Natural and Cultural Heritage of Point Salines, Grenada:
Proposal for Impact Assessment and Mitigation

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Executive Summary

Point Salines is a unique natural and cultural landscape, first settled by humans over 3500 years ago.

Since the 1960s, archaeologists have known that the ceramic refuse around the shores of the main Salt Pond reflected substantial Amerindian settlement between AD 700-900.

More recently, conch middens at Grand Bay and Degra Bay, just to the south, were radiocarbon dated to 1500 BC—the earliest evidence of human presence on the island (see Figure 2).

If further substantiated, Grand Bay would be one of just *two* confirmed Archaic sites in the Windward Islands. (Most of what we know about the Archaic period comes from the Leeward Islands and Trinidad.)

The area is also home to a rare phenomenon of sandstone that formed *after* human settlement, lithifying prehistoric artifacts within the rocks (see cover image and Figure 6).

This proposal offers a plan for rescuing the above archaeological remains from impending airport development and mitigating the destruction of an important site to world history.

The plan involves five weeks of fieldwork, at a cost of $13,170 XCD, including wages for ten local workers.

The possibility for an eventual exhibit at the airport that displays this project's findings is also suggested.

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Introduction

Like natural resources, *cultural* resources are finite, vulnerable to exploitation, and need active protection. We have an ethical—arguably, moral— duty to preserve the remains of our ancestors that have, against all odds, survived until today. The sites at Salt Pond have survived the original airport construction, sand-mining, and even the US-led military Intervention, but they cannot sustain such impacts forever. These sites are incredibly important, not just to Grenada or Caribbean archaeology but to world history, in part because they may reveal information about a highly enigmatic time in antiquity known as the Archaic Age. This proposal outlines a possible route to mitigate future impacts on the archaeological sites at Point Salines.

Background

Mudstone Fossils

Around 2-3 million years ago, *lahar* events (volcanic mudflow, probably originating from the Mt. Maitland-Mt. Sinai range) formed the western landmass of Point Salines.[1] Mudstone is the predominant rock in the area and clearly evident on the eroding promontories that jut out along the southern coastline. Thin layers of halite (rock salt) within eroded profiles of mudstone here suggest contact with sea water (Figure 1). During the glaciation periods of the Pleistocene Epoch, sea-levels lowered and rainwater pooled across the newly emerged landmass. As water slowly worked its way through the stone, it dissolved the halite, and deposited it onto the surface during the dry season. This ancient salt combines with other accumulating minerals during evaporation to form a salt pan or *salina*. Historically, salt from Point Salines was a major export for Grenada.[2]

Aside from halite, animals were also trapped in the lahar events, evidenced by their fossilized remains. Grenada is too young for dinosaurs, but their *megafaunal* successors roamed the Greater Antilles during the Pleistocene Epoch.[3] For years, it was believed megafauna were not present in the Lesser Antilles until, in the 1980s, teeth of an extinct sloth species (*Megalonychidae sp.*) and previously unknown capybara (*Hydrochaeris galordi)* were found in the mudstone formation at Prickly Point, dating to ~3mya.[4] This was the first evidence that sloths had lived in the Lesser Antilles. More recently, it has been shown that the Caribbean was probably the last refuge for giant sloths, who were finally exterminated when humans arrived.[5–7]

The Archaic Age

Human occupation of the Caribbean archipelago began 5000-7000 BP, when lithic blade producers known collectively as the *Casimiroid* left Central America for Cuba.[8–10] This was the beginning of the period archaeologists call the Archaic Age. By 4000 BP, the *Ortoroid* peoples— a group making lithic groundstone tools (a different tool tradition from blades) arrived in Trinidad and Venezuela. It has long been assumed that the Ortoroid moved into the Lesser Antilles and interacted with Casimiroid groups.[9,11–13] However, just three radiocarbon dates from Barbados represent the only evidence for either group between Montserrat and Trinidad.[14–16] Many researchers have begun to doubt any Archaic presence in the Windward Islands.[17]

Most of the data available on the Caribbean's Archaic Age comes from the Greater Antilles and Leeward Islands. Projects in the Leewards have recovered evidence that Archaic groups were hunter-fisher-gatherers who likely travelled in small, familial bands exercising seasonal mobility with the hurricane season and animal cycles (migrating birds, turtle nesting, fish spawning).[11,18–20] Later Archaic Age groups possessed knowledge of plant management,[21–23] low-fired, utilitarian pottery,[24,25] and may have been semi- or fully sedentary, practicing a delayed-return economy dependent on home-garden trees and tropical root-crops.[22,26] Paleobotanical and zooarchaeological studies have shown numerous plants and animals likely

arrived in the Caribbean during this period, including: achiote, agouti, beans, breadnut, dogs, guinea pigs, hutias, maize, mamey apple, manioc (cassava/farine/tapioca), opossums, papaya, peanuts, peppers, pineapple, pumpkins, shrews, sapodilla, soursop, squashes, sweet potatoes, arrowroot (tannia), and tobacco.[27] In short, many of the fruits and vegetables that define the modern Caribbean landscape are the fingerprints of the Archaic and Ceramic Age groups who first brought them.

The Ceramic Age

The Early Ceramic Age (500 BC–AD 500) began with the arrival of a distinctive pottery-making people known as the Cedrosan Saladoid.[9,13,28] Saladoid ceramics have been traced to the Orinoco watershed in modern Venezuela beginning around 2000 BC, suggesting that their appearance in the Caribbean — along with a similar agricultural repertoire and settlement plans— reflects diasporic fissioning from lowland South America.[9,29–32] It is notable that, like the Archaic, the earliest radiocarbon dates for Ceramic Age sites have consistently come from Puerto Rico and islands north of Guadeloupe, leaving a roughly 500-year gap from the earliest dates in the southernmost islands.[33–36]

A recent survey in Grenada by Hanna[37,38] confirmed the late colonization of the island, which appears to have begun around AD 200. Given their origin in the Orinoco, it is unknown why these islands were skipped. Theories have abounded whether the early Ceramic peoples simply reached the northern islands *first* by sailing directly across the Caribbean Sea (known as the "Southward Route Hypothesis"),[31,39–42] or whether they purposefully bypassed the southern Lesser Antilles to avoid Archaic peoples (whose presence, as mentioned, is equally unconfirmed).[43] Other explanations for avoidance have included volcanic activity,[14] rough inter-island currents and reefs,[39] compulsive exploration, [9,44] lack of terrestrial resources,[13,42,45] and deeply buried or destroyed sites.[18,46] All of these, however, could apply to the northern islands as well, where numerous Archaic sites have been identified.

Archaic Possibilities

Until 2017, the strongest evidence for an Archaic presence in Grenada came from two sediment cores taken by Siegel at Lake Antoine and Meadow Beach.[46] These cores exhibited sustained charcoal signals, decline in arboreal plant species, and other changes in vegetation beginning ~3645 BC. Unfortunately, these taxa did not include *introduced* species (e.g., any plants named above), suggesting natural, rather than anthropogenic, changes to the plant community.[47] Indeed, some charcoal peaks could well be volcanic events, given Grenada's modern[48] and relatively recent volcanic activity over the last 10,000 years.[49]

However, in November 2017, radiocarbon dates were processed from Hanna's previous survey of Point Salines.[37] Three of the sites dated (St. John's River, Grand Bay, and Black Point) contained unexpectedly early dates that suggest an Archaic component at Point Salines and possibly Queen's Park (Figure 2). Given the Ceramic Age sites around Salt Pond, it appears the area may have been a point of interaction between early Ceramic groups moving into the Caribbean and the Archaic groups they eventually replaced.

The Salt Pond Sites

Salt Pond was first surveyed by Ripley Bullen[50] in 1962 and later Petitjean Roget,[51] during construction of the MBIA. Bullen's survey identified three loci around the main pond, with Salt Pond 1 (a northern shell midden) later subsumed under the airstrip (Figure 3). Similarly, Salt Pond 3, on the pond's eastern edge, appears to have been heavily disturbed. Nonetheless, Hanna's survey of Salt Pond 2, on the pond's southwest shore, revealed deep deposits of ceramics and organic refuse, including charcoal later dated to AD 770-945 and a shell dated to AD 700-1025.

Bullen's analysis of Salt Pond's ceramics placed them at the end of the Saladoid period. The one exception was a shovel test off Black Point, southwest of Salt Pond 2, where he identified potentially earlier ceramics that appeared to precede the others. This conclusion may have been the result of selective sampling.[29,50] In 2016, the location of Bullen's test was found entirely submerged under water, but ceramics, conch, and shell tools were recovered, some lodged under mudstone boulders in the water.

While sea level has risen approximately one meter over the past 2000 years,[52–55] ongoing sand-mining has drastically reduced the present shoreline (Figure 4). Comparison of aerial photography taken in 1951 and 2016 (Figure 5) confirms the change in shoreline over just 60 years. This is probably why Bullen missed one of the most interesting features of the area— five sandstone eolianites (a kind of natural cement) along Cato Beach, loaded with Amerindian artifacts (Figure 6). Petitjean Roget[51] noted these "beach rocks" and rightly hypothesized that meteoric freshwater mixed with $CaCO_3$ from the shells, lithifying the sand with the artifacts.[56] A shell from one eolianite was radiocarbon dated to AD 665-985, aligning with the dates at Salt Pond 2 and suggesting they are part of the same site.

Just north of Cato Beach is Grand Bay, where numerous piles of conch shells can be found lining the shore and continuing north to Degra Bay (Figure 7). Upon close inspection, it is clear these middens were exposed during the extensive sand mining that has occurred. Two shells from here were radiocarbon dated to 800-410 BC and AD 10-390. Another shell from Black Point dated to 1685-1290 BC.

The meaning of these dates are not yet clear. They are the oldest known dates associated with human presence on Grenada. The Archaic dates from Black Point and St. John's River occurred within an otherwise Ceramic Age context, suggesting the shells were simply picked up off the beach and used as a tool, rather than eaten.[57] However, because the two Grand Bay dates were from the same shell midden and clearly not used as tools, it is believed they indicate an earlier, Archaic occupation of the area. If so, these sites hold rare and invaluable information about the Caribbean's first peoples.

Recommendations

An assessment must be made of the impact that future airport construction may have on the archaeological resources in the area. Not only is this current law (see below), but also the ethical responsibility of any state committed to preserving its heritage.

Complete scientific investigation of the area of potential impact (API) should be conducted, including areas of direct impact and secondary impacts, such as staging and waste disposal areas. At minimum, the following is recommended before any construction occurs at Point Salines:

1. Phase I: Assessments be made via systematic shovel/auger testing to determine the exact extents of the archaeological deposits and which fall within the API;
2. Phase II: Several excavations be placed in areas positive for cultural remains;
3. Phase III: Archaeologists be present during initial grading and bulldozing of the area, to document new finds and mitigate destruction of archaeological remains as much as possible;
4. Phase IV: Continued monitoring and evaluation of the project, as it progresses.

Every effort should be made to ensure that refuse from construction is properly disposed away from sensitive cultural resources. It is also advisable to consult other specialists about impacts to the coastal ecosystem and perhaps even geology of the area (given the salt pan).

Legal Requirements

Grenada's Cultural Policy encourages the protection of the national patrimony, specifying the need for the restoration and maintenance of archaeological and historical sites in the country, as well as the recovery, protection and display of artifacts and other cultural property. The Grenada National Museum Act 2017 implements the Cultural Policy by stating that all artifacts are vested in the State of Grenada and any excavation or removal is a summary offence, punishable by fine.[58]

Projects involving airports, harbours, the dredging and filling of ponds and swamps, sensitive environmental areas or development in the coastal zone require an Environmental Impact Assessment (EIA) by the Planning and Development Authority.[59] The objectives of the Authority include contribution to the protection of the cultural heritage, and the Natural and Cultural Heritage Advisory Committee makes recommendations to the Authority where development can potentially impact heritage resources.

Many countries manage their cultural resources in this way, including China, who is poised to hold the most number of UNESCO World Heritage sites in 2018.[60]

Estimated Timeline (adjusted April 2018)

Phase I: Auger Testing	Phase II: Excavation	Phase III and IV: Mitigation
(Hanna + 1 Tech)	(Hanna + 1 Tech)	TBD
2-3 days	2 weeks	TBD
June 18-21, 2018	June 25- July 7, 2018	TBD

Following each phase, necessary lab work is required to analyze the findings and understand the results (to be conducted at the Grenada National Museum). A general rule of thumb is that *one day in the field equals three days in the lab*. Thus, lab work for Phase II will likely require several months to complete.

Please also note that, because we do not know what will be found, the above timeline is only an estimate. If sensitive remains (e.g., human burials) were recovered, the time required would likely increase.

Budget (adjusted April 2018)

Item	Unit	Per Unit	# Units	Subtotal	Purchase from	Notes
vehicle transport	1 vehicle for 1 month	$1,100.00	1	$1,100.00	MAR	vehicle transport
crew wages	1 worker for 1 week	$500.00	3	$1,500.00		for 3 weeks
pint-size bags	box of 100	$16.00	1	$16.00	Foodland	soil samples
quart-size bags	box of 50	$16.00	2	$32.00	Foodland	artifacts
Gallon-size bags	box of 20	$16.00	2	$32.00	Foodland	artifacts
storage containers	1	$64.00	1	$64.00	Ace	Artifact storage and curation at GNM
^{14}C dating	1	$268.00	1	$268.00		internal rate at PSU-AMS, if Hanna preps himself (otherwise $250-$350 USD each)
		Total (XCD)		$3,012.00		

Sifter screens, buckets, and stationary items area already in HRG's possession. Amortized equipment costs and administrative fees have been waived for this project.

Efforts will be made to involve former young persons who were trained in archaeological methods during SGCAP,[61] as well as Leiden University's project at La Poterie.[62]

While not included in the budget, this may also be a perfect opportunity to design an exhibit for display at the airport, perhaps in association with the Grenada National Museum. The display would offer locals and visitors alike information about Grenada's rich cultural heritage and the specific sites located in the Point Salines area. (Associated costs not included in budget.)

Conclusion

The archaeological record at Point Salines may be one of the most important in the Lesser Antilles. Like any finite resource, cultural heritage disappears if mismanaged. Let us work together to set a precedent for how Grenada can develop in the 21st Century with integrity and sensitivity to its unique cultural heritage.

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Figures

Figure 1: Point Salines Mudstone and Halite

Figure 2: Grenada's Radiocarbon Dates (recent Archaic dates in green)

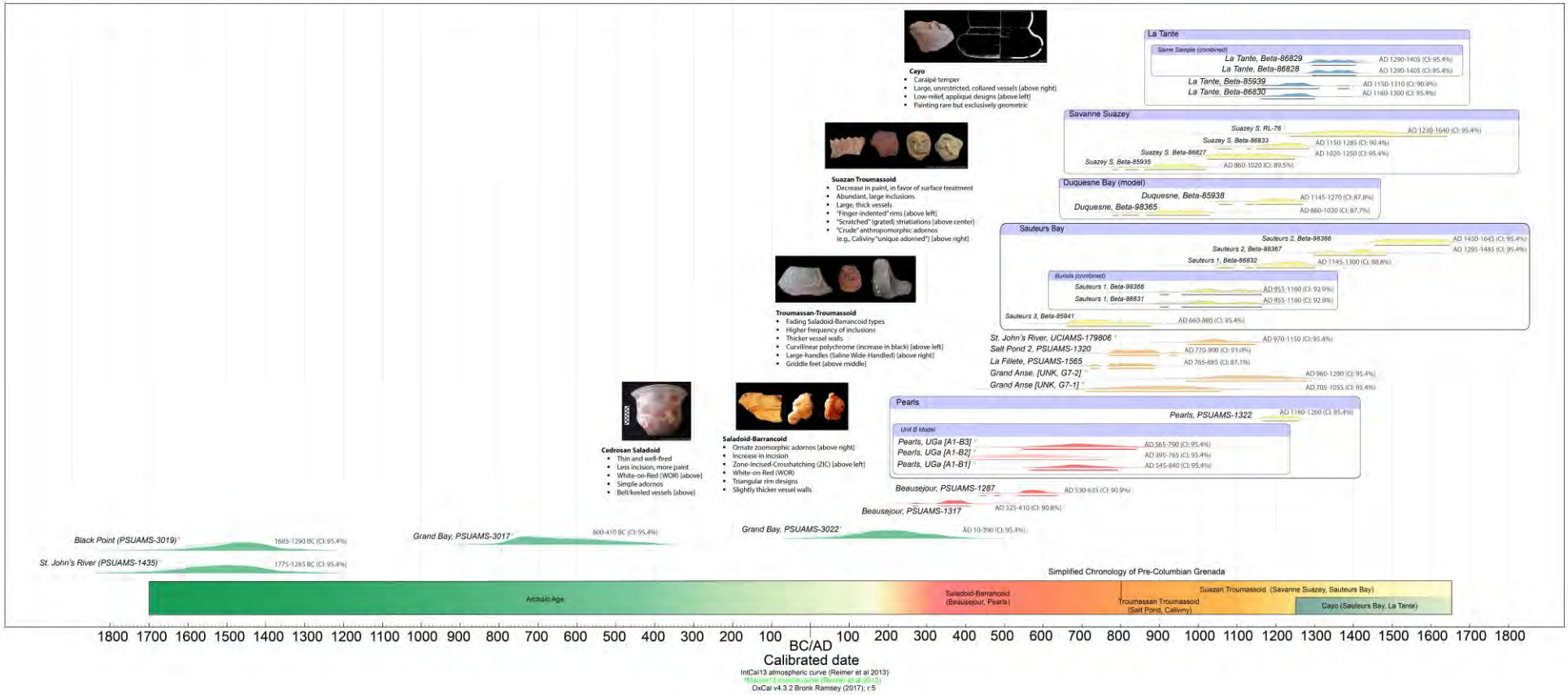

Figure 3: Archaeological Sites at Point Salines

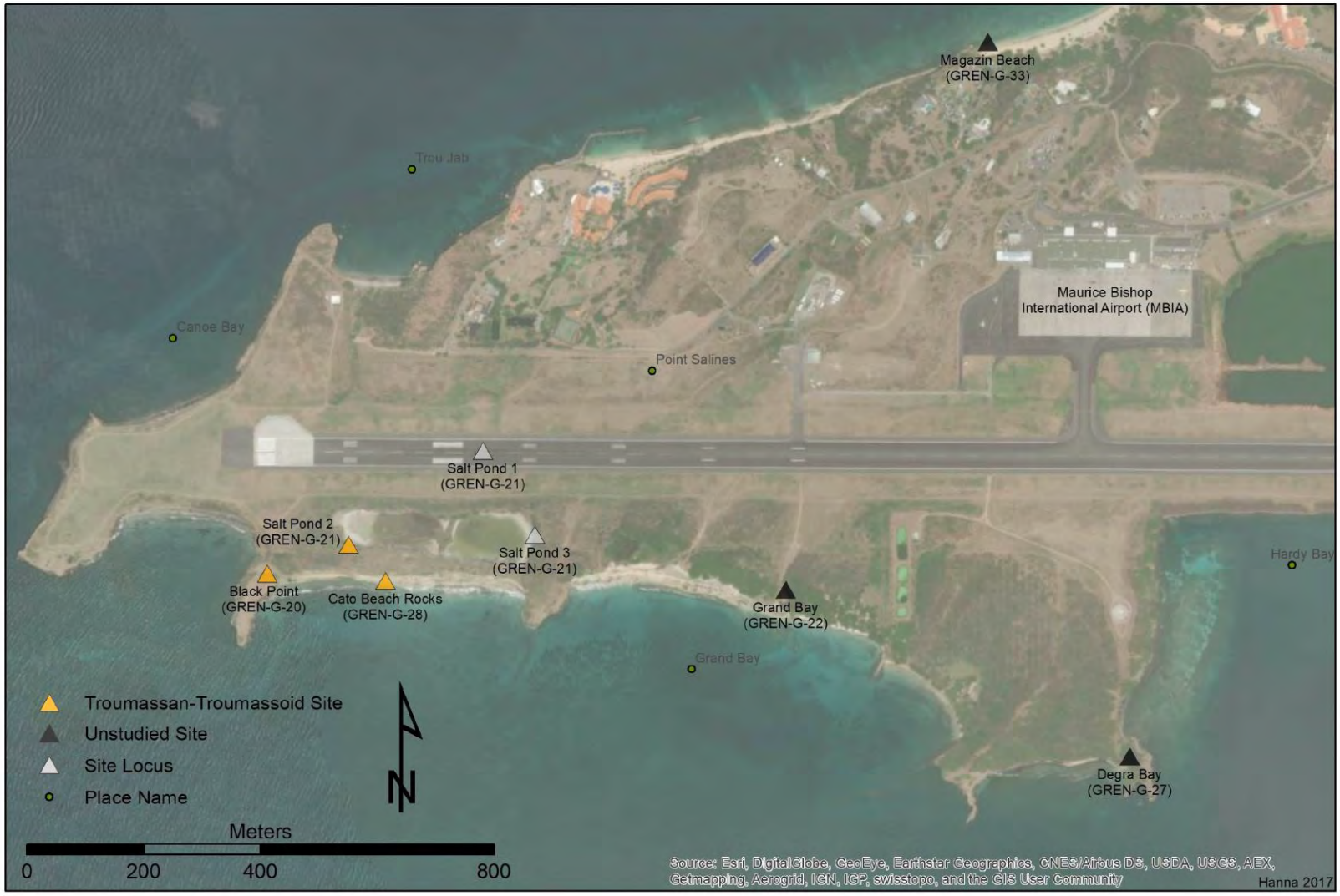

Figure 4: Evidence of Recent Sand Mining

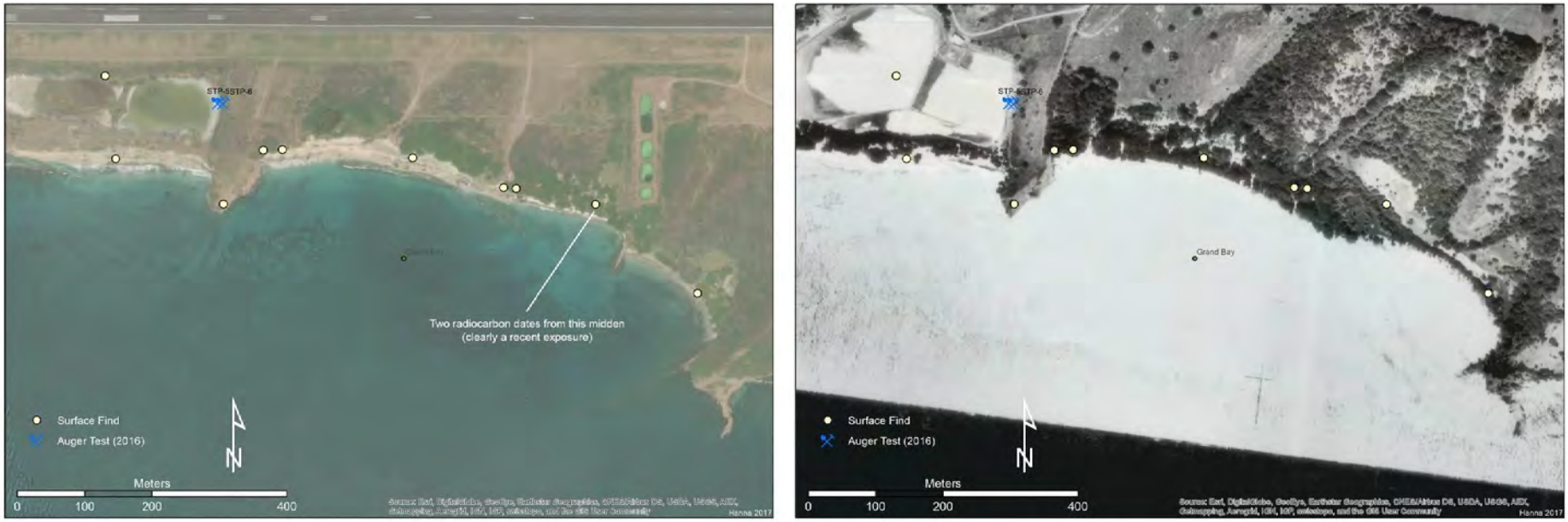

Figure 5: Aerial Images of Grand Bay in 2016 (left) and 1951 (right)

Figure 6: Cato Beach Eolianite and Lithified Artifacts

Figure 7: Recently Exposed Shell Middens at Grand Bay (top) and Degra Bay (bottom)