44' 30.7" N	82° 50' 47.7" W	Unknown	SE	9/3/2017
Mural 27	Palenque Luis sign	09° 44' 30.7" N	82° 50' 48.4" W	Unknown	ESE	9/3/2017
Carving 28	Seahorse and Seaturtle Carved on Bar posts and table	09° 44' 31.5" N	82° 50' 49.0" W	Unknown	SW	9/3/2017
Mural 29	Frog and Boat depicted in mural	09° 44' 31.5" N	82° 50' 50.2" W	Unknown	NE	9/3/2017
Mural 30	Salon Comunal Sign	09° 44' 32.1" N	82° 50' 51.1" W	Unknown	SW	9/3/2017
Mural 31	El Roncon De Sandra - Carib Women in Bathroom Mural	09° 44' 33.5" N	82° 50' 52.7" W	Unknown	SE	9/3/2017
Mural 32	Chauita Tours Sign featuring ocean	09° 44' 34.3" N	82° 50' 53.6" W	Unknown	SE	9/3/2017
Mural 33	Babilonia Mural	09° 44' 30.1" N	82° 50' 54.9" W	Unknown	NE	9/3/2017
Mural 34	"Liceo Rural De Cahuita" - Jamica Regae Club, painted ocean scenes on sheds, painted trees featuring people and rasta colors	09° 44' 27.3" N	82° 50' 59.9" W	Unknown	E	9/3/2017
Mural 35	Jose Sach Tours Sign	09° 44' 16.8" N	82° 50' 54.9" W	Unknown	NNE	9/3/2017
Mural 36	Bus Stop Sign	09° 44' 17.9" N	82° 50' 50.0" W	Unknown	N	9/3/2017
Mural 37	Cabinas Cahuita Sign	09° 44' 19.4" N	82° 50' 46.7" W	Unknown	N	9/3/2017
Mural 38	Mural of boats on beach, food names are written above what appear to be boats - a display of local boat typology?	09° 44' 20.3" N	82° 50' 44.2" W	Unknown	NW	9/3/2017
Artwork 39	Bar Rest y Cabinas Vaz - Rasta Lion Statues	09° 44' 23.7" N	82° 50' 47.1" W	Unknown	NNW	9/3/2017
Mural 40	Dos Pinos - Dolphins and Ocean scene	09° 44' 20.3" N	82° 50' 50.2" W	Unknown	N	9/3/2017
Artwork 41	House with a Canoe Carved on its Fence	09° 44' 23.6" N	82° 50' 50.0" W	Unknown	NNW	9/3/2017
Mural 42	"Mister Big J"	09° 44' 24.6" N	82° 50' 50.5" W	Unknown	NE	9/3/2017
Mural 43	"Salmo: 100" mural	09° 44' 32.9" N	82° 50' 45.1" W	Unknown	SE	9/3/2017
Mural 44	Signs on the front of Skankys	09° 44' 36.4" N	82° 50' 49.4" W	Unknown	NW	9/3/2017
Mural 45	Advertisements featuring maritime themes	09° 44' 36.6" N	82° 50' 56.7" W	Unknown	Unknown	9/3/2017
Mural 46	"Girls Surf Too" written on side of building	09° 44' 42.2" N	82° 50' 84.0" W	Unknown	Unknown	9/3/2017
WP 44	Cannon Site Unknown Object (cultural?)	09° 44' 30.0" N	82° 49' 23.8" W	Sealevel	NW	9/4/2017
WP 43	Cannon Site Unknown Object (cultural?)	09° 44' 30.4" N	82° 49' 23.8" W	Sealevel	NW	9/4/2017
WP 46	Cannon Site Big Reef	09° 44' 30.0" N	82° 49' 24.6" W	Sealevel	NW	9/4/2017
WP 45	Cannon Site New Cannon 2017	09° 44' 30.3" N	82° 49' 24.6" W	Sealevel	NW	9/4/2017

Cahuita Point 1	Cahuita Point Snorkel Survey Transect A Beginning	09° 44' 56.0" N	82° 48' 49.2" W	Sealevel	NNW	9/5/2017
Cahuita Point 2	Cahuita Point Snorkel Survey Transect A End	09° 44' 58.0" N	82° 48' 45.4" W	Sealevel	NNW	9/5/2017
Cahuita Point 3	Cahuita Point Snorkel Survey Transect B Beginning	09° 44' 57.9" N	82° 48' 51.5" W	Sealevel	NNW	9/5/2017
Cahuita Point 4	Cahuita Point Snorkel Survey Transect B End	09° 44' 59.3" N	82° 48' 46.4" W	Sealevel	NNW	9/5/2017
Cahuita Point 5	Cahuita Point Snorkel Survey Transect C Beginning	09° 44' 59.5" N	82° 48' 56.3" W	Sealevel	NNW	9/5/2017
Cahuita Point 6	Cahuita Point Snorkel Survey Transect C End	09° 45' 02.1" N	82° 48' 48.4" W	Sealevel	NNW	9/5/2017
Cahuita Point 7	Cahuita Point Snorkel Survey Transect D Beginning	09° 44' 59.9" N	82° 48' 57.2" W	Sealevel	NNW	9/5/2017
Cahuita Point 8	Cahuita Point Snorkel Survey Transect D End	09° 45' 07.7" N	82° 48' 53.9" W	Sealevel	NNW	9/5/2017
Cahuita Point 9	Cahuita Point Snorkel Survey Transect E Beginning	09° 45' 00.3" N	82° 48' 57.9" W	Sealevel	NNW	9/5/2017
Cahuita Point 10	Cahuita Point Snorkel Survey Transect E End	09° 45' 05.8" N	82° 49' 07.0" W	Sealevel	NNW	9/5/2017
Cahuita Point 11	Cahuita Point Snorkel Survey Transect F Beginning	09° 45' 00.3" N	82° 48' 57.9" W	Sealevel	NNW	9/5/2017
Cahuita Point 12 (A)	Cahuita Point Snorkel Survey Transect F End	09° 45' 02.3" N	82° 48' 50.9" W	Sealevel	NNW	9/5/2017
Cahuita Point 13	Cahuita Point Snorkel Survey Transect Extra (A) Incomplete or extra transect bouy?	09° 44' 55.2" N	82° 48' 48.4" W	Sealevel	NNW	9/5/2017
Cahuita Point 12 (B)	Cahuita Point Snorkel Survey Transect F (Artifact)	09° 45' 04.2" N	82° 49' 04.3" W	Sealevel	NNW	9/5/2017
Cahuita Pier	Bottle	09° 44' 87.7" N	82° 04' 03.6" W	Sealevel	Unknown	9/6/2017
Cahuita Pier	Timber #1	09° 44' 80.2" N	82° 49' 03.6" W	Sealevel	Unknown	9/6/2017
Cahuita Pier	Timber #2	09° 44' 80.4" N	82° 49' 04.0" W	Sealevel	Unknown	9/6/2017
Cahuita Pier	Timber #3	09° 44' 80.5" N	82° 49' 03.7" W	Sealevel	Unknown	9/6/2017
Cahuita Pier	Garage Submerged Tree	09° 44' 41.2" N	82° 49' 03.8" W	Sealevel	Unknown	9/6/2017
Cahuita Pier	Tree Branch	09° 44' 45.4" N	82° 49' 46.0" W	Sealevel	Unknown	9/6/2017
Cahuita Pier	Worked Log	09° 44' 45.1" N	82° 49' 04.9" W	Sealevel	Unknown	9/6/2017
Cahuita Pier	Clear glass bottle neck and ceramic with bottle	09° 44' 47.4" N	82° 49' 03.9" W	Sealevel	Unknown	9/6/2017
Cahuita Pier	Beginning of pier near shore (middle pylon)	09° 45' 05.8" N	82° 49' 07.7" W	Sealevel	North	9/6/2017

Cahuita Pier	Middle of pier (at faring outwards), row 8 middle pylon	09° 44' 51.4" N	82° 48' 59.8" W	Sealevel	North	9/6/2017
Cahuita Pier	End of pier, middle pylon	09° 44' 51.9" N	82° 49' 01.1" W	Sealevel	North	9/6/2017
Puerto Vargas	Puerto Vargas Pier NW Corner	09° 44' 14.3" N	82° 48' 47.3" W	Sealevel	Unknown	9/8/2017
Puerto Vargas	Puerto Vargas Pier SW Corner	09° 44' 14.2" N	82° 48' 37.4" W	Sealevel	Unknown	9/8/2017
Puerto Vargas	Puerto Vargas Pier SE Corner	09° 44' 14.9" N	82° 48' 37.0" W	Sealevel	Unknown	9/8/2017
Puerto Vargas	Puerto Vargas Pier NE Corner	09° 44' 14.6" N	82° 48' 36.8" W	Sealevel	Unknown	9/8/2017
Puerto Vargas	Puerto Vargas Pier Middle	09° 44' 14.6" N	82° 48' 37.1" W	Sealevel	Unknown	9/8/2017
Puerto Vargas	Puerto Vargas concrete pylon structure	09° 44' 19.7" N	82° 48' 65.1" W	Sealevel	Unknown	9/8/2017
Puerto Vargas	Puerto Vargas cylindrical concrete structure	09° 44' 19.4" N	82° 48' 67.3" W	Sealevel	Unknown	9/8/2017
Brick Site	Brick Site fish survey	09° 44' 56.2" N	82° 49' 03.9" W	Sealevel	West	9/9/2017
Cannon Site	Artifact 1: Glass Seal and fragments	09° 44' 19.4" N	82° 48' 67.3" W	Sealevel	Unknown	9/9/2017
Cannon Site	Artifact 2: Brick Scatter	09° 44' 27.5" N	82° 49' 23.0" W	Sealevel	Unknown	9/9/2017
Cannon Site	Artifact 3: Glass bottle, clear and modern	09° 44' 28.0" N	82° 49' 23.3" W	Sealevel	Unknown	9/9/2017
Cannon Site	Artifact 4: Beer bottle, modern garbage	09° 44' 27.7" N	82° 49' 22.4" W	Sealevel	Unknown	9/9/2017
Cannon Site	Artifact 5: Brick Scatter (2)	09° 44' 27.8" N	82° 49' 23.3" W	Sealevel	Unknown	9/9/2017
Cannon Site	Artifact 6: Case bottle base	09° 44' 27.0" N	82° 49' 22.8" W	Sealevel	Unknown	9/9/2017
Cannon Site	Artifact 7: ceramic and glass bottle fragment (2)	09° 44' 26.8" N	82° 49' 22.7" W	Sealevel	Unknown	9/9/2017
Cannon Site	Artifact 8: case bottle mouth	09° 44' 26.4" N	82° 49' 22.8" W	Sealevel	Unknown	9/9/2017
Cannon Site	Artifact 9: ceramic and case bottle base	09° 44' 25.8" N	82° 49' 22.7" W	Sealevel	Unknown	9/9/2017
Anchor Scatter	Site 7: glass bottle neck, painted ceramic sherd, glass fragment	09° 44' 26.7" N	82° 49' 22.9" W	Sealevel	North	9/10/2017
Anchor Scatter	Site 8: case bottle base and body fragment, ceramic plate sherd	09° 44' 25.9" N	82° 49' 22.7" W	Sealevel	Unknown	9/10/2017
Anchor Scatter	Site 10: gin bottle top	09° 44' 26.4" N	82° 49' 22.7" W	Sealevel	WSW	9/10/2017
Anchor Scatter	Site 11: cast iron pot	09° 44' 23.2" N	82° 49' 21.3" W	Sealevel	South	9/10/2017
Anchor Scatter	Site 12: glass bottle neck and ceramic sherd	09° 44' 22.7" N	82° 49' 20.9" W	Sealevel	South	9/10/2017

Anchor Scatter	Site 13: glass bottle, missing mouth	09° 44' 22.7" N	82° 49' 20.3" W	Sealevel	North	9/10/2017
Anchor Scatter	Site 14: window class and decorated stone ware	09° 44' 23.3" N	82° 49' 21.4" W	Sealevel	South	9/10/2017
Anchor Scatter	Site 15: ceramic sherd, glass bottle base	09° 44' 23.0" N	82° 49' 21.4" W	Sealevel	South	9/10/2017
Anchor Scatter	Site 16: half ceramic painted bowl	09° 44' 22.9" N	82° 49' 21.6" W	Sealevel	North	9/10/2017
Anchor Scatter	Site 17: small clear glass bottle	09° 44' 27.7" N	82° 49' 22.2" W	Sealevel	Unknown	9/10/2017
Anchor Scatter	Site 18: glass bottle base and body fragment	09° 44' 22.9" N	82° 49' 21.8" W	Sealevel	South	9/10/2017
Anchor Scatter	Site 19: intact patent bottle	09° 44' 23.0" N	82° 49' 21.4" W	Sealevel	Unknown	9/10/2017
Anchor Scatter	Site 20: bottle base with makers mark	09° 44' 21.6" N	82° 49' 20.4" W	Sealevel	ESE	9/10/2017
Anchor Scatter	Site 21: Iron pipe	09° 44' 24.1" N	82° 49' 20.0" W	Sealevel	Unknown	9/10/2017
Anchor Scatter	Site 22: ironstone sherd, iron pot sherd, enamaled ware	09° 44' 24.9" N	82° 49' 19.4" W	Sealevel	Unknown	9/10/2017
Anchor Scatter	Site 23: ironstone sherd	09° 44' 24.6" N	82° 49' 19.1" W	Sealevel	Unknown	9/10/2017
Anchor Scatter	Site 24: iron spike and iron eye	09° 44' 24.4" N	82° 49' 20.2" W	Sealevel	Unknown	9/10/2017
Anchor Scatter	Sea marker 1	09° 44' 28.2" N	82° 49' 22.7" W	Sealevel	Unknown	9/10/2017
Anchor Scatter	Sea marker 2	09° 44' 24.2" N	82° 49' 25.7" W	Sealevel	Unknown	9/10/2017
Anchor Scatter	Sea marker 3	09° 44' 24.1" N	82° 49' 26.6" W	Sealevel	Unknown	9/10/2017

APPENDIX E. NAS STUDENT ROSTER

Anderson Rodríguez Brown

Salvadore Van Dyke Arias

Tygo Constant Brederoo

Sangye Wang Brenes

Carlos Mairena Cruz

Maria Suarez ~~del~~ Toro

Ramon Ernesto Cruz Espinoza

Esteban Gallo

Gloriana Brenes Gonzales

Alexandre Koblenksy

Kevin Rodríguez Brown

Royer Steven Colomer Leiva

Jose Fransisco Saballo Lopez

Pete Stephens Rodriguez

Giovani Sandoval

Antonio More Streber

APPENDIX F. CAPTAINS AND BENEFACTORS

APPENDIX G. PROPOSED PART II NAS PROJECTS

Ramón Espinoza and Tygo Brederoo: Record the anchor found near the Puerto Vargas dock and compare to the anchors at the Cannon Site.

María Suárez Toro (CCB Ambassadors) and José López (SINAC / MINAE): Record the plywood dock at Puerto Vargas and investigate the pier's original foundation.

Carlos Mairena and Antonio Mora: Investigate the Sinclair Oil Company well. Further record the history of the Sinclair Oil Company in the park.

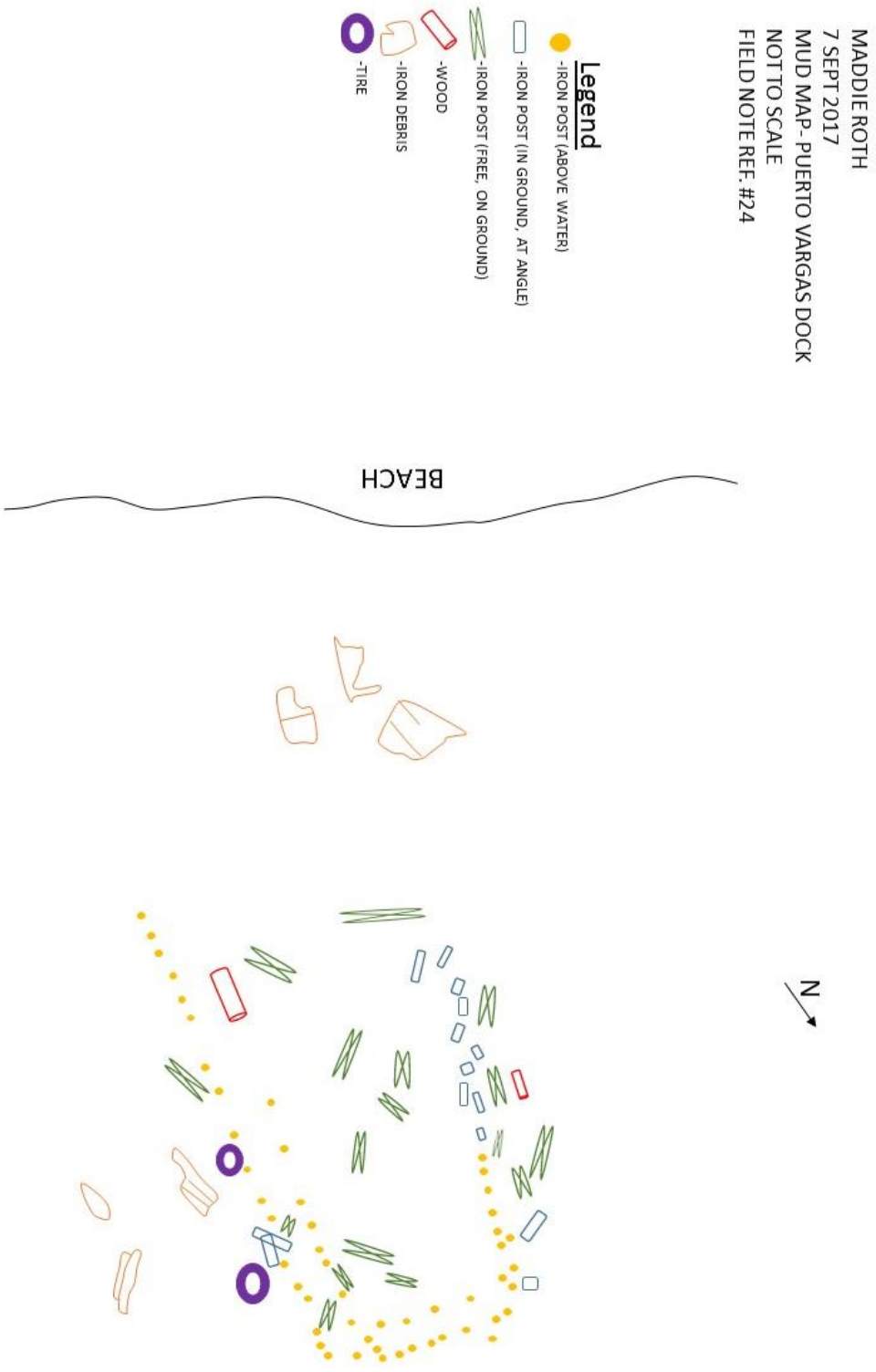
Alexander, Gloriana and Sangye Koblensky-Brenes: Record the new cannon found at the Cannon Site and continue research on the Cannon/Anchor Site.

Anderson and Kevin Rodriguez, Royer Colomer and Pete Stevens with the support of Gloriana Brenes and Maria Suarez Toro: Document and Record the remains of the vessel Daisy Gray in Manzanillo.

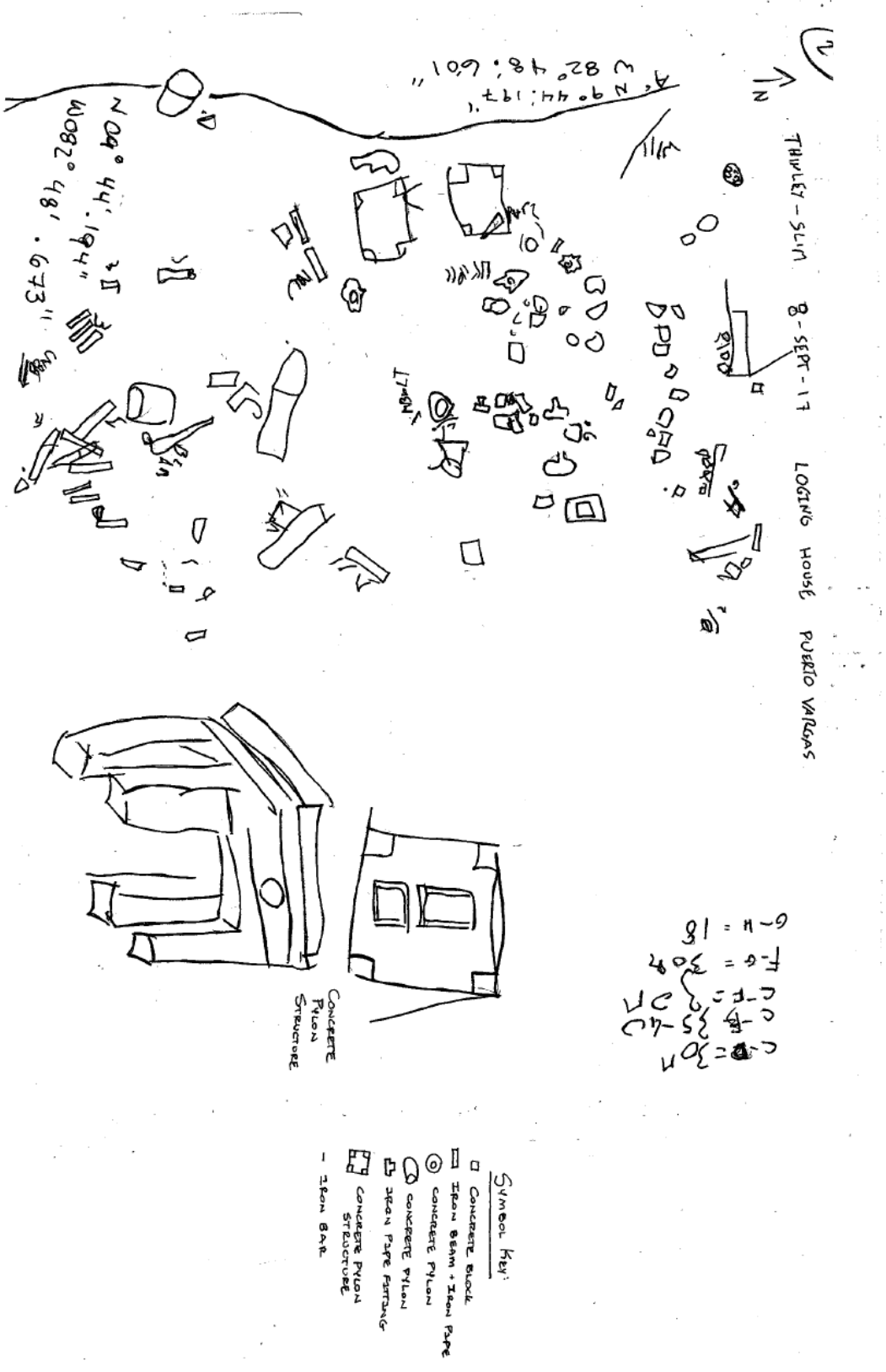
Salvador Van Dyke: Work with the local fishing community to document submerged cultural remains near Puerto Viejo and Manzanillo.

Giovani Sandoval: Train CCB Ambassadors in Advanced PADI Diving techniques to expand upon skills learned in NAS Part I and Part II.

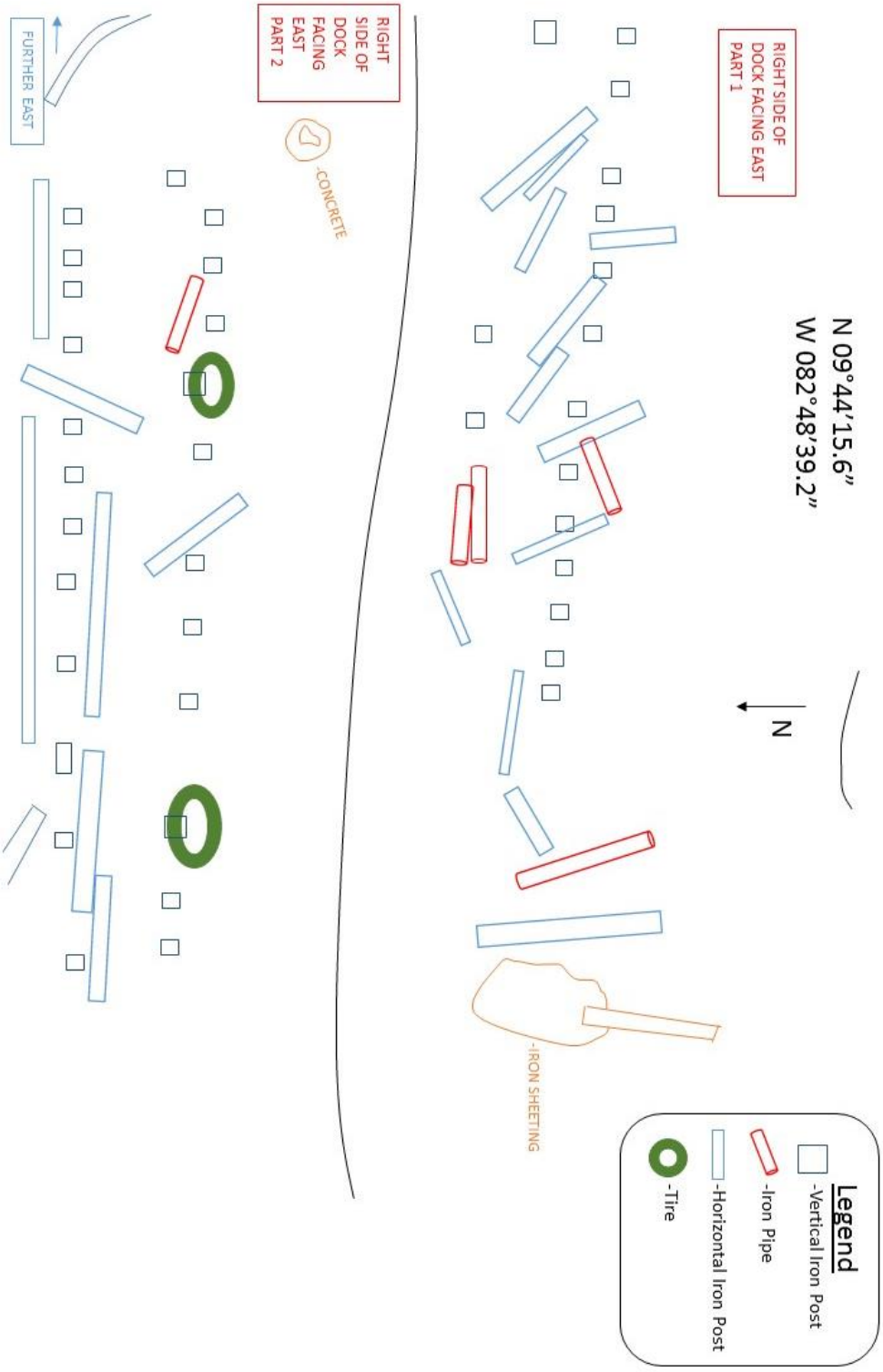
APPENDIX H. DIGITIZED MAPS



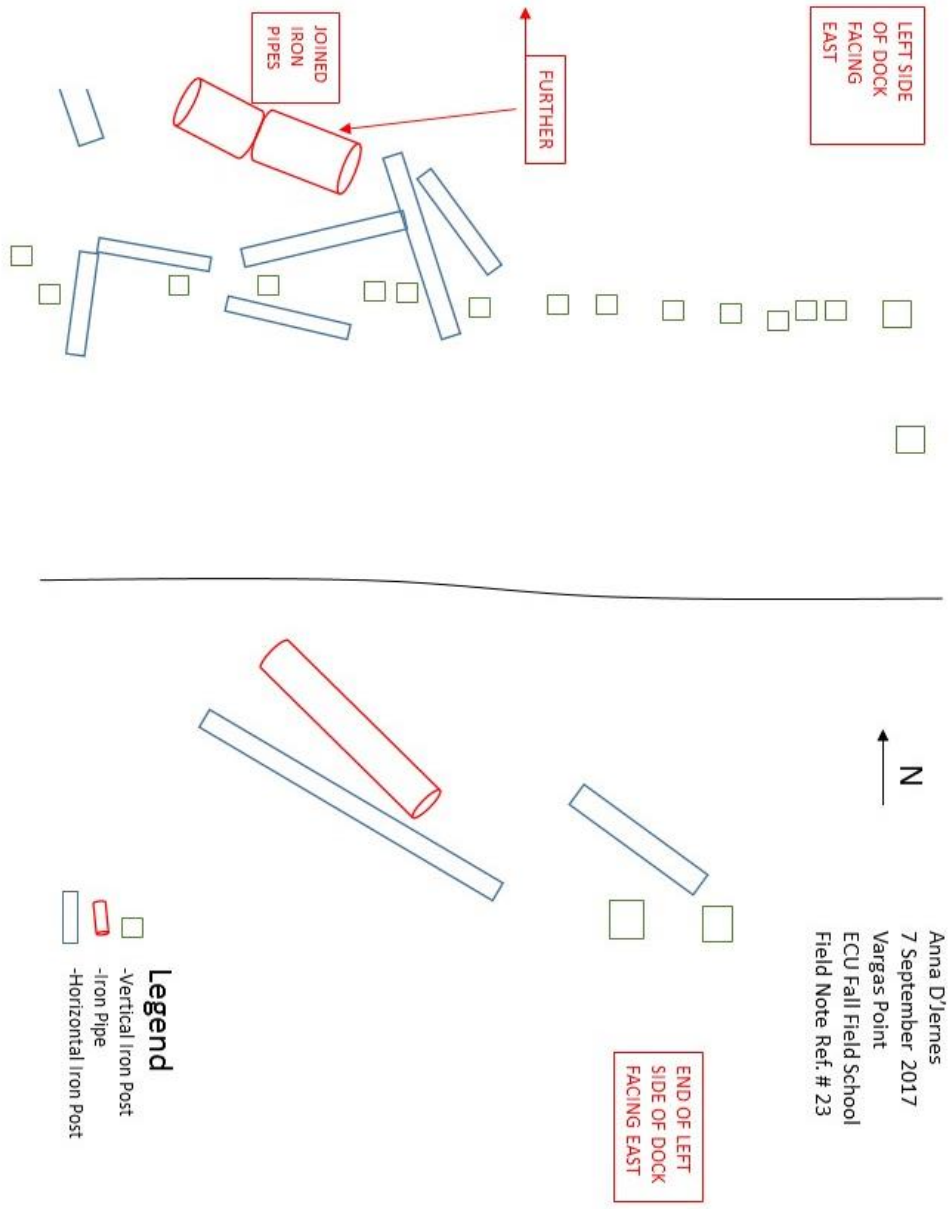
Mud Map of Puerto Vargas Dock. Not to Scale. Drawn by M.Roth, 7 Sept. 2017.



Mud Map of Puerto Vargas Dock. Not to Scale. Drawn by T. Koblensky, 8 Sept. 2017.



Mud Map of Puerto Vargas Dock, Part I. Not to Scale. Drawn by A. D'Jernes, 7 Sept. 2017.



Mud Map of Puerto Vargas Dock, Part II. Not to Scale. Drawn by A. D'Jernes, 7 Sept. 2017.

Mud Map of Puerto Vargas Dock, Part I. Not to Scale. Drawn by Marian Suarez and Giovanni Sandoval, 8 Sept. 2017.

APPENDIX I.

SISTEMA NACIONAL DE ÁREAS DE CONSERVACIÓN
PROGRAMA DE INVESTIGACIÓN

PI-01: Formulario de solicitud de permiso para realizar investigaciones

Datos del INVESTIGADOR:

Datos del investigador: Nombre Primer apellido Segundo apellido

Identificación : Maria del Rosario Suárez Toro Cédula 800520083 País : Costa Rica

Teléfonos: Móvil: 86581091 Habitación: 27500336 Fax:0000

Apartado postal: 000 Correo electrónico escuelabuceocaribesur@gmail.com

Dirección permanente: Casa 9. Cubali Toewn, Cocles, Talamanca

Dirección en Costa Rica: igual

Sexo: ☐ Masculino x Femenino

Profesión: Pesducadora, educadora y arqueóloga comunitaria Fecha de nacimiento: 5/7/48

Datos de persona contacto en caso de emergencia:
Nombre: Gloriana Brenes
Teléfono: 88502750 Teléfono contacto en caso de emergencia

Datos de la INSTITUCIÓN que respalda:

Nombre: Universidad de Costa Rica

Cédula jurídica de la institución (si está inscrita en Costa Rica): indicar número de cédula jurídica

Sitio Web: Dirección Sede Caribe Teléfono: 88236083

Nombre de persona Marianita Harvey Chavarrian la institución que respalda la investigación

Datos de la INVESTIGACIÓN CIENTÍFICA O ACADÉMICA:

Título: Investigaciones NAS 2

Período de realización de la investigación o curso:	Toma de datos:	Análisis de datos:
	Inicio: 1 de noviembre, 2017	
	Final: 1 de septiembre, 2018	

Sitios de estudio: Indicar Áreas de Conservación y sitios de estudio

El Estudio constituye parte de requisitos NAS 2

Acompañantes: x Sí*

*Completar Anexo1

¿Desea recolectar especímenes u otros materiales, ya sea de forma permanente o temporal (manipulación en campo y liberación)?:

☐ Sí* x No

Fuente de financiamiento: comunidad y voluntariado

Medio para notificaciones: (Marque solo una opción)
x Correo electrónico: correo para notificaciones
☐Fax: número fax para notificaciones
☐Personal

Firma: _____ Fecha: _____

Con la presente, el investigador declara que la investigación aquí descrita y para la cual se solicita permiso, no persigue fines comerciales. Así mismo se compromete a revisar periódicamente el medio destinado para notificaciones o a apersonarse a las oficinas del SINAC respectivas en el caso de elegir la notificación personal.

Esta solicitud de permiso de investigación **no** debe ser considerada como una autorización. Adjunte a este documento los requisitos que correspondan a su trámite y que se describen en el siguiente documento: Ruta para investigar la biodiversidad de flora y fauna en Costa Rica. Posterior al análisis administrativo y el recibido conforme de la solicitud completa, la Administración dispone de **30 días naturales para resolver** (Ley N° 7317, artículo 42).
NOTA: El investigador está en la obligación de entregar al SINAC un informe sobre los resultados de la investigación y/o colecta autorizada y dos copias de todos los informes y publicaciones que se generen con la presente investigación (Ley Nº 7317, artículos 38 y 41).

Uso oficial

Fecha de recepción: _____ Firma receptor: _____

Nombre del Receptor:_____

Anexo 1. Acompañantes

Nombre completo	Sexo M	Sexo F	N° Identificación	Nacionalidad	Fecha de Nacimiento	Profesión /Especialidad	Asistente/Coinvestigador

Si requiere más espacio, utilice hojas adicionales

Nombre de persona contacto en caso de emergencia: _____Teléfono:_____

RESOLUCIÓN N°
SINAC-ACLAC-PI-R-030-2017
Exp. Dig. N°ACLAC-PI-001-2017

Ministerio Del Ambiente y Energía, Sistema Nacional de Áreas de Conservación, a través del Programa de Investigación del Área de Conservación La Amistad Caribe, a las trece horas, 30 minutos del día 31 de agosto del año dos mil diecisiete.

RESULTANDO

PRIMERO: Que el día vigésimo noveno del mes de julio del año dos mil diecisiete, se recibe vía electrónica la solicitud de permiso de investigación académica y pasaporte científico por parte de María del Rosario Suarez Toro, mayor, doctora en educación, costarricense cédula de identidad N° 8-0052-0083. Dirección permanente: Casa 9 Cubali Town, Cocles, Talamanca, Costa Rica, solicita permiso para desarrollar la investigación científica: "Arqueología Subacuática Comunitaria en el Parque Nacional Cahuita para mapear el Sitio".

SEGUNDO: Que la investigación académica es apoyada por la Universidad de Costa Rica, sede del Caribe, Coordinación de Acción Social. Tel. 2511-7307 /7349 / Apartado: 111-730. Correo electrónico: mchavaria@gmail.com.

TERCERO: Que se solicita autorizar la participación en esta investigación académica se incluya como co-investigadores y capacitadores "colaboradores" a los profesionales siguientes de la Universidad de Carolina del Este, Estados Unidos de América: Brenda Lynn Harris, estadounidense pasaporte Nº 530414304, Sara Mackenzie Parkin, estadounidense pasaporte 503045790, Madeline Roth, estadounidense pasaporte 455223650, Ryan David Marr, estadounidense pasaporte 488529750, Stephen Lacey, estadounidense pasaporte 485108539, Tyler Woodson Ball, estadounidense pasaporte 535459674, Mark Anthony Keusenkothen estadounidense pasaporte 204209605, Ian Harrison, estadounidense pasaporte Nº 489260804, Anna Christian D'Jernes, estadounidense pasaporte Nº 491633709, Kimberly Piage Kenyon, estadounidense pasaporte Nº 483725119 y Jason Thomas Raupp, estadounidense pasaporte N° 493947688; siendo María del Rosario Suárez Toro y los colaboradores mencionados antes, los responsables de facultar y velar por los estudiantes de dicha investigación-capacitación, para lo que concierne con la toma de datos ambientales (biológicos, ecológicos, físicos, químicos, etc.), arqueológicos y demás aspectos relacionados con el recurso biodiversidad y la seguridad propia.

CUARTO: Que el día vigésimo noveno de mes de agosto del año dos mil diecisiete, vía electrónica la solicitante cumplió con todos los requisitos establecidos en el Decreto Nº32553-MINAE.

QUINTO: Que se realizó consulta al administrador del Área Silvestre Protegida: Parque Nacional Cahuita-ACLAC-SINAC-MINAE, mediante correo electrónico del 31 de agosto del 2017, de

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Limón-Costa Rica
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acuerdo con el artículo Nº 43 de la Ley de Conservación de Vida Silvestre Nº 7317 y sus reformas, con respecto al criterio de visto bueno para el desarrollo de la investigación denominada "Aislamiento y caracterización de microorganismos anaeróbicos de diferentes hábitats".

SEXTO: Que mediante resolución SINAC-ACLAC-DR-015-2017, del 18 de agosto del 2017, se exonera del pago por derechos de ingreso al Parque Nacional Cahuita, se exonerar al grupo de 11 profesores del Departamento de Estudios Marítimos de la Universidad de Carolina del Este, estudiantes y personal de la expedición Galeones y Otras Embarcaciones.

CONSIDERANDO

PRIMERO: Que la Ley de Conservación de la Vida Silvestre No.7317, del treinta de octubre de mil novecientos noventa y dos y sus reformas, en los artículos 1 y 3, establece que: "La vida silvestre está conformada por el conjunto de organismos que viven en condiciones naturales, temporales o permanentes en el territorio nacional,..." que "Se declara de dominio público la fauna silvestre que constituye un recurso natural renovable,.... De interés público la flora silvestre..." y que únicamente pueden ser objeto de apropiación particular y de comercio mediante las disposiciones contenidas en los tratados públicos, en los convenios internacionales y en la presente Ley Nº 7317 y su reglamento, artículos 3 y del 36 al 50 y otras normativas vinculantes.

SEGUNDO: Que según la ley Nº 7317, Ley de Conservación de la Vida Silvestre y sus reformas, en el artículo 6 o, establece que el Sistema Nacional de Áreas de Conservación del Ministerio de Ambiente y Energía es el órgano competente en materia de planificación, desarrollo y control de la vida silvestre, en igual sentido dicha competencia se encuentra establecida en el artículo 22 de la ley de Biodiversidad Nº 7788.

TERCERO: Que según la ley Nº 7317, Ley de Conservación de la Vida Silvestre y sus reformas, en el artículo 7o, inciso e) establece que el Sistema Nacional de Áreas de Conservación del Ministerio de Ambiente y Energía tiene entre sus competencias el promover y ejecutar investigaciones en el campo de la Vida Silvestre.

CUARTO: Que según la ley Nº 7317, Ley de Conservación de la Vida Silvestre y sus reformas, del artículo 40 al 49, faculta al SINAC dar autorización para permisos de investigación y rechazar cualquier solicitud contraria al interés público y fiscalizar la ejecución de estas actividades.

QUINTO: Que según la ley No 4594, Duplicado Material Zoológico Botánico o Mineral a UCR y Museo Nacional del primero de julio del año mil novecientos setenta, en su artículo 1o indica que: "Artículo 1º.- Todo científico o institución que personalmente o en representación, recoja material

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botánico, zoológico o mineral con fines taxonómicos, en cualquier zona o lugar del territorio nacional, tiene la obligación de dejar duplicados de sus colecciones a la Universidad de Costa Rica y al Museo Nacional. La Universidad de Costa Rica y el Museo Nacional, conjuntamente, pueden exonerar al científico o institución de que se trata, de la obligación a que se refiere el párrafo anterior, tomando en consideración motivos calificados que el impidan dejar esos duplicados."

SEXTO: Que según el decreto No D.E.12329-A, Reglamento de Investigaciones de Servicios de Parques Nacionales del 6 de marzo de 1981, establece lo referente a las investigaciones en los parques nacionales y áreas afines administradas por el Servicio de Parques Nacionales.

SÉTIMO: Que la Ley Forestal número siete mil quinientos setenta y cinco (Ley N° 7575, publicada en La Gaceta N° 72 del 16 de abril de 1996) y sus reformas, artículo dieciocho, determina la facultad del Estado para realizar o autorizar labores de investigación en el patrimonio natural del Estado.

OCTAVO: Que la Ley Orgánica del Ambiente (Ley N°7554), Capitulo VII, en su Artículo 35, define como uno de los objetivos de las Áreas Silvestres Protegidas la promoción de la investigación científica, el estudio de los ecosistemas y su equilibrio, así como el conocimiento y las tecnologías que permitan el uso sostenible de los recursos naturales del país y su conservación.

NOVENO: Que la Ley de Biodiversidad (Ley N° 7788) en su Artículo 89: Fomento de programas de investigación, divulgación e información; establece que el Ministerio del Ambiente y Energía y las demás instituciones públicas y privadas fomentarán el desarrollo de programas de investigación sobre la diversidad biológica.

DÉCIMO: Que la Ley de Conservación de la Vida Silvestre (Ley N° 7317), en su Artículo 2, define como Estudio Científico: Toda investigación que aplica el método científico; colectar: acción de recoger, cortar, capturar o separar de su medio especies orgánicas, sus productos o subproductos. El Artículo N° 36, define ***Colecta Científica de Investigación***: cuando se realice con fines de estudio científico o con base en estudios científicos para el manejo de las poblaciones silvestres con fines de conservación y ***Colecta Académica***: cuando se realice con fines educativos y al amparo de un curso o programa educativo, de alguna institución educativa debidamente reconocida por el Ministerio de Educación o el Consejo Nacional de Rectores, el permiso de colecta deberá ser autorizado por la autoridad competente.

DÉCIMO PRIMERO: Que el Reglamento de Investigaciones de los Parques Nacionales (Decreto Ejecutivo 12329-A), actualmente bajo administración del Sistema Nacional de Áreas de Conservación (SINAC); en sus considerándoos establece: a) que la investigación es uno de los fines fundamentales para preservar y proteger áreas naturales y juega un papel muy importante

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en la elaboración de los planes de manejo de los parques nacionales y áreas afines, así como para los avances de la ciencia en el área de los recursos naturales. b) que la investigación en los Parques puede resultar favorecida por la coordinación de sus funcionarios con organismos o personales especializadas. c) que tienen prioridad las investigaciones que ayuden a comprender y conocer mejor los recursos de los Parques, con el fin de manejarlos (y utilizarlos) en forma correcta.

DÉCIMO SEGUNDO: Que la Estrategia Nacional de Conservación y Uso Sostenible de la Biodiversidad, establece dentro de sus políticas: el impulso a las investigaciones dirigidas a conocer el estado de las especies y ecosistemas de interés particular para la conservación.

DÉCIMO TERCERO: Que las Políticas para las Áreas Silvestres Protegidas establecen que se debe: • fomentar el desarrollo de la investigación básica y aplicada dentro de las áreas silvestres protegidas, de acuerdo con las necesidades identificadas por la institución; • autorizar aquellas investigaciones que se realicen en las áreas silvestres protegidas de conformidad con lo que establece la legislación vigente, la reglamentación interna del Área de Conservación y las prioridades de investigación identificadas por las áreas silvestres protegidas. Políticas que priorizan como actividad el que: cada Área de Conservación deberá fomentar, emitir lineamientos, participar y colaborar en el desarrollo de investigaciones básicas e inventarios de biodiversidad con las instituciones interesadas en este campo; para lograr lo antes posible un mejor entendimiento de la biodiversidad presente en las ASP y en los bosques patrimonio del Estado tanto en áreas estatales como privadas.

DECIMO CUARTO: Que las Áreas de Conservación tienen un Encargado de Investigación que tiene como objetivo, promover, coordinar y facilitar procesos de investigación y monitoreo de manera que la información generada y sistematizada oriente la toma de decisiones para la conservación, manejo y uso sostenible de los recursos naturales y culturales presentes en el Área de Conservación.

DECIMO QUINTO: Que en el Manual de Procedimientos para realizar Investigación en Biodiversidad y Recursos Culturales en las Áreas de Conservación, establecido por el Comité Técnico de Investigación del SINAC (decreto ejecutivo Nº28993-MINAE) y oficializado por el SINAC (oficios SINAC-DG-147 y DG-149, del 2002 y por el decreto ejecutivo Nº32553-MINAE) se establece como función de los encargados de los Programas de Investigación, entre otras, las siguientes: a) Tramitar, evaluar y resolver los proyectos de investigación que se presenten ante su oficina regional, para realizar estudios científicos en su área de conservación. b) Elaborar las resoluciones respectivas y otorgar el pasaporte científico (licencia de recolecta científica). c) Recibir y analizar toda solicitud de permiso de investigación que se presente ante su oficina regional, para realizar estudios científicos en su área de conservación. d) Establecer acuerdos de

Transferencia de Material cuando sea considerado necesario por la naturaleza de la investigación.

DÉCIMO SEXTO: Que de conformidad con el criterio de la Secretaría Técnica Nacional Ambiental (SETENA), según acuerdo ACP-70-2015, del 23 de junio de 2015, de la Sesión Ordinaria 088-2015-SETENA de su Comisión Plenaria, la evaluación de impacto ambiental no resulta de aplicación para los permisos de investigación ni las licencias de colecta científica o académica, a que se refiere el numeral 26 de la Ley de Conservación de la Vida Silvestre 7317.

DECIMO SÉTIMO: Que los objetivos de la investigación concuerdan con los objetivos de conservación del SINAC-MINAE, detallados en su Plan Estratégico respectivo cuando procede; así como en los objetivos de investigación que se enmarcan en la Estrategia Nacional de Investigación.

DÉCIMO OCTAVO: Las personas físicas o jurídicas que acrediten personal de apoyo al proceso de investigación, deberán especificar la condición de dicho personal (asistentes). En caso de manejo de vida silvestre únicamente lo podrá realizar las personas que sean acreditadas por el investigador como asistentes de la investigación y que se encuentren facultadas para tal manejo según los fines y métodos de la investigación. Se aclara que en el caso de colaboradores que participen del proyecto de investigación en forma ad honorem (como voluntarios), por tratarse de una relación entre particulares, esta no se encuentra regulada por la normativa del Decreto de voluntariado del SINAC vigente, Decreto Ejecutivo N° 36812.

Por tanto,

El Programa de Investigación del Área de Conservación La Amistad – Caribe

RESUELVE:

PRIMERO: Aprobar la solicitud presentada por María del Rosario Suarez Toro, cédula de identidad N° 8-0052-0083, en calidad de investigadora principal para desarrollar la investigación académica denominada "Arqueología Subacuática Comunitaria en el Parque Nacional Cahuita para mapear el Sitio", con el objetivo general siguiente: - Mapeo y formación a los estudiantes del Centro de Buceo EEM en el ámbito arqueológico, introducción básica en historia marítima, métodos y técnicas empleadas en la investigación científica en arqueológica náutica; incluyendo habilidades prácticas, como remote sensing, ROV y técnicas de estudio arqueológicos dentro de la zona de hundimientos en el arrecife coralino, PN Cahuita, Talamanca, Limón Costa Rica.

SEGUNDO: Autorizar la participación en esta investigación académcia a María del Rosario Suarez Toro, cédula de identidad N° 8-0052-0083, como investigadora principal. A Brenda Lynn Harris, pasaporte Nº 530414304, Sara Mackenzie Parkin, pasaporte 503045790, Madeline Roth, pasaporte 455223650, Ryan David Marr, pasaporte 488529750, Stephen Lacey, pasaporte 485108539, Tyler Woodson Ball, pasaporte 535459674, Mark Anthony Keusenkothen, pasaporte 204209605, Ian Harrison, pasaporte Nº 489260804, Anna Christian D'Jernes, pasaporte Nº 491633709, Kimberly Piage Kenyon, pasaporte Nº 483725119 y Jason Thomas Raupp, pasaporte N° 493947688 como coinvestigadores y capacitadores. Asimismo, se autoriza la participación de las personas del Caribe Sur siguientes dentro de la investigación - capacitación:

NOMBRE	DOCUMENTO DE IDENTIDAD
Royer Coloner Leiva	702590430
Esteban Gallo	702520410
Anderson Rodríguez Brown	702610724
Kevin Rodríguez Brown	702740676
Peter Stevens	702810859
Sigrid Lahmann	105170790
Julio Ugalde	702810859
Tygo Constant Brederoo	105600040811
Antonio Mora Strebe	113300786
Sangye Wang Brenes	118710594
Gloriana Brenes González	109660096
Salvador de Los Ángeles Van Dyke	101851008
Carlos Mairena Cruz	700940661

TERCERO: Otorgar el pasaporte científico N° 120-2017 a María Del R. Suárez Toro, N° PI-ACLAC-121-2017 a Brenda L. Harris, N° PI-ACLAC-122-2017 a Sara Mackenzie Parkin, N° PI-ACLAC-123-2017 a Madeline Roth, N° PI-ACLAC-124-2017 a Ryan David Marr ¸ N° PI-ACLAC-125-2017 a Stephen Lacey ¸ N° PI-ACLAC-126-2017 a Tyler Woodson Ball, N° PI-ACLAC-127-2017 a Mark A. Keusenkothen y Nº PI-ACLAC-128-2017 a Ian Harrison, PI-ACLAC-129-2017 a Anna Christian D'Jernes, PI-ACLAC-130-2017 a Kimberly Piage Kenyon y PI-ACLAC-131-2017 a Jason Thomas Raupp. Los portadores de los pasaportes científicos y/o colecta académica establecidas "supra" serán los responsables del manejo y comportamiento de las personas mencionadas en el **resuelve SEGUNDO** dentro del PN Cahuita; así como durante la manipulación temporal en la toma de datos ambientales (biológicos, ecológicos, físicos, químicos), arqueológicos y demás aspectos relacionados con el recurso biodiversidad.

CUARTO: Descripción del lugar de acceso. Que el área específica donde se llevará a cabo el trabajo de campo de la investigación y capacitación ales dentro del Parque Nacional Cahuita –

PNC, específicamente en las zonas: - Sitio de Los Galeones y 50 metros este de Punta Cahuita, cantón de Talamanca, provincia de Limón, Área de Conservación La Amistad – Caribe.

QUINTO: El Sistema Nacional de Áreas de Conservación únicamente autorizará los métodos de recolecta científica enumerados en el reglamento # 32633 de la Ley de Conservación de la Vida Silvestre N° 7317 y sus reformas.

SEXTO: De la metodología científica-académica. Se autoriza los procedimientos metodológicos siguientes para el desarrollo de las actividades programadas para el trabajo de campo propuesto:

31 de agosto: Reuniones de planificación. Noche (1 hora: 15 minutos de clase)
Bienvenida y presentaciones: 2017 Objetivos del proyecto
• NAS Parte II: Sonar de embarque y escaneo lateral
• NAS Parte II: Principios de Conservación
• NAS Parte I y II: ECU Buceo y Seguridad del Agua
• NAS Parte II: Barco Pequeño y Grabación Marítima de la Obra
Septiembre 1. Mañana
• Grupo 1: conferencias introductorias de NAS
• Grupo 2: Sonar de remolque y sonar de barrido lateral que prepara el trabajo de campo
Tarde
• Grupo 2: Conferencias NAS Parte I
• Grupo 1: Buoying el sitio del cañón / del ancla
Noche
• 6:00 pm: Reunión de planificación y actualización del trabajo de campo (ECU)
2 de Septiembre. Mañana
Grupo 1: NAS Introducción mapeo de sitios de playa
Grupo 1: Taller de NAS II Parte: Patrones de búsqueda
Grupo 2: Sonar de embarque y escaneado lateral
Tarde
• Grupo 2: Elaboración de los resultados del mapeo de playa
• Grupo 1: NAS Parte II taller de mapeo de cañones y anclas en el sitio del cañón
Noche
• 6:00 pm: Reunión de actualización y planificación del trabajo de campo (ECU)
• Taller de la Parte II de NAS: Procesos de Formación de Cañones y Crecimiento Marino
3 de Septiembre. Mañana
• Grupo 1: NAS Parte II taller de cartografía de cañones y anclas en el sitio del cañón.
Busca patrones alrededor del sitio del cañón y de la costa.
• Grupo 2: NAS Parte II. Post Processing Resultados de remolque y sonar hasta la fecha
Tarde
• Grupo 1. Sesión de pool de introducción de NAS

• Grupo 2: Mapeo de la línea de arrecifes de Cahuita Point
Noche
• 6:00 pm: Reunión de actualización y planificación del trabajo de campo (ECU)
4 de septiembre. Mañana
• Grupo 1: El buzo busca a lo largo de la línea de arrecifes de Cahuita Point
• Grupo 2: NAS Parte II. Post-procesamiento de datos de línea de arrecifes de Cahuita Point
Tarde
• Grupo 1. Sesión de pool de introducción de NAS
• Grupo 2: Mapeo de la línea de arrecifes de Cahuita Point continúa
Noche
• 6:00 pm: Reunión de actualización y planificación del trabajo de campo
• Mini Conferencia de NAS II: El estudiante habla sobre la investigación de tesis hasta la fecha.
5 de septiembre. Mañana
• Grupo 1: El buzo busca a lo largo de la línea de arrecifes de Cahuita Point
• Grupo 2: NAS Parte II. Post-procesamiento de datos de línea de arrecifes de Cahuita Point
Tarde
• Grupo 1. NAS Parte II. Post El procesamiento de los datos de línea de arrecife de búsqueda de buceador
• Grupo 1. NAS Parte II. Grabación de barcos pequeños
• Grupo 2: Mapeo de la línea de arrecifes de Cahuita Point continúa
Noche
• 6:00 pm: Reunión de actualización y planificación del trabajo de campo (ECU)
• Taller de la NAS Parte II: Turismo Patrimonio y Arqueología Subacuática (Todos los ECU)
6 de septiembre. Mañana
• Grupo 1: El buzo busca a lo largo de la línea de arrecifes de Cahuita Point
• Grupo 2: NAS Parte II. Post-procesamiento de datos de línea de arrecifes de Cahuita Point
Tarde
• Grupo 1. Post Procesamiento de los datos de la línea de arrecife de búsqueda de buzo
• Grupo 1. NAS Parte II. Pequeños barcos y la grabación de paisaje marítimo
• Grupo 2: Mapeo de la línea de arrecifes de Cahuita Point continúa
Noche
• 6:00 pm: Reunión de actualización y planificación del trabajo de campo (ECU)
7 de septiembre. Mañana
• Grupo 1: El buzo busca a lo largo de la línea de arrecifes de Cahuita Point
• Grupo 2: NAS Parte II. Post-procesamiento de datos de línea de arrecifes de Cahuita Point
Tarde
• Grupo 1. Post Procesamiento de los datos de la línea de arrecife de búsqueda de buzo
• Grupo 1. NAS Parte II. Pequeños barcos y la grabación de paisaje marítimo
• Grupo 2: Mapeo de la línea de arrecifes de Cahuita Point continúa
Noche

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• 6:00 pm: Reunión de actualización y planificación del trabajo de campo (ECU)
NAS II Mini-Conferencia: Arqueología de buques esclavos, buques piratas y barcos balleneros
8 de septiembre. Mañana
• Grupo 1: NAS Parte II. Pequeño barco y grabación del paisaje marítimo. Patrimonio de la pesca de Cahuita
• Grupo 2: Mapeo de la línea de arrecifes de Cahuita Point continúa
Tarde
• Grupo 1: Las búsquedas de buceadores a lo largo de la línea de arrecifes de Cahuita o de la línea de costa entre los sitios continúan
• Grupo 2: NAS Parte II. Post-procesamiento de datos de línea de arrecifes de Cahuita Point
Noche
• 6:00 pm: Reunión de actualización y planificación del trabajo de campo (ECU)
9 de septiembre. Mañana
• Grupo 1: Las búsquedas de buceadores a lo largo de la línea de arrecifes de Cahuita Point o línea de costa entre los sitios continúan
• Grupo 2: NAS Parte II. Post-procesamiento de datos de línea de arrecifes de Cahuita Point
Tarde
• Grupo 1. Post Procesamiento de los datos de la línea de arrecife de búsqueda de buzo
• Grupo 1.NAS Parte II. Pequeños barcos y la grabación de paisaje marítimo
Grupo 2: Mapeo de la línea de arrecifes de Cahuita Point continúa
Noche
• 6:00 pm: Reunión de actualización y planificación del trabajo de campo (ECU)
10 de septiembre
• Grupo 1 y Grupo 2 completan cualquier trabajo de campo y post-procesamiento
• Trabajar con estudiantes del CCB para crear presentaciones de power point sobre temas de elección.
11 - 16 de septiembre
• Escribir el informe
• Trabajo de snorkel desde la playa del parque de Cahuita
• Presentaciones públicas
• Snorkel tours para mostrar los hallazgos
Salida el 17 de septiembre
NOTA: 1. Habrá equipos de buceo rotatorios por la mañana y por la tarde. 2. Los buzos traen un almuerzo, agua y aperitivos al lugar. 3. El equipo de la mañana termina al mediodía y transiciones con el equipo de la tarde. El trabajo de campo termina a las 4:30 pm. 4. El equipo que no practica el buceo trabajará en tareas de grupos pequeños. 5. Los cursos de Introducción al NAS, Parte I y Parte II están incorporados a lo largo de los 10 días. 6. A las 6 - 6: 30 pm todas las noches antes de la cena, ECU tendrá una reunión de planificación con los líderes de CCB.

SEPTIMO: Para la inscripción de personas adicionales en la investigación académica y/o el otorgamiento de licencias de colecta científica o académica adicionales a asistentes de investigación, se deben presentar en físico o mediante medio electrónico de acuerdo a la legislación vigente, los requisitos siguientes: Una fotografía reciente tamaño pasaporte (4,5cmx3,5cm) de frente que cubra toda la cara hasta los hombros, sin lentes oscuros, sombrero, gorra u otro accesorio, hoja de Vida en idioma español para cada uno de los asistentes, copia de la cédula de identidad o pasaporte de cada uno de los asistentes, una carta de solicitud de inclusión de los asistentes dentro de la investigación.

OCTAVO: El presente permiso no autoriza la comercialización de plantas o animales ni subproductos de éstos.

NOVENO: Cuando los especímenes obtenidos mediante recolecta científica o cultural se destinen a instituciones extranjeras, el Sistema Nacional de Áreas de Conservación, exigirá, antes de otorgar el permiso de exportación con fines científicos o culturales, la entrega de ejemplares idénticos para el Museo Nacional y a la Universidad de Costa Rica, para los jardines botánicos y los zoológicos estatales, única y exclusivamente. (Artículo 46 Ley No 7317). Así, también se exigirá la devolución de los especímenes colectados (vivos o muertos) al Museo de Zoología de la UCR.

DÉCIMO: Este permiso no faculta para colectar en finca particulares o en Territorio Indígena sin el respectivo permiso de quien está legalmente autorizado para otorgarlo. La eficacia de este permiso queda sujeta a la existencia de una autorización adicional por parte del propietario de dichos terrenos privados o de quien estuviera legalmente facultado para ello.

DÉCIMO PRIMERO: Este permiso de investigación no autoriza a la permisionaria el utilizar los recursos biológicos descritos en la **cláusula TERCERO** para fines de acceso a la información genética o bioquímica de dichos recursos. Si así fuere, este permiso no tendría validez y el interesado deberá tramitar su solicitud en cumplimiento de la legislación nacional respectiva.

DÉCIMO SEGUNDO: El Área de Conservación La Amistad Caribe se reserva el derecho de cancelar este permiso sin responsabilidad alguna para el Estado, cuando se compruebe que se ha incumplido el mismo.

DÉCIMO TERCERO: La investigadora principal no puede ceder ni en modo alguno enajenar el permiso, pues el mismo es intransferible.

DÉCIMO CUARTO: La investigadora principal deberá permitir a los funcionarios (as) del Sistema Nacional de Áreas de Conservación, el ingreso al lugar donde se realizará el acceso o al lugar donde se realiza la investigación.

Dirección: Reserva Biológica Hitoy Cerere, Valle La Estrella.
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DÉCIMO QUINTO: El Sistema Nacional de Áreas de Conservación salva la responsabilidad sobre cualquier accidente o situación que afecte y/o ponga en peligro la integridad de las personas (investigadora, asistentes, estudiantes, acompañantes) que participan en el desarrollo de las actividades de la investigación académica.

DÉCIMO SEXTO: La investigadora principal se compromete a rendir un informe final el 31 de enero del 2018, en idioma español, como lo establece la Ley de Conservación de la Vida Silvestre N° 7317 y su Reglamento, decreto Ejecutivo N° 32633-MINAE y el Manual para realizar investigaciones en Biodiversidad y en los recursos culturales en las Áreas de Conservación, N° 32553, escritos en idioma español. El incumplimiento de este requisito será sancionado (a) con la imposibilidad, para los (as) científicos (as) en forma personal o para la institución que representa, de obtener nuevas autorizaciones, de estudios o investigaciones, hasta por un período de cinco años.

DÉCIMO SEPTIMO: La investigadora principal deberá acatar las recomendaciones técnicas dadas por el Sistema Nacional de Áreas de Conservación y se compromete a enviar copia a la Biblioteca Nacional y al Área de Conservación las publicaciones que genere el presente permiso de investigación.

DÉCIMO OCTAVO: Cuando desee ingresar al Área Silvestre Protegida (Parque Nacional Cahuita-PNC), la investigadora deberá coordinar con la Administración de dicha Área, con al menos ocho días de antelación y coordinar las facilidades que el Área Silvestre Protegida pueda ofrecerle, dentro de sus posibilidades. La investigadora principal y sus colaboradores deberán además reportar su ingreso, salida y material colectado en la bitácora de investigación que para tal fin se encuentra en el Área Silvestre Protegida.

DÉCIMO NOVENO: La investigadora deberá presentar el recibo de pago por "Tarifa de ingreso" para ejecutar investigaciones autorizadas por el SINAC dentro de las Áreas Silvestres Protegidas y según lo dispuesto en el Decreto Ejecutivo No. 38295-MINAE, "Tarifas por derechos de ingreso y otros servicios ofrecidos en las Áreas Silvestres Protegidas bajo la administración del Sistema Nacional de Áreas de Conservación y Derogatoria del Decreto Ejecutivo No. 34164-MINAE", específicamente para el caso del Parque Nacional Cahuita-PNC, según el decreto *supra* para cada uno de los participantes dentro del proyecto de investigación durante el trabajo de campo, o en su defecto solicitar la "exoneración" del ingreso bajo el concepto respectivo y la aprobación de la Dirección Regional del Área de Conservación, según el Artículo N°19 de dicho decreto.

VIGÉSIMO: Este permiso rige a partir del 01 de septiembre del 2017 y hasta el día 16 de septiembre del 2017.

Dirección: Reserva Biológica Hitoy Cerere, Valle La Estrella.
Tel. (506) 22065516 • Fax: (506) 22065516 • Apdo.: 1077-7300.
Limón-Costa Rica
www.sinac.go.cr

VIGÉSIMO PRIMERO: De comprobarse el incumplimiento parcial o total de algunas de las cláusulas citadas en la presente resolución o a la Ley de Vida Silvestre número 7317 y su reglamento, se cancelaría el permiso, con las consecuencias administrativas, civiles y penales, que consecuentemente se deriven y se interpondrá sin mayor demora la denuncia penal o administrativa ante la autoridad correspondiente.

VIGÉSIMO SEGUNDO: Contra la presente resolución proceden los recursos ordinarios de revocatoria y / o apelación, de conformidad con los artículos 343 y siguientes de la Ley General de la Administración Pública, los cuales serán resueltos, el de revocatoria por el mismo órgano que lo dictó y el de apelación por el Consejo Nacional de Áreas de Conservación. Los recursos deberán interponerse ante el órgano que dicta esta resolución dentro de los tres días tratándose de acto final y de veinticuatro horas en los demás casos, contados, en ambos casos, posteriores a su notificación.

VIGÉSIMO TERCERO: Notifíquese contra la presente.

JORGE ARTURO GONZALEZ VILLALOBOS (FIRMA)

Firmado digitalmente por JORGE ARTURO GONZALEZ VILLALOBOS (FIRMA)
Fecha: 2017.09.01 02:40:08 -06'00'

Jorge González Villalobos
Programa de Investigación
ACLAC-SINAC-MINAE

C: Mario Cerdas, Administrador Parque Nacional Cahuita-PNC-ACLAC-SINAC-MINAE
Gina Cuza, Directora de Áreas Silvestres Protegidas-ASPs-ACLAC-SINAC-MINAE
Archivo Programa de Investigación-ACLAC-SINAC-MINAE

NOTIFICADO VIA CORREO ELECTRÓNICO

MINISTERIO DE AMBIENTE Y ENERGÍA
SISTEMA NACIONAL DE ÁREAS DE CONSERVACIÓN
ÁREA DE CONSERVACIÓN LA AMISTAD CARIBE

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(Pasaporte Científico / *Scientific Passport*)

N° PI-ACLAC-120-2017

Investigadora Principal

Apellidos / *Last name*: **Suárez Toro**
Nombre / *Name*: **María del Rosario**
N° de identificación / *Identification N°*: **8-0052-0083**
Nacionalidad / *Nationality*: **costarricense**
N° de pasaporte / *Passport N°*: **PI-ACLAC-120-2017**
Universidad o centro de investigación / *University or research center*: **Universidad de Costa Rica, sede del Caribe, Coordinación de Acción Social**
Nombre, dirección de correo electrónico y teléfono de persona a contactar en caso de emergencia / *Name, E-mail address and phone number of the person to be contacted in case of an emergency*:
Nombre / *Name*: **Cristina Zeledón**
Dirección de correo electrónico / *E-mail*: Haga clic aquí para escribir texto.
Teléfono/*Phone Number*: **89 31 66 93**

Título de la Investigación / *Research title*: **Arqueología Subacuática Comunitaria en el Parque Nacional Cahuita para mapear el Sitio".**
Área(s) de conservación donde se autoriza la colecta / *Authorized conservation areas to collect*: **Parque Nacional Cahuita: Sitio de Los Galeones y 50 metros este de Punta Cahuita.**
Período de vigencia de esta licencia de colecta / *Authorized period to collect*:
Inicio / *Start*: **01-setiembre-2017**
Finalización / *Finish*: **16-setiembre-2017**
Descripción del tipo(s) y cantidad(es) de material autorizado(s) a colectar / *Description of the type(s) and amount(s) of authorized material(s) to collect*: Solo **manipulación temporal en la toma de datos ambientales (biológicos, ecológicos, físicos, químicos), arqueológicos y demás aspectos relacionados con el recurso biodiversidad.**
N° de resolución (permiso de investigación) / *Research permit N°*: **SINAC-ACLAC-PI-R-030-2017**
Fecha de entrega del informe de colecta / *Date to deliver the collection report*: **31-enero-2018**
Nombre del funcionario(a) que autoriza / *Name of the officer who signs this license*: **Jorge Arturo González Villalobos**

Firma / *Signature*

Fecha / *Date*: 31-08-2017

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APPENDIX J.

MINISTERIO DE AMBIENTE Y ENERGÍA
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(Pasaporte Científico / *Scientific Passport*)

N° PI-ACLAC-121-2017

Apellidos / *Last name*: **Harris**
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N° de pasaporte / *Passport N°*: **PI-ACLAC-121-2017**
Universidad o centro de investigación / *University or research center*:
Universidad de Costa Rica, sede del Caribe, Coordinación de Acción Social
Nombre, dirección de correo electrónico y teléfono de persona a contactar en caso de emergencia / *Name, E-mail address and phone number of the person to be contacted in case of an emergency*:
Nombre / *Name*: **María del R. Suárez Toro**
Dirección de correo electrónico / *E-mail*:
escuelabuceocaribesur@gmail.com
Teléfono/*Phone Number*: (506) **86581091**

Coinvestigadora

Título de la Investigación / *Research title*: **Arqueología Subacuática Comunitaria en el Parque Nacional Cahuita para mapear el Sitio".**
Área(s) de conservación donde se autoriza la colecta / *Authorized conservation areas to collect*:
Parque Nacional Cahuita: Sitio de Los Galeones y 50 metros este de Punta Cahuita.
Período de vigencia de esta licencia de colecta / *Authorized period to collect*:
Inicio / *Start*: **01-setiembre-2017**
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Nombre del funcionario(a) que autoriza / *Name of the officer who signs this license*: **Jorge Arturo González Villalobos**

Firma / *Signature*

Fecha / *Date*: 31-08-2017

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(Pasaporte Científico / *Scientific Passport*)

N° PI-ACLAC-131-2017

Coinvestigador

Apellidos / *Last name*: **Raupp**
Nombre / *Name*: **Jason Thomas**
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Universidad o centro de investigación / *University or research center*: **Universidad de Costa Rica, sede del Caribe, Coordinación de Acción Social**
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Nombre / *Name*: **María del R. Suárez Toro**
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Título de la Investigación / *Research title*: **Arqueología Subacuática Comunitaria en el Parque Nacional Cahuita para mapear el Sitio".**
Área(s) de conservación donde se autoriza la colecta / *Authorized conservation areas to collect*: **Parque Nacional Cahuita: Sitio de Los Galeones y 50 metros este de Punta Cahuita.**
Período de vigencia de esta licencia de colecta / *Authorized period to collect*:
Inicio / *Start*: **01-setiembre-2017**
Finalización / *Finish*: **16-setiembre-2017**
Descripción del tipo(s) y cantidad(es) de material autorizado(s) a colectar / *Description of the type(s) and amount(s) of authorized material(s) to collect*: Solo **manipulación temporal en la toma de datos ambientales (biológicos, ecológicos, físicos, químicos), arqueológicos y demás aspectos relacionados con el recurso biodiversidad.**
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Fecha de entrega del informe de colecta / *Date to deliver the collection report*: **31-enero-2018**
Nombre del funcionario(a) que autoriza / *Name of the officer who signs this license*: **Jorge Arturo González Villalobos**

Firma / *Signature*

Fecha / *Date*: 31-08-201

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N° PI-ACLAC-130-2017

Coinvestigadora

Apellidos / *Last name*: **Kenyon**
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N° de pasaporte / *Passport N°*: **PI-ACLAC-130-2017**
Universidad o centro de investigación / *University or research center*: **Universidad de Costa Rica, sede del Caribe, Coordinación de Acción Social**
Nombre, dirección de correo electrónico y teléfono de persona a contactar en caso de emergencia / *Name, E-mail address and phone number of the person to be contacted in case of an emergency*:
Nombre / *Name*: **María del R. Suárez Toro**
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Título de la Investigación / *Research title*: **Arqueología Subacuática Comunitaria en el Parque Nacional Cahuita para mapear el Sitio".**
Área(s) de conservación donde se autoriza la colecta / *Authorized conservation areas to collect*: **Parque Nacional Cahuita: Sitio de Los Galeones y 50 metros este de Punta Cahuita.**
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Finalización / *Finish*: **16-setiembre-2017**
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Firma / *Signature*

Fecha / *Date*: 31-08-2017

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(Pasaporte Científico / *Scientific Passport*)

N° PI-ACLAC-127-2017

Coinvestigador

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Universidad o centro de investigación / *University or research center*:
Universidad de Costa Rica, sede del Caribe, Coordinación de Acción Social
Nombre, dirección de correo electrónico y teléfono de persona a contactar en caso de emergencia / *Name, E-mail address and phone number of the person to be contacted in case of an emergency*:
Nombre / *Name*: **María del R. Suárez Toro**
Dirección de correo electrónico / *E-mail*:
escuelabuceocaribesur@gmail.com
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Título de la Investigación / *Research title*: **Arqueología Subacuática Comunitaria en el Parque Nacional Cahuita para mapear el Sitio".**
Área(s) de conservación donde se autoriza la colecta / *Authorized conservation areas to collect*:
Parque Nacional Cahuita: Sitio de Los Galeones y 50 metros este de Punta Cahuita.
Período de vigencia de esta licencia de colecta / *Authorized period to collect*:
Inicio / *Start*: **01-setiembre-2017**
Finalización / *Finish*: **16-setiembre-2017**
Descripción del tipo(s) y cantidad(es) de material autorizado(s) a colectar / *Description of the type(s) and amount(s) of authorized material(s) to collect*: **Solo manipulación temporal en la toma de datos ambientales (biológicos, ecológicos, físicos, químicos), arqueológicos y demás aspectos relacionados con el recurso biodiversidad.**
N° de resolución (permiso de investigación) / *Research permit N°*: **SINAC-ACLAC-PI-R-030-2017**
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Firma / *Signature*

Fecha / *Date*: 31-08-2017

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N° PI-ACLAC-129-2017

Coinvestigadora

Apellidos / *Last name*: **D'Jernes**
Nombre / *Name*: **Anna Christian**
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Nacionalidad / *Nationality*: **estadounidense**
N° de pasaporte / *Passport N°*: **PI-ACLAC-129-2017**
Universidad o centro de investigación / *University or research center*: **Universidad de Costa Rica, sede del Caribe, Coordinación de Acción Social**
Nombre, dirección de correo electrónico y teléfono de persona a contactar en caso de emergencia / *Name, E-mail address and phone number of the person to be contacted in case of an emergency*:
Nombre / *Name*: **María del R. Suárez Toro**
Dirección de correo electrónico / *E-mail*: escuelabuceocaribesur@gmail.com
Teléfono/*Phone Number*: (506) **86581091**

Título de la Investigación / *Research title*: **Arqueología Subacuática Comunitaria en el Parque Nacional Cahuita para mapear el Sitio".**
Área(s) de conservación donde se autoriza la colecta / *Authorized conservation areas to collect*: **Parque Nacional Cahuita: Sitio de Los Galeones y 50 metros este de Punta Cahuita.**
Período de vigencia de esta licencia de colecta / *Authorized period to collect*:
Inicio / *Start*: **01-setiembre-2017**
Finalización / *Finish*: **16-setiembre-2017**
Descripción del tipo(s) y cantidad(es) de material autorizado(s) a colectar / *Description of the type(s) and amount(s) of authorized material(s) to collect*: Solo **manipulación temporal en la toma de datos ambientales (biológicos, ecológicos, físicos, químicos), arqueológicos y demás aspectos relacionados con el recurso biodiversidad.**
N° de resolución (permiso de investigación) / *Research permit N°*: **SINAC-ACLAC-PI-R-030-2017**
Fecha de entrega del informe de colecta / *Date to deliver the collection report*: **31-enero-2018**
Nombre del funcionario(a) que autoriza / *Name of the officer who signs this license*: **Jorge Arturo González Villalobos**

Firma / *Signature*

Fecha / *Date*: 31-08-2017

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MINISTERIO DE AMBIENTE Y ENERGÍA
SISTEMA NACIONAL DE ÁREAS DE CONSERVACIÓN
ÁREA DE CONSERVACIÓN LA AMISTAD CARIBE

LICENCIA DE COLECTA CIENTÍFICA / ACADÉMICA
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(Pasaporte Científico / *Scientific Passport*)

N° PI-ACLAC-128-2017

Coinvestigador

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Título de la Investigación / *Research title*: **Arqueología Subacuática Comunitaria en el Parque Nacional Cahuita para mapear el Sitio".**
Área(s) de conservación donde se autoriza la colecta / *Authorized conservation areas to collect*: **Parque Nacional Cahuita: Sitio de Los Galeones y 50 metros este de Punta Cahuita.**
Período de vigencia de esta licencia de colecta / *Authorized period to collect*:
Inicio / *Start*: **01-setiembre-2017**
Finalización / *Finish*: **16-setiembre-2017**
Descripción del tipo(s) y cantidad(es) de material autorizado(s) a colectar / *Description of the type(s) and amount(s) of authorized material(s) to collect*: **Solo manipulación temporal en la toma de datos ambientales (biológicos, ecológicos, físicos, químicos), arqueológicos y demás aspectos relacionados con el recurso biodiversidad.**
N° de resolución (permiso de investigación) / *Research permit N°*: **SINAC-ACLAC-PI-R-030-2017**
Fecha de entrega del informe de colecta / *Date to deliver the collection report*: **31-enero-2018**
Nombre del funcionario(a) que autoriza / *Name of the officer who signs this license*: **Jorge Arturo González Villalobos**

Firma / *Signature*

Fecha / *Date*: 31-08-2017

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MINISTERIO DE AMBIENTE Y ENERGÍA
SISTEMA NACIONAL DE ÁREAS DE CONSERVACIÓN
ÁREA DE CONSERVACIÓN LA AMISTAD CARIBE

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N° PI-ACLAC-125-2017

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Título de la Investigación / *Research title*: **Arqueología Subacuática Comunitaria en el Parque Nacional Cahuita para mapear el Sitio".**
Área(s) de conservación donde se autoriza la colecta / *Authorized conservation areas to collect*:
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Inicio / *Start*: **01-setiembre-2017**
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N° PI-ACLAC-122-2017

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Título de la Investigación / *Research title*: **Arqueología Subacuática Comunitaria en el Parque Nacional Cahuita para mapear el Sitio".**
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(Pasaporte Científico */ Scientific Passport*)

N° PI-ACLAC-124-2017

Coinvestigador

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Universidad o centro de investigación / *University or research center*: **Universidad de Costa Rica, sede del Caribe, Coordinación de Acción Social**
Nombre, dirección de correo electrónico y teléfono de persona a contactar en caso de emergencia / *Name, E-mail address and phone number of the person to be contacted in case of an emergency*:
Nombre / *Name*: **María del R. Suárez Toro**
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Título de la Investigación / *Research title*: **Arqueología Subacuática Comunitaria en el Parque Nacional Cahuita para mapear el Sitio".**
Área(s) de conservación donde se autoriza la colecta / *Authorized conservation areas to collect*: **Parque Nacional Cahuita: Sitio de Los Galeones y 50 metros este de Punta Cahuita.**
Período de vigencia de esta licencia de colecta / *Authorized period to collect*:
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SCIENTIFIC / ACADEMIC LICENSE TO COLLECT
(Pasaporte Científico / *Scientific Passport*)

N° PI-ACLAC-123-2017

Coinvestigadora

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N° de pasaporte / *Passport N°*: **PI-ACLAC-123-2017**
Universidad o centro de investigación / *University or research center*: **Universidad de Costa Rica, sede del Caribe, Coordinación de Acción Social**
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Nombre / *Name*: **María del R. Suárez Toro**
Dirección de correo electrónico / *E-mail*: escuelabuceocaribesur@gmail.com
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APPENDIX K:

Investigaciones Estudiantiles para finalizar el Nivel 2 del Curso en arquelogía subacuática de la Nautical Archaelogy Society (NAS) y Nutrir los Fundamentos de Paquetes Vistas Arqueologicas

Parque Nacional Cahuita Y REGAMA

Investigadora Responsible: Dra. Maria Suárez Toro
Centro Comunitario de Buceo Embajadores y Embajadoras del Mar con la dirección técnica de la Dra. Lynn Harris del Programa Maritimo de la Univiersidad de Carolina del Este y la Nautical Archaeological Society
Y con la MsC Marianita Harvey Chavarria, UCR, sede Caribe

. Entre el 1 de noviembre 2017 al septiembre 1, 2018

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Introducción y antecedentes

La presente investigación está estrechamente relacionada por la dos investigaciones previas realizadas por los mismos dos organismos que presentan esta y de las cuales el SINAC/MINAE cuenta con dos Reportes.

Una bajo el titulo "Arqueología Marina Comunitaria en el Parque Nacional

Cahuita" entre el 1-10 de septiembre 2016 y la otra "Informe Preliminar 12 de septiembre", realizada entre el 1 – 17 de septiembre, 2017, ambas en el Parque Nacional Cahuita.

Se refieren a las investigaciones y capacitación especializada en arqueologia subacuática en el Parque Nacional Cahuita, las cuales ha aportado relevantes informaciones acerca del acervo histórico cultural de artefactos que se encuentran hundidos alli.

Se entiende por arquelogía subacuática el estudio de artefactos en el fondo del mar y la historia documental y oral que sobre ellos existe en la localidad, pais u otros lugares en e mundo.

Los aportes en conocimiento remiten a la capacidad desarrollada, tanto para contar con los primeros buzos entrenados en la materia en toda Costa Rica, comos la capacidad desarrollada de desentrabhar, visibilizar y compartir historias relacionada con la arqueología subacuáticas en el PNC poco conocidad y sistematizadas previamente.

Aportes del Proyecto hasta ahora

Amplía la información para desarrollar conocimiento y consciencia comunitaria sobre la historia que se encuentra contenida en el fondo del mar acerca de la llegada, presencia y aportes de la población afro costarricense al Caribe Sur, mucho antes de lo que se pensaba, es decir hace mas de tres siglos y de las hipótesis acerca de los origenes de los artefactos en el sitio de los Galeones en el PNC (galeones daneses, barcos piratas, galeón portugués, que data la llegada a la época de hace mas de 300 años).

Identifica el sitio arqueológico subacuático en el Parque como un componente histórico cultural estratificado que contiene artefactos de distintos momentos civilizatorios en diferentes momentos históricos a Cahuita. Eso cambia la perspectiva lineal de la arqueología, de la historia de la zona y de los imaginarios de pobladores y pobladoras.

Ejemplo son los análisis preliminares de botella y tetera que nos remiten a 1850, pero los ladrillos, anclas y cañones, aunque sin resultados científicos todavía, remiten a mas de 300 años. Y la basura encontrada nos remite a la civilización actual, lastimosamente.

Reafirma la relación simbiótica cultura/naturaleza poco reconocido hasta ahora, pero que ha enriquecido sustancialmente la perspectiva sustentable en la relación del Parque con la comunidad y las proyecciones de su conocimiento y usufructo sustentable le las riquezas del Parque al cerrar la brecha entre naturaleza protegida y la cultura que se encuentra allí, lo que fortalece además el comanejo formalizado mediante decreto en el 2016.

Ejemplo de ellos es la forma como el Comanejo y el Centro Comunitario de Buceo están acordando paquetes de turismo arqueológico que fortalecerán el turismo de cultura en el que todos ganen cultural y económicamente, el acercamiento a la relación entre naturaleza y cultura en el fondo del mar y la relación gobernanza/comunidad/turista en un ámbito Nuevo.

Ha abierto nuevas oportunidades a la juventud que participó en las actividades, capacitación y autoría del informe, para convertirse en exponentes y conferencistas desde su conocimiento y eventualmente (y muy pronto), en guías turísticas subacuáticas en un área nueva de atracción turística: un sitio arqueológico subacuático bien delimitado e identificado en el Parque Nacional Cahuita.

Ejemplo de ello es que la UNESCO invite a los jóvenes a exponer los resultados de su trabajo en su evento el 21 de junio en San José y quiere mandar dos expertos a trabajar con la Expedición.

Ha validado las tres hipótesis principales acerca de la identidad de los artefactos mas antiguos, reconociendo que mientras no se compruebe una de ellas, todas se basan en conocimientos, por lo que deben ser validadas como hipótesis al mismo nivel.

Ejemplo es el de la hipótesis de que son artefactos de barcos piratas. Es una hipótesis de la historia oral, fundamentada en los conocimientos empíricos de los pobladores de Punta Cahuita en la segunda mitad del Siglo XX.

Ha apoyado la Campaña por la Ratificación de la Convención del Patrimonio Cultural Subacuático de la UNESCO por parte del Estado Costarricenses, proceso iniciado en agosto, 2017 al fin luego de haber pasado mas de una década desde la firma de tal Convención,

Le valió al Centro y p[or ende al Caribe sur y a Costa rica, el Segundo Lugar Internacional en Proyectos en Arqueología Histórica de Campo otrogado al Centro y UEC por la Sociedad de Arqueología Histórica el pasado 4 de enero, 2017.

Objetivo general

Realizar las investigacioens de campo que son requistio para que los estudiantes locales del CCB Embajadores puedan graduarse de NAS 2, realizando las pequenhas investigaciones que pongan a prueba sus capacidades adquiridas para desarrollar investigaciones arqueológicas subacuáticas.

Esta parte teórica implica que cada buceador, individualmente o en pareja, debe elaborar un Reporte de Campo que muestre al máximo las capacidades técnicas en investigación en arqueología subacuática adquiridas en el curso.

Curso NAS 2

Objetivos específicos

Desarrollar en el periodo de tiempo especificado las investigacioens de cada grupo de aspirantes a graduarse de NAS 2 con la siguente guía:

Duración del proyecto de investigación

El Proyecto de las invetigaciones para aprobar NAS 2 está planteado entre noviembre 2017 – septiembre 2, 2018 cuando vengan los profesores de la UCE y NAS a la tercera Expedición y entrega de certificados a los graduados de NAS 2 que haya completado satifactoriamente las investigaciones.

Materiales y métodos:

Mediante observaciones, mediciones con cinta métrica y documentación fotográfica, de mapearan los siguentes:

1. **Sendero Eduardo y Sitio de los Anclas en Sitio de los Galeones para medir ancla hallado allí recientemente por Ramón Espinoza y Tygo Brederoo y comparar medidas con los dos anclas en Sitio de los Galeones. Ambos son estudiantes de NAS 2.**

2. **Senderos en los alrededores de los restos del antiguo muelle de Playwood en Puerto Vargas y el muelle mismo para buscar nuevas "huellas" arqueológicas para el Reporte de María Suárez Toro (CCB Embajadores) y José López (SINAC/MINAE), ambos estudiantes NAS.**

3. **Visitas de exploración y medición al Pozo de Petróleo de la Sinclair Oil Company en el PNC para medir instrumentos y el pozo mismo y tratar de encontrar nuevas "huellas" arqueológicas del dicha exploración para el Reporte de Carlos Mairena y Antonio Mora, ambos cursando NAS 2.**

4. **Visitas de exploración y medición de nuevas evidencias en el Sitio de los Galeones por la familia Koblensky-Brenes: Alexander, Gloriana y su hijo Sangye, quien descubrió el pasado 8 de septiembre la pista/evidencia mas clara acerca de la antigüedad de los restos de embarcaciones allí. Los tres son estudiantes del curso NAS 2.**

5. **En busca del *Cristina* por equipo integrado entre graduandos NAS 2 a ser nombrado, buscará datos fistico en Tuba Creek y documentales acerca de la posible ubicación del yate del naufragio del ex Presiente González Flores en 1915 en Cahuita.**

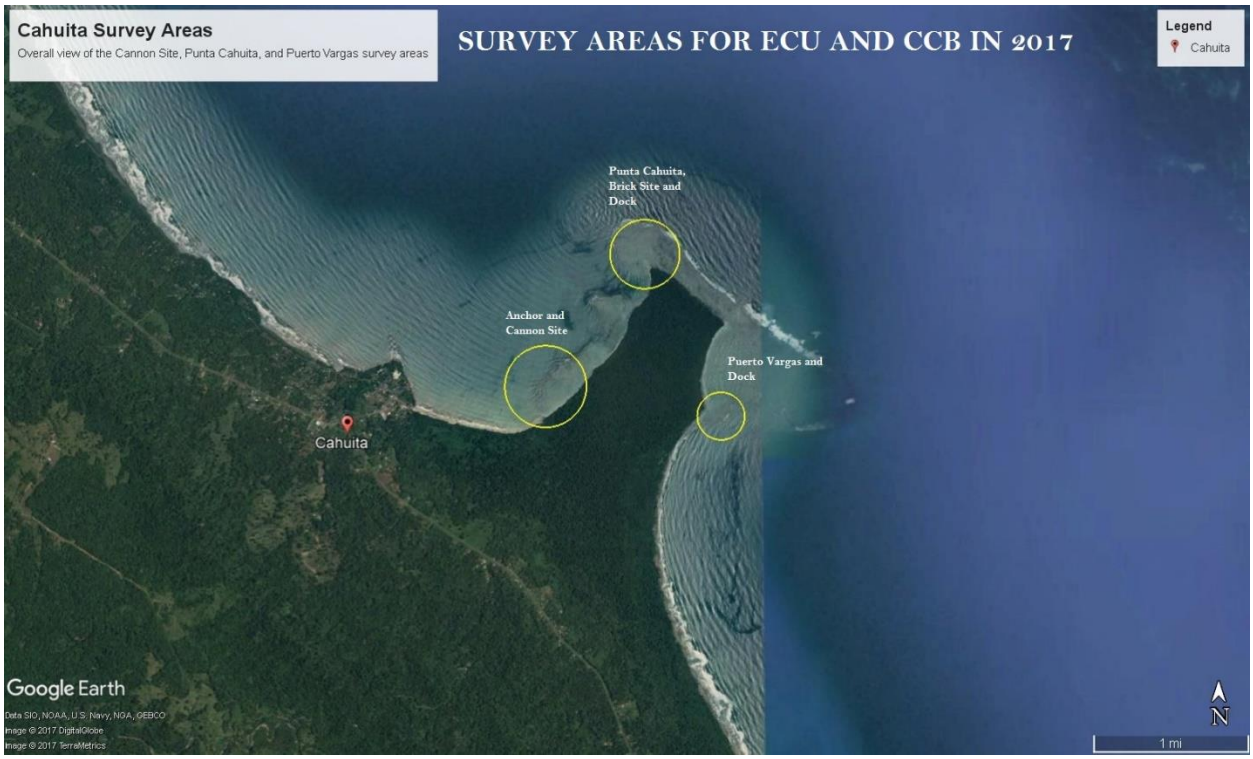
6. **Otro equipo integrado buscará otros artefactos hundido en el PNC siguiendo las pistas de pobladores y pescadores de la zona.**

7. **En REGAMA, visitas de exploración y medición de restos del maderero encallado en Manzanillo, Daisy Gray. Será realizado por Anderson y Kevin Rodriguez, Royer Colomer y Pete Stevens con el apoyo de Gloriana Brenes y Maria Suarez Toro.**

8. **En REGAMA, Salvador Van Dyke, NAS 2, realizará búsquedas de otros restos en el REGAMA entre Puerto Viejo y Manzanillo con pescadores de la zona.**

9. **Adicionalmente, el Master Diver Geovani Sandoval del CCB Embajadores entrenando a en buceo básico PADI Avanzado en técnicas para ampliar las búsquedas, necesita realizar cuatro incursiones de buceo nocturno para enseñarle esas técnicas a los buceadores y buceadoras del Centro a fin de aprender a realizar esas exploraciones.**

Todas las visitas de estudiantes particulares serán apoyadas por el personal del Centro (María Suárez, Gloriana Brenes y Giovani Sandoval) y técnicamente desde Estados Unidos por la dra. Lynn Harris y su equipo de capacitación NAS 2.



Los Reportes de las investigaciones serán depositadas en el archivo de la NAS, en el Reporte a SINAC/MINAE y formarán parte del Módulo de Formación de Guías en Arqueología Comunitaria que propone el CCB Embajadores a la Comisión Local del PNC para los Paquetes de Turismo Arqueológico.

Sobre los paquetes:

Qué? Una propuesta de turismo arqueológico diseñado en nueve paquetes turísticos arqueológicos para adultos y tres familiares con énfasis infantil, en distintos puntos arqueológicos de la zona marino costera del Caribe Sur de Costa Rica.

Dónde nace? En el 2017 surge de la nueva oportunidad que ha desarrollado el Centro en su capacitación en arqueología marina, su relación orgánica en las comunidades y con instituciones que promueven el turismo sustentable cultural y naturalista en la Provincia.

Para qué? Potenciar el usufructo colectivo de los bienes marino costeros – culturales y naturales – que son nuestros comunes en el Caribe Sur, en una de las principales fuentes de subsistencia en la zona: el turismo cultural. Crear oportunidades en nuevos nichos que integren lo cultural, lo histórico y arqueológico.

Participantes

. Se detalla una lista de los estudiantes que estarían participando, incluyendo número de identificación, nacionalidad, nombre de la persona contacto en caso de emergencia y número de teléfono de la persona contacto.

Resultados esperados

Tejido soco-cultural en el Caribe Sur. El Proyecto busca aportar a la promoción de la rearticulación del tejido socio-cultural casi resquebrajado por políticas aislacionistas en la conservación que casi fracturaron la relación naturaleza y cultural, población y zonas protegidas y, en muchos momentos, hasta la de gobierno y sociedad civil cuando todavía no se ponían de acuerdo acerca de lo que constituyen derechos históricos en la zona marino costera.

Hoy día, producto de luchas sociales de las comunidades del Caribe Sur por tener acceso a sus zonas protegidas; de un marco constitucional que ha afirmado la participación directa de la ciudadanía en la modificación del Articulo 9 en el 2003; de un marco gubernamental actual que expresa una voluntad integrista de las dimensiones resquebrajadas que se expresa en el decreto sobre gobernanza compartida de zonas protegidas; de un marco internacional hacia la política integracionista de cultura y ambiente que se expresa en la declaratoria de este como el año de Turismo Sostenible, entre otros.

El Caribe Sur en el país se destaca por haberse convertido en el primer ejemplo de integración de este tipo al haber formalizado el régimen de con gobernanza del Parque Nacional Cahuita con el Decreto de Gobernanza Compartida.

Como bien señaló el Presidente en su informe anual 2017, "el esquema modelo de gobernanza compartida en el Parque Nacional Cahuita asigna la gestión del parque nacional a las autoridades del SINAC y a la comunidad representada en el Consejo Local del Parque Nacional Cahuita, a fin de garantizar el uso sostenible y la distribución justa y equitativa de los beneficios derivados de la conservación, de acuerdo al marco normativo vigente. La virtud de este esquema es el aprovechamiento de la riqueza histórica, cultural y biológica del entorno en la gestión del parque" ...

Internacionalmente , este año es *Año Internacional del Turismo Sostenible para el Desarrollo y* este 9 de mayo la Organización Mundial del Turismo (OMT) acaba de nombrar al Presidente Solís como Embajador Especial del

Año Internacional del Turismo Sostenible para el Desarrollo por *las iniciativas desarrolladas en materia de turismo sostenible y el posicionamiento e impulso internacional del país a este campo…"*

Internacionalmente el Centro Comunitario de Buceo Embajadores y Embajadoras del Mar junto con el Programa Marítimo de la Universidad de Carolina del Este acaba de recibir el premio de Segundo Lugar en Arqueología Histórica de la Sociedad de Arqueología Histórica por su trabajo en el Caribe Sur en esa disciplina, la diversidad de su composición, su trabajo comunitario y mediático en el campo.

Cómo? Los bienes comunes a contemplar en la propuesta y que serán organizados en paquetes arqueológicos, incluyen antiguos y mas modernos artefactos y embarcaciones hundidas a lo largo y ancho de una zona marino costera que en el pasado fue refugio de piratas y paso de embarcaciones mercantiles que traficaban bienes materiales y humanos convertidos en mercancía durante la esclavitud. Incluye además vestigios en tierra, como pozos petroleros, barcazas encalladas a flor de agua, objetos culturales como las tecnologías para secado de cacao entre otros, casas y construcciones que caracterizan y han sido fuente de la cultura de la zona y monumentos modernos a acontecimientos significativos de la historia de la zona.

Estrategia de comunicación y seguimiento de resultados

El blog, el facebook, los videos en YouTube y reportajes en el periodico local mensual, *ActualidadesTalamanquenhas*, en Radio Casino y otros medios nacionales e internacionales estan dirigidas a distintos segmentos de poblacion local, nacional e internacional para dar a conocer lo que se hace, se descubre y cómo ello se inserta en la conservación de la historia y la cultura submarina en el Caribe Sur.

Este trabajo comunicacional fue uno de los criterios por los cuales la Soceidad de Arqueología Histórica lo otorgó el premio de 2do Lugar a nuestro Proyecto en el 2017.

Seguimiento resutlados:

Al terminar las investigaciones y de ser aprobadas, el equipo de capacitadores de la UCE y NAS regresarán el 1 de septiembre a continuar estudios avanzados NAS 3.

El CCB Embajadores por su parte converirá los productos de las investigaciones en insumos para los Paquetes Turisticos y el Módulo de Capacitación en Guias Arqueológicas Subacuáticas.

Cronograma

No es posible poner fechas exactas debido a los estados del tiempo y porque todo el personal que lo va a realizer, trabaja y estudia a tiempo completo.

Debido a que todos somos pobladores del Caribe Sur que nos relacionados vivencialmente con los sitios a investigar, cada vez que se vaya a hacer una visita de este Proyecto, la encargada lo reportará a las autoridades del PNC.

Bibliografía

Las metodologías propuestas son las de la internacional Nautical Archaeological Society (NAS), debidamente comprobadas mundialmente durante los últimos 30 años.

Intended NAS Part II Field Work:

LOCATION	SITE RECORDERS
Anchor in Eduardo Sendero	Tygo Constant Brederoo and Ramón Ernesto Cruz Espinoza
Puerto Vargas Dock	José Francisco Saballo López and María Suárez del Toro
Sinclair Oil Well	Carlos Mairena and Antonio Mora Streber
Daisy Gray Wreck	Koblensky and Brenes Family
Yankee Clipper	Pete Stephens Rodríguez
To Be Determined	Anderson Rodríguez Brown, Kevin Rodríguez Brown, and Esteban Gallo