Leiden University

Fieldwork Report Grenada 2016

Fieldwork Report from the work carried out at La Poterie, Grenada in January 2016 by the Faculty of Archaeology, Leiden University, under the direction of Professor dr. C.L. Hofman

Universiteit Leiden

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Contents

Participants Archaeological investigations at La Poterie, Grenada

Corinne L. Hofman, Menno L.P. Hoogland, Julijan Vermeer (Leiden University), Patrick Degryse, Becky Scott (KU, Leuven), Jason Laffoon, Samantha de Ruiter (Leiden University), Tom Brughmans (University of Konstanz), and Marc W. Hauser (northwestern University, Chicago)

Team members: Ruud Stelten, Samantha de Ruiter, Angus Martin, Liliane de Veth, Emma de Mooij, Emma Slayton, Finn van der Leeden, Noortje Wauben, Tom Breukel, Catarina Falci, Tom Brughmans, Dolton Charles, Wayne Edward, Trina Antoine, Ray Antoine, Arkell Baptiste, Akimmon Andrew, Steyson Bernard, Alec Charles, Nicky Edgar, Josh Elahie, Rockim St. Bernard, and Lornadale Charles.

1. La Poterie Excavation Report

By Corinne L. Hofman and Menno L.P. Hoogland, with contributions from Julijan Vermeer, research assistant, Leiden University

1.1. Introduction and Previous Archaeological Research in Grenada

The state of Grenada consists of the island of Grenada and Carriacou and Petite Martinique at the southern end of the Grenadines in the southeastern Caribbean Sea; other islets include Ile de Ronde, Diamond Island, Large Island, Saline Island, and Frigate Island. Grenada is located northwest of Trinidad and Tobago, northeast of Venezuela, and southwest of Saint Vincent and the Grenadines.

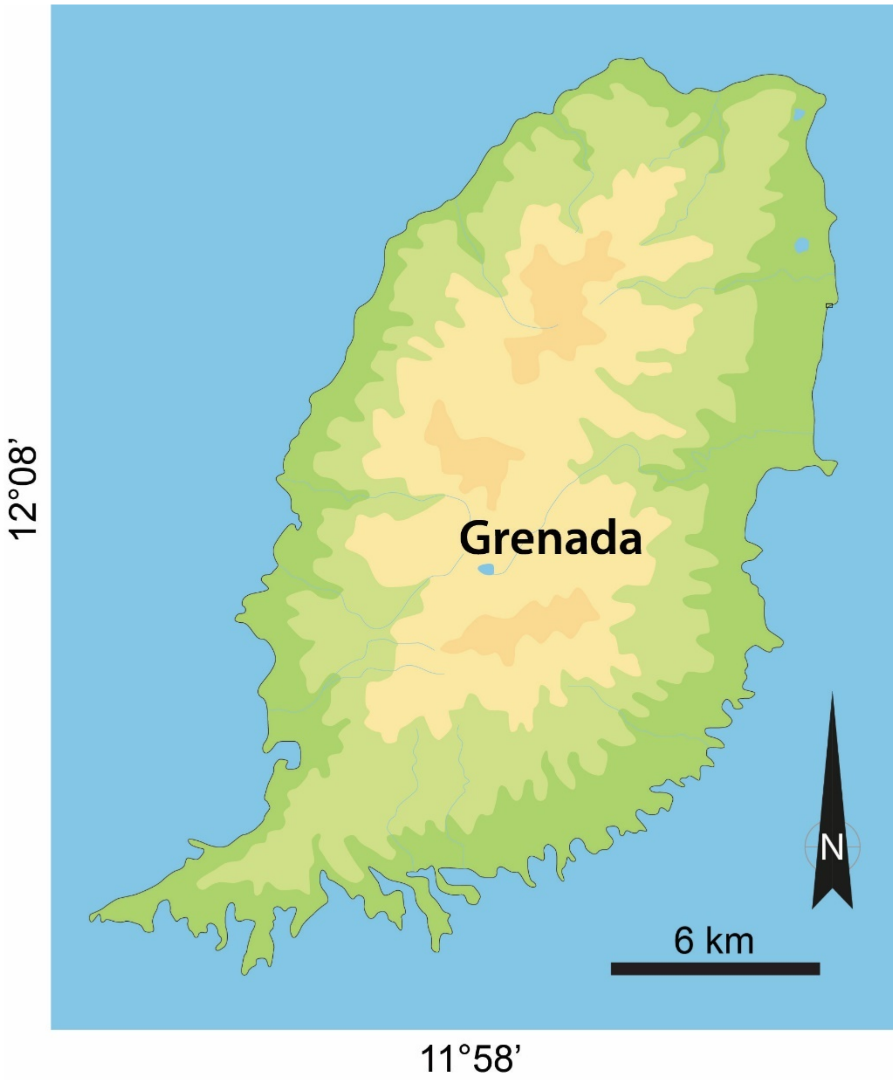

Figure 1. Island of Grenada

After the early 20th century collection-based studies of Holmes (1907) and Fewkes (1922), and the survey of Huckerby (1921), the first archaeologist to carry out long-term investigations on Grenada was R. P. Bullen, who performed stratigraphic tests in five sites discovered through partial surveying of the island. Bullen (1964; 1965) studied over 30,000 sherds and arranged the major pottery series into culture and time-periods: Pearls, Calivini (Calivigny) and Suazey, also identifying four main Amerindian settler groups: pre-Ceramic, pre-Arawak agriculturalists, Arawaks and Caribs. With the exception of a survey carried out by Dr. Henry Petitjean Roget (1981) and the work of vocational archaeologists, the island had not been further investigated until the late 1980's, when William Keegan and Annie Cody carried out surface surveys and test excavations at the Pearls site with the objective of assessing its spatial configuration and to formulate future research strategies. Finally, the combined efforts of various specialists permitted a multi-disciplinary study of cultural development and diet in this extremely disturbed site (Keegan and Cody 1990; Keegan 1991), while Annie Cody continued to perform test excavations in the area during the 1990s (Cody 1995). Although some archaeologists have since worked on particular materials from the Pearls site (Harris 2001; Byrne and Keegan 2001; Boomert 2007), no further pre-Colonial archaeological work has been initiated in the island.

Similarly, little archaeological work was undertaken in the Grenadines until the late 20th century. After the surveys and excavations of the Bullens (1972), Lesley Sutty carried out archaeological work throughout the 1980s and the 1990s (Sutty 1978; 1985; 1991). In the last two decades, the efforts of collaborative teams have focused on the island of Carriacou, recovering evidence of various economic activities in Saladoid and post-Saladoid times in intensely occupied sites such as Grand Bay and Sabazan (Fitzpatrick et al. 2009; Kaye et al. 2005).

1.2. The 2016 Investigations

The investigations at La Poterie have been conducted in the context of the project CARIB: Caribbean connections: Cultural Encounters in a New World Setting, financed by HERA, grant nr. 1133. This project is a collaboration between Leiden University, KU Leuven, University of Konstanz, and Caribbean GO's and NGO's. It focusses on the cultural encounters between the Old and New Worlds which are among the most infamous in human history. The Caribbean was the center stage for interactions between cultures of dramatically different backgrounds, which after a turbulent colonial period eventually laid the foundations for the modern-day, multi-ethnic societies of the region. Our knowledge of the beginnings of this unsettled history is based on descriptions by early European chroniclers, who provide vivid but heavily biased and fragmented accounts of the indigenous Amerindian inhabitants of the islands. Archaeological research of this period, now virtually non-existent, is needed to provide a more balanced picture of the transformations of cultures and societies across the historical divide (AD 1000-1800). In a trans-national collaboration, the universities of Leiden, Leuven, and Konstanz, together with Caribbean governments and local communities employ a multi-disciplinary approach to study this epoch in the Lesser Antilles. This region is considered one of the key regions of the Caribbean in which the lasting effects of the encounters are represented. The unique combination of archaeology, history, archaeometry, and social network theory, is expected to produce major breakthroughs in understanding this important region and period in world history. The HERA project also aims to make contributions to current societal discussions on climate change and coastal erosion, cultural encounters, indigenous resistance, and heritage valorization, ranging from local to global scales of inquiry.

1.3. La Poterie: Background to the Excavation

The archaeological site of La Poterie is located on the northeast coast of the island of Grenada and dates to the 16th century on the basis of the mixed Amerindian (Cayo) and European material assemblage found at the site (Figure 2).

The site was revealed by Mr. Dolton Charles, a resident of the village of La Poterie, during a landslippage following heavy rainfall in 2010. The site is characterized by a plateau with possible habitation features and an eroded cliff similar to contemporaneous sites in the region, notably at Argyle, St. Vincent (Hofman and Hoogland 2012). Cayo sites on St. Vincent and Grenada are located on strategic locations near rivers on top of ridges overlooking the Atlantic Ocean, on the windward-side of both islands.

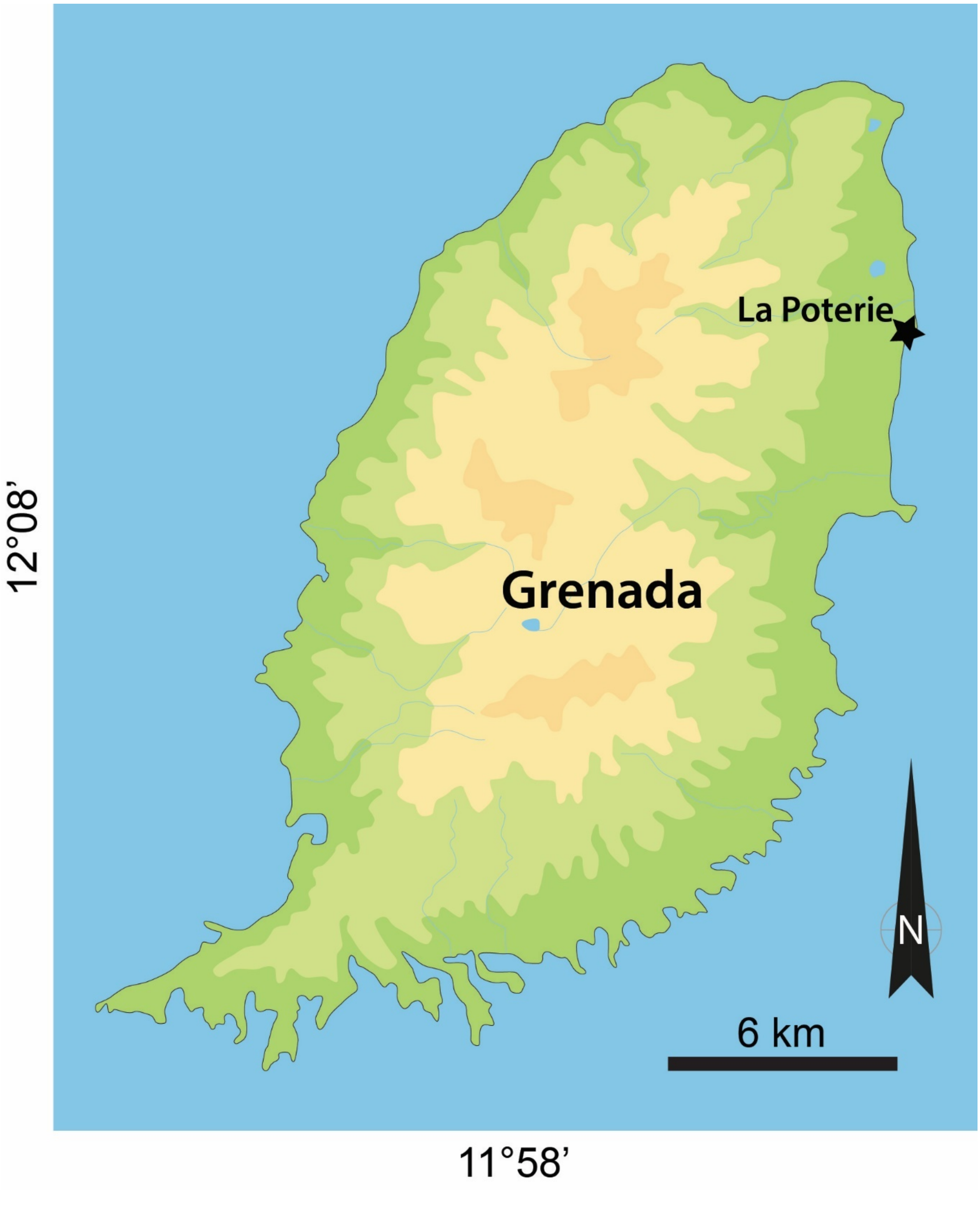

Figure 2. Cayo site of “La Poterie” in Grenada

Figure 3. Northeast coast of Grenada along which the Cayo site of La Poterie is located

Currently more than 20 sites with Cayo ceramics are known across the Lesser Antilles between Grenada and Guadeloupe, with a vast majority on St. Vincent and Grenada. Besides the clear mainland (Koriabo from the Guyanas – Brasil) association in ceramic style, morphology and manufacture, some decorative motifs and associated cultural remains also clearly suggest affiliations to the Greater Antilles (Chicoid-Meillacoid). The latter emphasizes the possible role that Greater Antillean refugees or Carib raids on Greater Antillean settlements may have played in the transmission of stylistic traits from the larger islands to Lesser Antillean ceramic assemblages. At La Poterie, as at other Cayo sites in the region, the cultural material remains come from a cliff. This material consists of Cayo pottery, European faience pottery, coins and beads as well as faunal remains, of which some are worked into flutes and pendants. The Cayo pottery is similar to that from the site of Argyle, St. Vincent, excavated by Hofman and Hoogland in 2010, and which is radiocarbon dated in the 16th-early 17th century, cal AD 1540-1620 (Hofman 2013; Hofman and Hoogland 2012; and Hofman et al. 2015).

1.4. The 2016 Fieldwork Campaign

The 2016 investigations were carried out under the Memorandum of Understanding (MOU) signed between the Ministry of Tourism, Civil Aviation and Culture and Leiden University in 2015 and legalized in 2016. Permissions were granted by Minister of Culture Senator Brenda Hood, landowner Mrs. Cleopatrice Daniel Andrew, and the community of La Poterie. The team included researchers and students from Leiden University, northwestern University (Chicago), St. George's University, Grenada, and members of the La Poterie community.

1.5. Objectives

The main objectives of the 2016 field campaign were to:

1) Determine the nature of the site and dating
2) Document the extent of the site and its stratigraphy
3) Determine the spatial organization of the settlement
4) Document features and eventual structures
5) Record the distribution of finds
6) Determine the nature of material culture remains
7) Position the site in the local and regional context
8) Raise historical awareness for the *Kalinago* history of La Poterie
9) Develop outreach activities for the community and school children

1.6. Research Questions Specifically Related to the Excavations at La Poterie

1) What was the Amerindian settlement pattern at the advent of European encounter in the Lesser Antilles
2) How does La Poterie fit within this larger picture
3) What is the spatial layout of the La Poterie *Kalinago* village
4) What is the relation between the materials found in the eroded cliff during the 2010 land slippage and the finds on the plateau.

1.7. Methods

In order to meet the objectives, six 2 x 2 m units (1-6) were set out across the plateau to determine the stratigraphy, material deposition, and the presence of features. In locations with the highest potential to find structures, the units were larger. These extensions were labelled as units 7 to 9. The 20-30 cm topsoil was removed, the excavation surface was shovel skimmed, and the features were recorded using a TOPCOM and GETAC. The material in the topsoil could not be sieved due to the very dense texture of the clay so the finds were systematically collected by hand. An additional eight shovel tests (50 x 50 cm; 10-17) were done to record stratigraphy and artifacts, beginning on the plateau down slope towards where materials were collected from the eroded profile in 2010. All of the artefacts were washed, catalogued and photographed. Samples have been retrieved for radiocarbon dating and starch grain analysis.

1.8. Preliminary Results

As the laboratory analyses are still ongoing, this report presents the findings of the fieldwork. The surface area of the site is estimated at ca. 200 x 50 m, i.e. it stretches out 200 m along the coast and 50 m inland. In total 128 m^2 have been excavated. The concentration of finds was higher towards the south (seaside) of the site. It also appeared from the excavated units that the concentration of features was highest in this area. The occurrence of features and Cayo materials on the plateau confirms the presence of a settlement in that location related to the materials found after the land slippage of 2010.

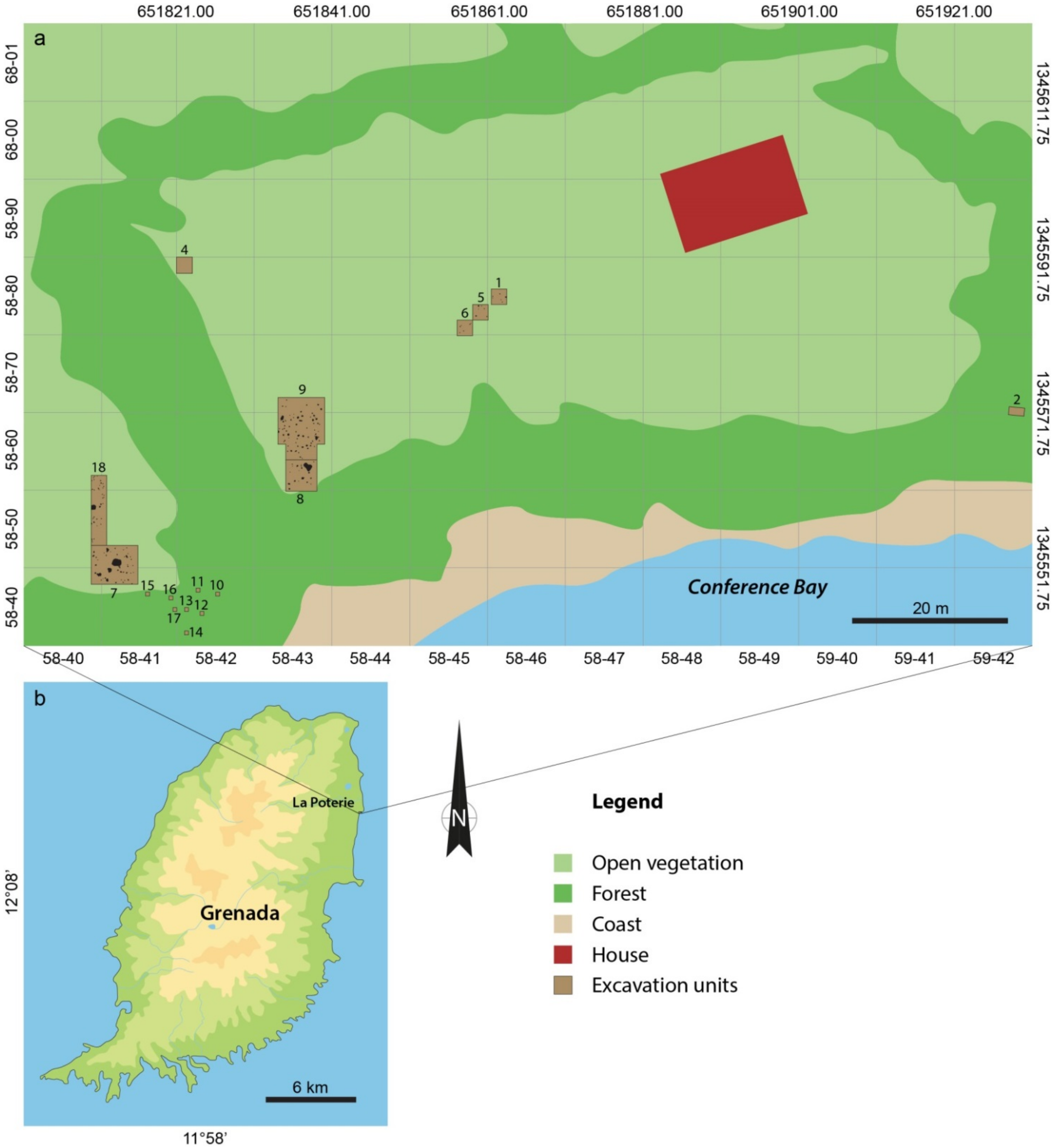

Figure 4. Excavation plan of La Poterie

1.9.Stratigraphy

The site area is located on private property. The terrain was modified for agricultural purposes in the past. This is clearly shown by the ditches for potato cultivation which are visible on the drone images made by Dr. Mark Hauser.

The stratigraphy in all units on the plateau shows a homogenous clay layer covered by a very thin (10 to 30 cm) topsoil of humus materials. The geological profile along the shoreline is composed of a layer of beach sand, covered with a layer of limestone bedrock (limestone), covered with a layer of weathered bedrock, covered by a clay deposit (Figure 47). The lower part of the bedrock is covered with sediments from the cliff higher up, and this is where the archaeological materials (recovered after the land slippage of 2010) were present as a secondary deposit. These archaeological materials thus originally come from the upper half of the slope, where they were part of a sweeping deposit belonging to the houses that were situated on the plateau.

1.10. Features and structures

Features consist of postholes, pits and burned floors. Sparse features were recovered in units 1, 5, and 6 (Figure 5). However, two potential house structures were reconstructed on the basis of the configuration of postholes in units 7 and 9. Structure 1 (unit 7) comprises 42 posthole features (Figure 6). The floorplan is ~75-80% complete (part outside excavated area). It has an oval shape with 3 circles of posthole features, measuring ~6 m diameter on E-W axis and ~8 m diameter on N-S axis. There are two large features (41-3, 51-1) in the centre which may be interpreted as pits or central uprights. Structure 2 (unit 9) consists of 56 posthole features (Figure 7). The floorplan is complete. It also has an oval shape with 3 circles of posthole features of ~5 m diameter on E-W axis and ~6 m diameter on N-S axis. Structures 1 and 2 are fairly similar in size and geometry, structure 2 is 1-2 m smaller than structure 1. The posts in the south part of structure 2 show evidence of burning (Figure 8). Outside the structure there is evidence of a burned floor, which may indicate a kitchen area adjacent to a house.

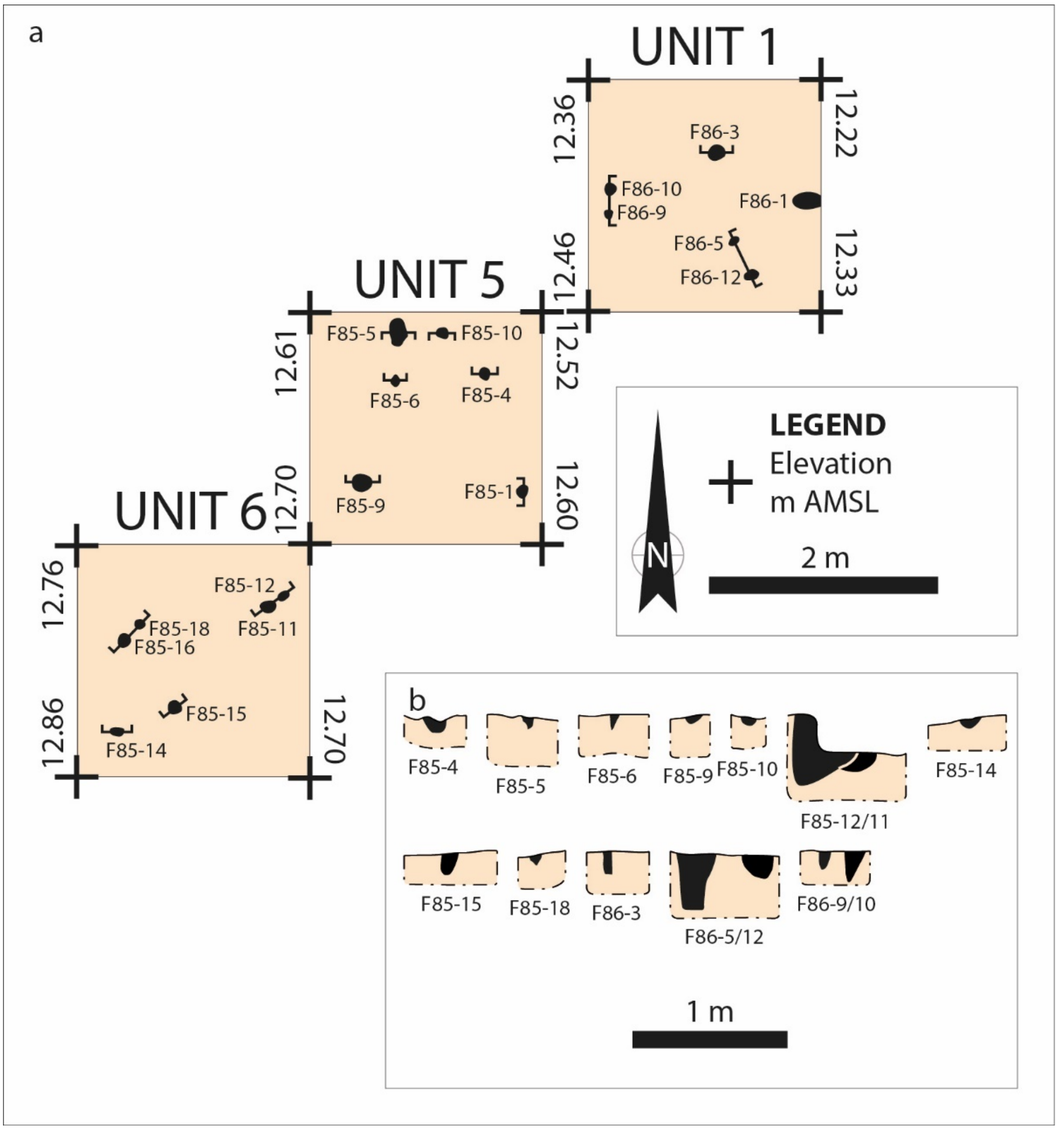

Figure 5. Features plan Units 1, 5 and 6

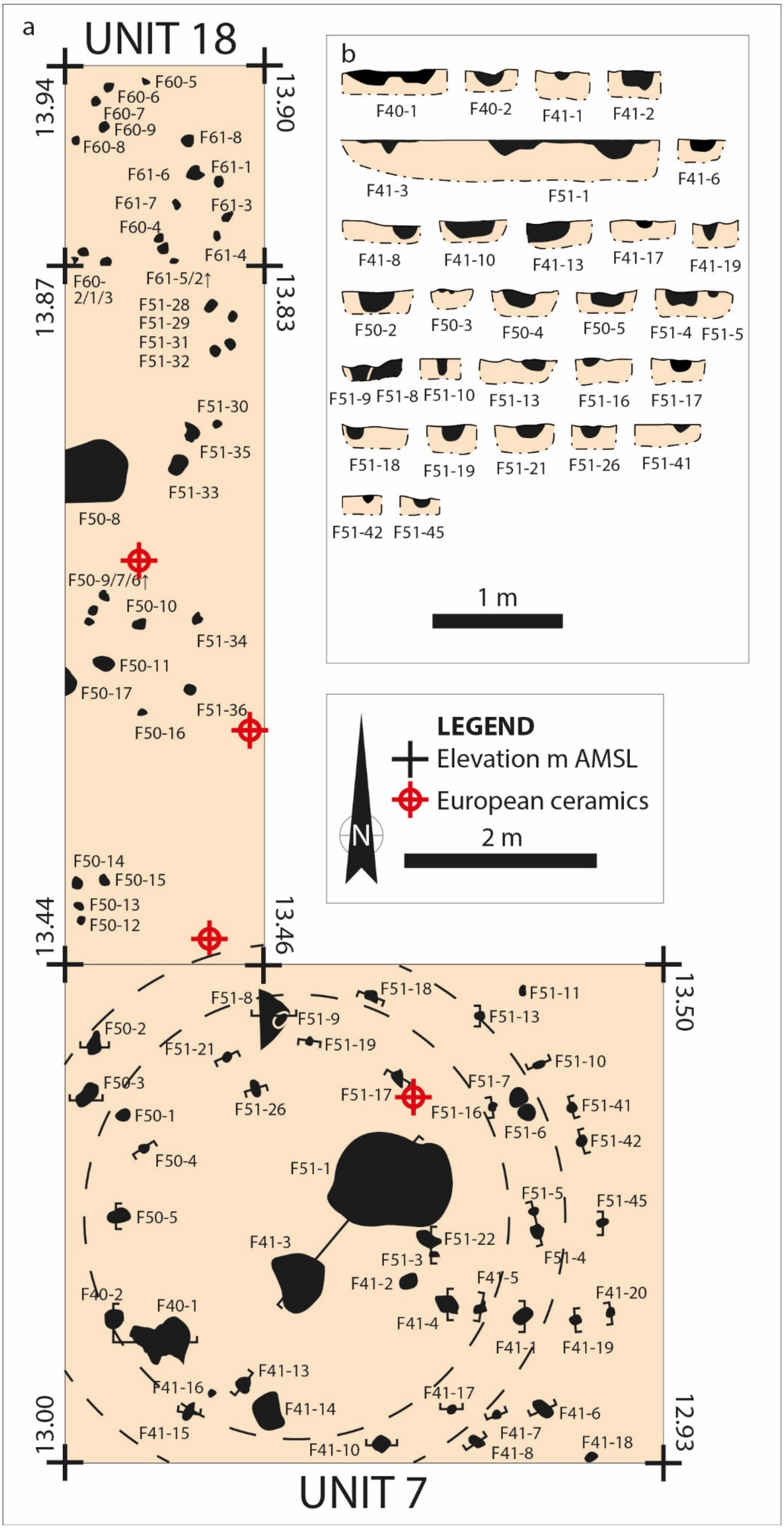

Figure 6. Features plan Units 7 and 18

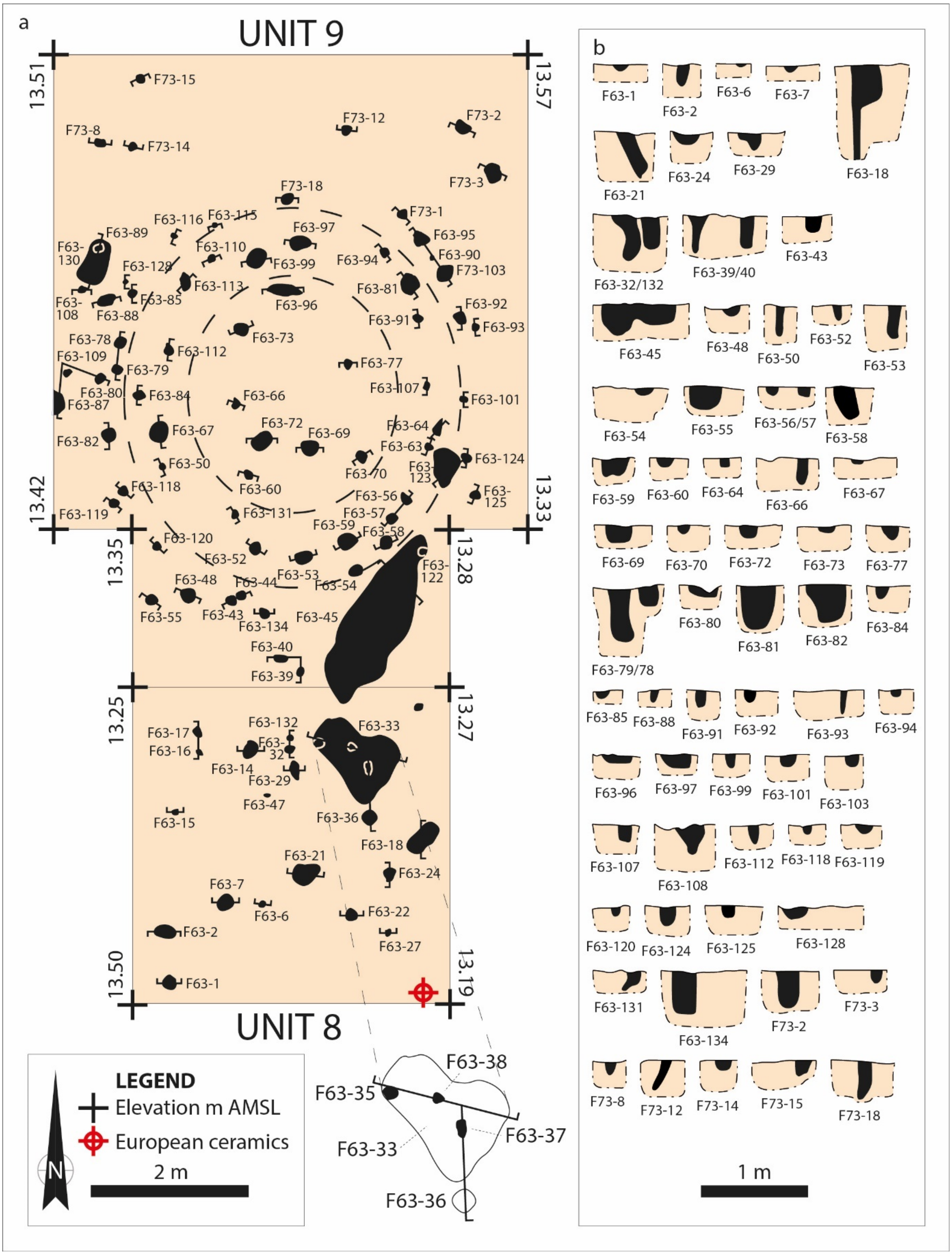

Figure 7. Features plan Units 8 and 9

Figure 8. Posthole in unit 9, big chunks of charcoal evidence burning of the post

1.11. Material Remains

The largest find category is Cayo ceramics, followed by lithic materials, and then European wares (Table 1). Lithics mainly consist of pebbles and pounding and rubbing tools from local rock types. Preservation of shell and bone is very poor. The small shell assemblages include some very weathered fragments of *Lobatus gigas.* The ceramic material in the units is very fragmented. The high fragmentation rate can be explained by heavy trampling that has taken place on the terrain probably for cultivation purposes. The materials recovered from the coastal profile, on the contrary, were far less fragmented and very large potsherds were collected from there in 2010.

		Unit 1		Unit 2		Unit 4		Unit 5		Unit 6	
		Number	Weight	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Ceramics	**Total**	**52**	402	**5**	573	**40**	404	**42**	364	**89**	640
	%	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*
Decorated Ceramic	**Total**	**–**		**–**		**–**		**–**		**–**	
	%	*–*		*–*		*–*		*–*		*–*	
Red Slip Ceramic	**Total**	**–**		**–**		**–**		**1**		**–**	
	%	*–*		*–*		*–*		*2,38*		*–*	
White Slip Ceramic	**Total**	**2**		**2**		**2**		**–**		**–**	
	%	*3,85*		*40*		*5*		*–*		*–*	
Appendages Ceramic	**Total**	**2**	33	**–**	–	**1**	61	**1**	2	**2**	3
	%	*3,85*	*8,21*	*–*	*–*	*2,5*	*15,1*	*2,38*	*0,55*	*2,25*	*0,47*
Griddles	**Total**	**4**	48	**–**	–	**3**	19	**4**	73	**7**	107
	%	*7,69*	*11,94*	*–*	*–*	*7,5*	*4,7*	*9,52*	*20,05*	*7,87*	*16,71*
Bases	**Total**	**6**	16	**1**	144	**4**	62	**4**	69	**6**	43
	%	*11,54*	*3,98*	*20*	*25,13*	*10*	*15,34*	*9,52*	*18,96*	*6,74*	*6,71*
Lithic material	**Total**	**1**	68	**6**	419	**2**	10	**1**	30	**5**	49
Shell material (approx.)	**Total**	**–**	–	**1**	6	**3**	17	**1**	4	**2**	10
Colonial Material (approx.)	**Total**	**–**		**–**		**2**		**2**		**3**	

		Unit 7		Unit 8		Unit 9		Unit 13		Unit 14	
		Number	Weight	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Ceramics	**Total**	**985**	16741	**349**	4068	**801**	9569	**14**	510	**28**	566
	%	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*
Decorated Ceramic	**Total**	**6**		**3**		**1**		**–**		**–**	
	%	*0,61*		*0,86*		*0.12*		*–*		*–*	
Red Slip Ceramic	**Total**	**28**		**1**		**10**		**1**		**–**	
	%	*2,84*		*0,29*		*1,25*		*7,14*		*–*	
White Slip Ceramic	**Total**	**14**		**2**		**20**		**–**		**1**	
	%	*1,42*		*0,57*		*2,5*		*–*		*3,57*	
Appendages Ceramic	**Total**	**6**	51	**–**	–	**–**	–	**–**	–	**–**	–
	%	*0,61*	*0,3*	*–*	*–*	*–*	*–*	*–*	*–*	*–*	*–*
Griddles	**Total**	**23**	2374	**16**	497	**35**	1013	**–**	–	**2**	36
	%	*2,34*	*14,18*	*4,58*	*12,22*	*4,37*	*10,59*	*–*	*–*	*7,14*	*6,36*
Bases	**Total**	**48**	954	**29**	337	**44**	804	**3**	80	**5**	48
	%	*4,87*	*5,7*	*8,3*	*8,28*	*5,49*	*8,4*	*21,43*	*15,69*	*17,86*	*8,48*
Lithic material	**Total**	**38**	3189	**5**	2343	**40**	6278	**–**	–	**1**	91
Shell material (approx.)	**Total**	**83**	1257	**1**	18	**9**	16	**1**	12	**1**	4
Colonial Material (approx.)	**Total**	**18**		**3**		**14**		**–**		**1**	

		Unit 15		Unit 16		Unit 17		Unit 18		Surface		Total	
		Number	Weight	Number	Weight	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Ceramics	**Total**	–	–	**3**	66	–	–	**431**	4782	**26**	776	**2864**	39489
	%	100	100	100	100	100	100	100	100	100	100	100	100
Decorated Ceramic	**Total**	–		–		–		**1**		–		**11**	
	%	–		–		–		0,23		0		0,38	
Red Slip Ceramic	**Total**	–		–		–		**5**		–		**46**	
	%	–		–		–		1,16		0		1,61	
White Slip Ceramic	**Total**	–		–		–		**9**		**1**		**53**	
	%	–		–		–		2,09		3,85		1,85	
Appendages Ceramic	**Total**	–	–	–	–	–	–	–	–	–	–	**10**	150
	%	–	–	–	–	–	–	–	–	–	–	0,35	0,38
Griddles	**Total**	–	–	–	–	–	–	**33**	729	**2**	63	**182**	3959
	%	–	–	–	–	–	–	7,66	15,24	7,69	8,12	6,35	10,03
Bases	**Total**	–	–	–	–	–	–	**41**	664	**1**	26	**245**	3247
	%	–	–	–	–	–	–	9,51	13,89	3,85	3,35	8,55	8,22
Lithic material	**Total**	–	–	–	–	**1**	2500	**23**	987	–	–	**123**	15964
Shell material (approx.)	**Total**	**1**	2	–	–	–	–	**16**	92	**1**	2	**121**	3094
Colonial Material (approx.)	**Total**	–		**1**		–		**15**		**4**		**63**	

Table 1. Finds by Units

1.12. Distribution of Ceramics

Ceramics were counted and weighted during on-site lab work (Figures 9 and 11) and recorded following the Leiden Code Book for Ceramics. Numbers and weights of rim, base, body and griddle sherds were recorded, as well as slip and decoration (incision, modelling, painting), appendages (handles, lugs) and other ceramic features (spindle whorls, potstands, figurines, incesence burners etc.).

From the distribution of ceramics it is apparent that the highest concentrations are to be found in Units 7, 8 and 9, in the south side of the site, towards the cliff. Unit 7 yielded the largest number of potsherds (Table 2). Sherds are very fragmented in all units.

Figure 9. On-site labwork with children from La Poterie looking at the finds

Figure 10. Showing the findings to the Tivoli schoolchildren

Unit	Sherd #	Weight (gr)
1	36	269
2	4	429
3	0	0
4	29	169
5	79	178
6	70	465
7	794	11648
8	279	2705
9	665	6911
10	0	0
11	0	0
12	0	0
13	6	228
14	17	400
15	0	0
16	3	66
17	0	0
18	324	2967

Table 2. Distribution of ceramics: sherd number and weight (gr) per excavation unit

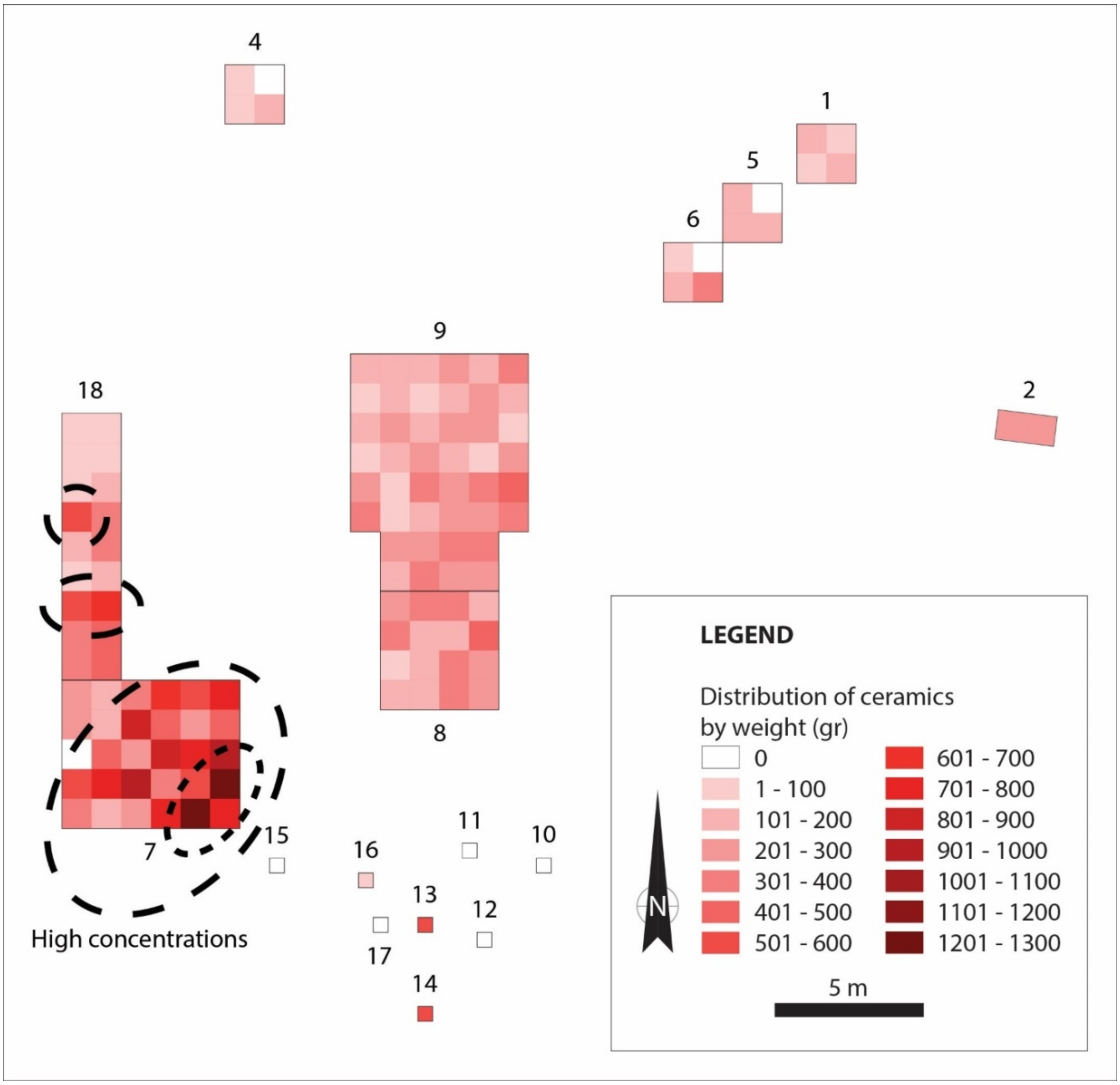

Figure 11. La Poterie ceramic distribution map by weight

1.13. Cayo Pottery

All of the pottery recovered belongs to the Cayoid series. Vessels have a variety of shapes and are sometimes embellished with decorations, modeled decorations, incisions and painting (Figure 12). Very characteristic are the unrestricted bowls with carinated rims, and often white painted inside surfaces. There are a few examples of red or yellow painted designs on the white paint. These bowls are very typical of the Koriabo pottery of the Guianas and can be found as far as northern Brasil. Another characteristic vessel is the large restricted jar made of reddish clay with very large diameters and sometimes decorated with a modelled face (Figure 13). These may have served as containers for cassava beer.

Figure 12. Cayo style ceramic from La Poterie recovered in 2010

Figure 13. Koriabo style ceramics from La Poterie recovered in 2010

(*ouicou*) mentioned by the early French 17th century chroniclers. In some cases, these jars have modeled decorations of human faces. A fair number of griddle fragments have been recovered from across the site. The pottery has been tested with a portable X-ray fluorescence device in order to determine the geochemical compositions of the clays used to produce these vessels. The analyses have been carried out by our partners from the KU, Leuven under the direction of Prof. dr. Patrick Degryse.

1.14. European materials

Figure 14. European artefacts from La Poterie recovered in 2010

The European materials were classified and described by Dr. Mark Hauser. The collection shows a mix of European trade wares and pieces of gun flint (Figure 14).

Olive Jar (Figure 15)

This coarse earthenware with a compact buff paste and sand tempering. According to Goggin's typology (1960: 11-17), this sherd is from a middle style Olive Jar (1560-1800). Wall thickness ranges from 11 to 12 mm. There are wide smooth marks made on the construction of it on the interior surfaces. Exterior surfaces are even and poorly smoothed. If glazed, the lead glaze is usually translucent green. Lead glazing, usually green, can be present on the interior and/or exterior. Yellow, white, and grey glazing have also been documented.

Figure 15. Fragment of Spanish olive jar (recovered in 2010)

Ichetucknee Blue on White (Find 165, 328) (Figure 16)

This is an Iberian tin enameled coarse earthenware (Goggin 1968: 148). While made in Spain (1600-1650), it is named after the Florida site from which it was initially recovered. It has a thin, cream-colored, compact paste. The enamel has a chalky matte appearance with some pebbling. It usually has hand printed drake blue floral appearance, which is often found in Dutch or Italian ceramics in Europe. It can also be confused with contemporary Portuguese tin enameled earthenware.

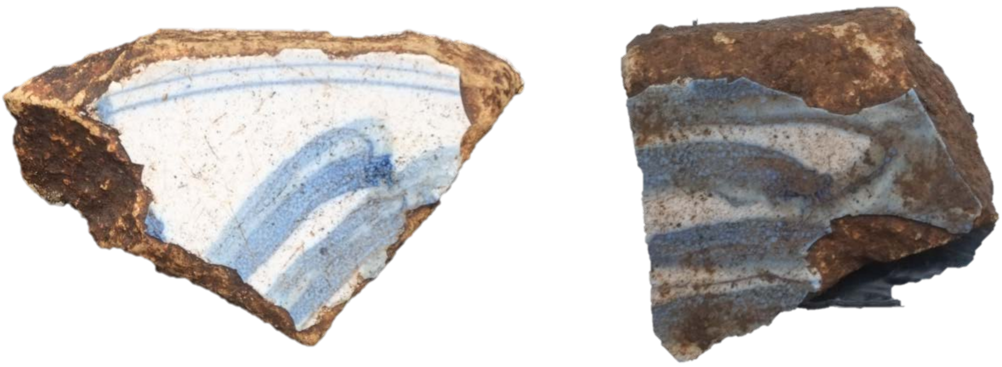

Figure 16. Find 328 and Find 165

Saintonge (Find 249) (Figure 17)

This glazed coarse earthenware has Salmon / red paste, with a bright green lead glaze. Produced in the Saintonge region of France since the middle ages until 1800, when production tapered off. It was made on the Atlantic Coast, France beginning in the 13th century (Barton 1963). This earthenware continued to be manufactured in the region until the late 18th century (Losier 2012). It is found commonly on Early French colonial sites, including Champlain's early residence in St. Croix Island in the St Lawrence River (Mock 2006).

Figure 17. Find 249

Sugar Ware (Find 264) (Figure 18)

This utilitarian ceramic is often identified as Caribbean redware. Documented potteries are in Martinique, Les Sainte, Antigua, Grenada, Barbados, and Trinidad. It was made in the forms of drip jars, sugar cones, and tiles. People often reused these wares for architectural features and water storage (Kelly et al 2009).

Figure 18. Find 264

Delftware (Find 362, 340, 343, 362, 374) (Figure 19)

This tin-enameled earthenware was made between 1600 and 1800. The clay body is soft and most often buff or pinkish-buff in color. The tin glaze is very fragile and flakes off with mechanical abrasion or spate when exposed to heat. This opaque white matte enamel has a pale blue or gray tint. Designs were generally hand painted in cobalt-blue. Some polychrome examples exist. Commonly identified by archaeologists after one production center, the ceramic was made in multiple locations including England and the Low countries (Noël Hume1970).

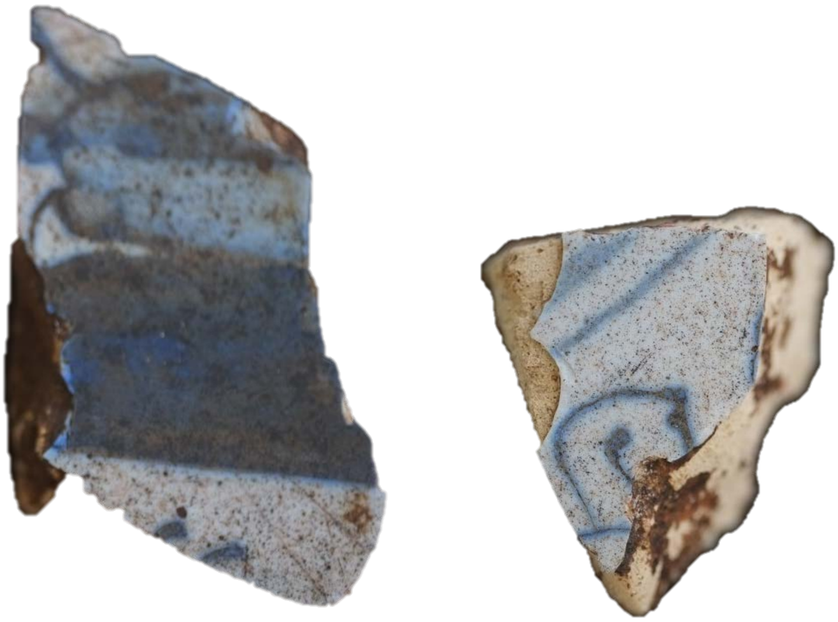

Figure 19. Find 362

Faience Normandy Plain (Find 338)

This tin-enameled coarse earthenware has a hard cream colored paste. It is characterized by a white tin enamel with no decoration. It is possible that this small sherd may in fact be an undecorated portion of other faience. Mostly considered an 18th century French Faience, some examples date to the mid-17th century (Waselkov and Walthall 2002).

San Louis Blue on White (Find 416, Find 71) (Figure 20)

San Louis Blue on White (1530-1650) is characterized by creamy yellow compact paste. A glossy thick white glazed often has crazing and firing marks. Designs are painted in a light cobalt blue. Decoration is painted in two shades of grayish-blue. The blue paint is often thick and slightly raised in relief on the surface of vessels. Blue paint sometimes has a foamy appearance. Cobalt decorations include floral motifs thick lines and monograms (Goggin 1968).

Figure 20. 16th century ceramics from La Poterie surface find (F 416)

1.15. Community Engagement and Outreach Activities

Collaboration with the La Poterie community was our priority, and their daily involvement as part of the excavation team was extremely important in the joint interpretation of the past lifeways of the village.

The excavations were open to the public on a daily basis, and members from the La Poterie community and the general public paid regular visits to the excavation area (Figure 21 and 22). We organized two open days, which were very well attended by people from all over the island. Television crews came by to interview the participants, and the excavations were broadcasted several times as news items.

All school classes from the Tivoli primary school were invited to the site to engage with the Amerindian (*Kalinago*) past of the village of La Poterie, and to learn about the work of the archaeologists (Figure 22 - 24). Pictures of the events have been taken, some have been printed on canvas screens and given to the school.

Figure 21. On site with Evan Bhola, Kester Lyons, Corinne Hofman, Bernard Alexander, Angela Peters and Livingston Krumah Nelson

Figure 22. Open day: first visit of the La Poterie community members to the excavations

Figure 23. Explanation of the excavations by Prof. dr. Corinne Hofman during the visit of the schoolchildren of the Tiivoli RC Primary School

Figure 24. Visit to the site by the Tivoli RC Primary School

1.16. Conclusions and Future Directions

The fieldwork was considered to be very successful, with the objectives partially or completely met. The plateau is indeed the location where the proto-historic (*Kalinago*) village of La Poterie is located. On the basis of the ceramics and associated European materials, a date in the mid-16th-ealry 17th century is proposed. However, several charcoal samples have been submitted for radiocarbon dating and we need to await these results to be able to definitely attribute a date to the village of La Poterie which definitely is one of the last free *Kalinago* villages in Grenada.

The materials found during the 2010 land slippage were not in context, but are materials swept from the actual village on the plateau. These had ended up down the cliff due to slope wash erosion and then finally the massive land slippage of 2010. The location of the site along the northeastern shore of Grenada and the configuration of a plateau where the structures are located with the bulk of materials found on the slope, is very similar to the situation documented for the site of Argyle on St. Vincent during the Leiden excavations of 2010. The inhabitants of the village were sweeping their garbage, consisting of broken pottery, discarded stone tools, and remains of their food (fish bones and shell), to the side of the dwellings. The continuous coastal erosion accelerated the amount of materials rolling down the slope. A similar configuration was found at Argyle. The recovery of a house floor with Cayo artefacts and European materials at the La Poterie site is unique, as in Argyle this was not possible due to machine scraping (because of the rescue aspect of the archaeological interventions), and the mechanical removal of the topsoil with artefacts. The possibility to attribute artifact densities and specific artifacts (pottery, lithics, European wares) to particular loci in the settlement provides the opportunity to identify possible functions for certain structures and activity areas.

Now that the potential for postholes has been verified, future excavations will be directed towards the excavations of structures, particularly in the area of Units 7 and 3, to be able to determine the entire spatial layout of the village. The La Poterie *Kalinago* may have consisted of a number of smaller houses, and maybe one or two larger oval structures, which may have served as communal houses such as is the case at Argyle. The next field campaign is planned for December 2016-January 2017.

We would also like to discuss the possibility of building an experimental structure in La Poterie on the basis of the floorplans of the house structures found at the site. A similar project was carried out in St. Vincent in February 2016 at the location of the Argyle site (Figure 25). The idea would be to construct this house with community members during the fieldwork campaign in December 2016-January 2017. Collaboration with the Department of Forestry would be necessary to help providing the wood for construction. Ideally, a small interpretation centre would be established next to it explaining the excavations and the results.

During the coming years an inter-disciplianry team will continue to work on the archaeology and heritage of Grenada amongst whom Grenadian scholars as Amanda Byer (heritage and legislation), Angus Martin (Kalinago history), and Lornadale Charles (heritage and education), all pursuing their MA or PhD at Leiden. Two members of the La Poterie community (Ray Antoine and Arkell Baptiste) will be participating in the NEXUS1492 excavations in the Dominican Republic during the summer of 2016, in order to acquire experience in excavation techniques and heritage issues and learn about the indigenous past of the wider Caribbean region.

Figure 25. Experimental construction of a Kalinago rouse house at Argyle, St. Vincent February 2016

1.17. Acknowledgments

We would like to acknowledge Senator Brenda Hood, Permanent Secretary Mrs. Arlene Buckmire-Outram, former Permanent Secretary Aaron Francois, and Heritage Officer Mr. Michael Jessamy in the Ministry of Toursim, Civil Aviation and Culture for their permissions, help and trust in setting up the excavations at La Poterie. Great thanks goes to Ms. Cleopatrice Daniel Andrew for the permissions she granted to excavate on her property and for organizing a wonderful stay at her home. We are very grateful to Wayne Edward, and Trina Antoine for the delicious meals and taking care of use while on Grenada. We also thank Ray Antoine, Arkell Baptiste, Alec Charles, Dolton Charles, Akimmon Andrew and Steyson Bernardfor their involvement in the excavations, their welcome and friendship. Special acknowledgments go to the community of La Poterie and specifically to the elders of the village, Evan Bhola, Kester Lyons, Bernard Alexander, and Livingston Krumah Nelson for hosting us, guiding us, and above all for their interest and trust in our work.

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2. Analysis of Grenada Ceramics from La Poterie Using pXRF

By Professor Dr. Patrick Degryse, Bert Neyt, PostDoc, and Becki Scott, PostDoc, KU Leuven

2.1. Introduction

This study was undertaken to identify clay signatures of the Cayo ceramics found at the site La Poterie. Both petrographic and pXRF analysis were carried out. Previously analysed ceramics from St. Vincent (Cayo) and Trinidad (post-Saladoid), were used as comparison to establish a base line for the La Poterie material. This analysis is part of a much later study aimed at creating a petrographic database for Amerindian pottery and clays from the entire Lesser Antilles.

A Bruker Tracer III SD pXRF spectrometer was used to analyse the chemical composition of a number of ceramic objects from La Poterie, Grenada. The analyses were of 22 Cayo ceramics retrieved by D. Charles after a land slippage in 2010.

The instrument was operated at 40 kV, 30 μA, for 60 seconds per sample. This was in order to screen all the elements which may have been present in the sample, and to make the results comparable to data previously gathered in the laboratory. Although 40 kV is not ideal for the analysis of light elements in the sample, it gives good results for the mid-range elements which the previous laboratory tests had indicated could be useful for provenancing purposes. Since the net peak area counts do not directly reflect the concentration of elements in the samples, ratios of peak areas were compared, as this is a better reflection of the relationship between the elements.

2.2. Preliminary Laboratory Analyses

Prior to the pXRF field work on Grenada a series of laboratory analyses were undertaken. 98 ceramic fragments from the islands of Trinidad, St Vincent, and Grenada were analysed with pXRF. Figures 26, 27, and 28 indicate that there is a certain amount of overlap between the ceramic signatures from different islands. This is most notable in the samples from Grenada and St Vincent. With the exception of seven samples, the ceramics from Trinidad can be readily distinguished from the other islands, particularly in terms of Sr/Zr (<2.14) (Figures 22 and 24), and Zn/Mn (>1) (Figure 27). In terms of distinguishing the ceramic samples from Grenada and St Vincent some general observations can be made. Grenada ceramics tend to have a higher Sr/Zr ratio (generally >2.5) (Figures 26 and 28), the Ga/Sr ratio is ≤0.06, and the Zn/Mn ratio is <1 (Figure 27). These ceramics also have a fairly low Ti/Zr ratio of <5.25 (Figure 12). St Vincent ceramics have a noticeably higher Ga/Sr ratio of ≥0.1 (Figure 23), and the Ti/Zr ratio also tends to be >5 (Figure 28). The general characteristics of the groups are summarized in Table 3.

	Sr/Zr	**Zn/Mn**	**Ga/Sr**	**Ti/Zr**
Trinidad	<2.14	>1		<5
Grenada	>2.5	<1	≤0.06	<525
St Vincent	1-4	<1	≥0.1	>5

Table 3. A summary of the characteristics for the bulk of each group

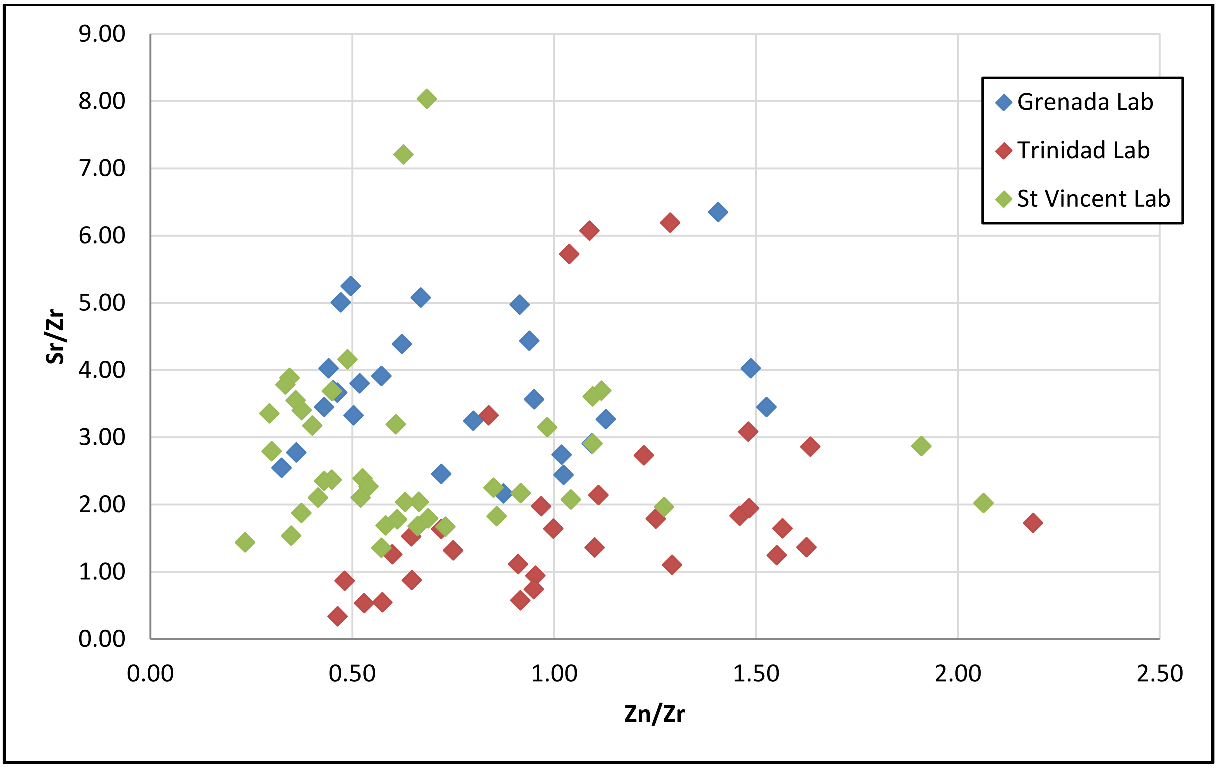

Figure 26. Laboratory pXRF data plotting Zn/Zr against Sr/Zr. Ceramics from Grenada tend to have a higher Sr/Zr ratio, although there is overlap between the island groups

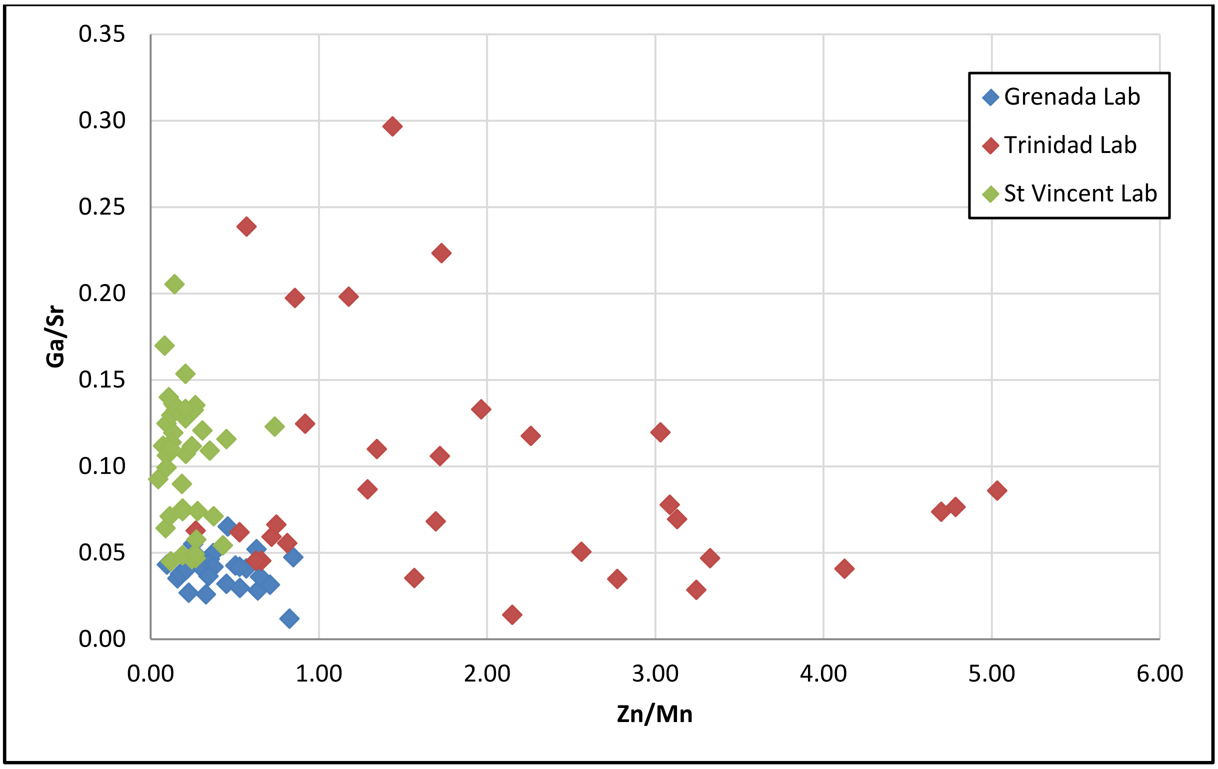

Figure 27. Laboratory pXRF data, plotting Zn/Mn against Ga/Sr, indicating that ceramics from Trinidad tend to have higher Zn/Mn ratios (usually >1), while St Vincent ceramics have a higher Ga/Sr ratio (usually ≥0.1)

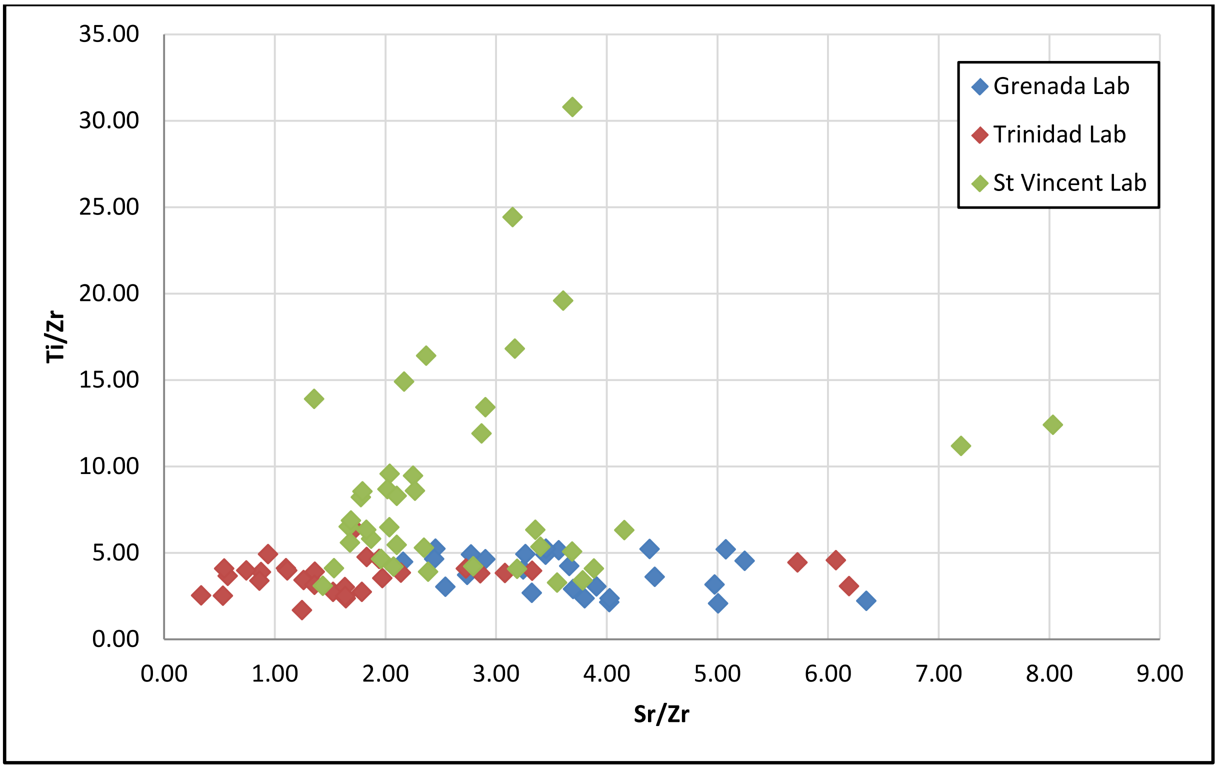

Figure 28. Laboratory pXRF data plotting Sr/Zr against Ti/Zr. This indicates that most of the Trinidad ceramics can be separated from the Grenada ceramics in terms of the Sr/Zr content. While the St Vincent material overlaps both groups in terms of Sr/Zr, this material tends to have a higher Ti/Zr ratio

Of these ceramic samples, 62 had been analysed petrographically. From the petrographic analysis a number of different groups were identified, in particular, the samples from Grenada were all assigned to petrographic group 3 (Pet 3) and are all characterised as containing hornblende. We have determined that a small number of the fragments found on St Vincent also belonged to Pet 3 and were therefore most likely made on Grenada. Figure 29 shows the pXRF laboratory data for Grenada and St Vincent with Pet 3 highlighted as open black circles. It is clear from Figure 30 that samples which belong to Pet 3 also group together chemically in terms of the pXRF data. This suggests that while Grenada ceramics form a fairly dispersed group in terms of the Zn/Zr ratio, they generally have a Sr/Zr ratio >2.5. The Pet 3 ceramics from St. Vincent consistently plot with the Grenada material. Therefore, while it is impossible to say for certain that all the St. Vincent samples which plot with Grenada, and therefore Pet 3, are from Grenada, it is highly likely that they do belong to this group. Further petrographic analysis would be needed to confirm this. Two St. Vincent samples have high Sr/Zr ratios (>7), these two samples belong to petrographic group 4, which has so far not been found amongst the material from Grenada.

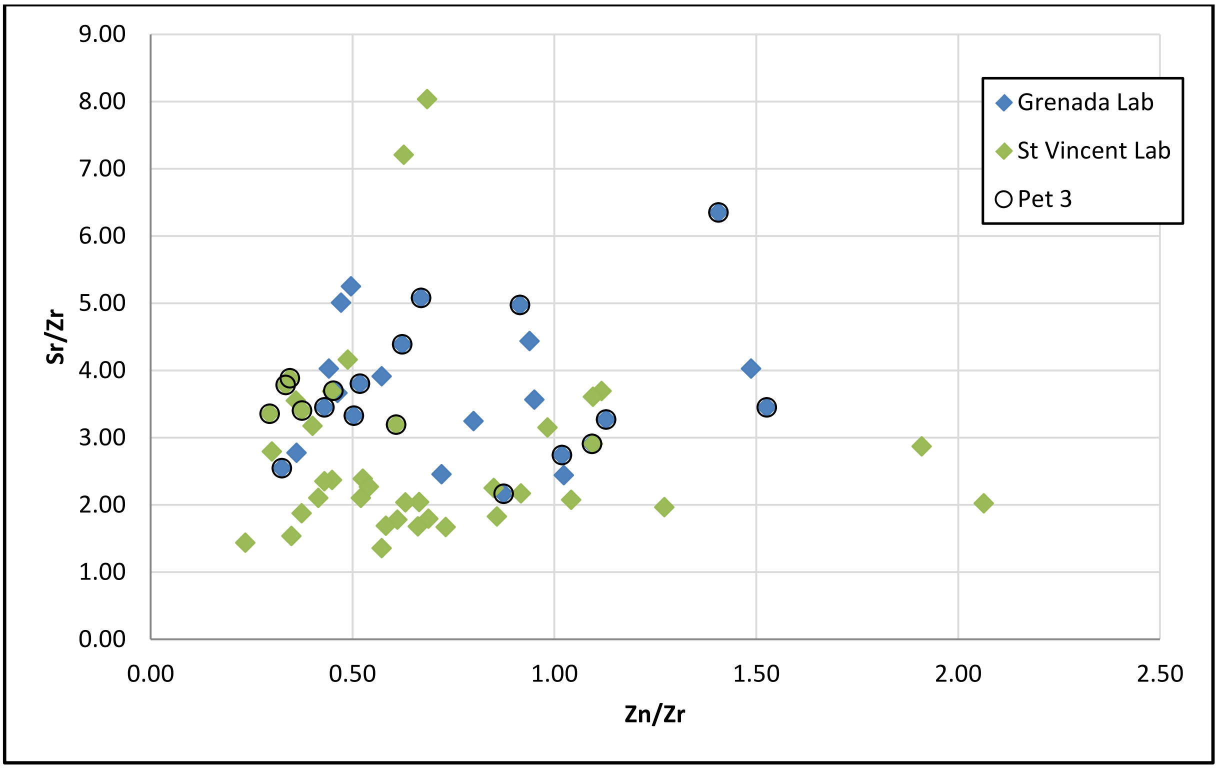

Figure 29. The black circles indicate the samples which have the Grenada petrographic signature as identified by Bert Neyt

A Principal Components Analysis (PCA) of laboratory pXRF data, using elements (Al, Si, P, S, K, Ni, Cu, Zn, Ga, Rb, Sr, Nb) ratioed over Zr and elements (Al, Si, P, S, K, Ti, Mn, Ni, Cu, Zn, Ga, Rb, Sr, Zr, Nb) ratioed over Mn as the variables, indicated that statistically a small overlap existed between the groups (Figure 31). This plot also shows a small number of samples found amongst the St. Vincent material belong to the Grenada group, this includes all the Pet 3 samples. Therefore, in all further comparisons, these samples shall be treated as part of the Grenada group. It can be seen from the loading plot of the PCA (Figure 30) that the Trinidad samples are more strongly influenced by Mn and St Vincent ceramics are more strongly influenced by Zr. Principal Component 1 (PC1) and Principal Component 2 (PC2) accounted for 81% of the data.

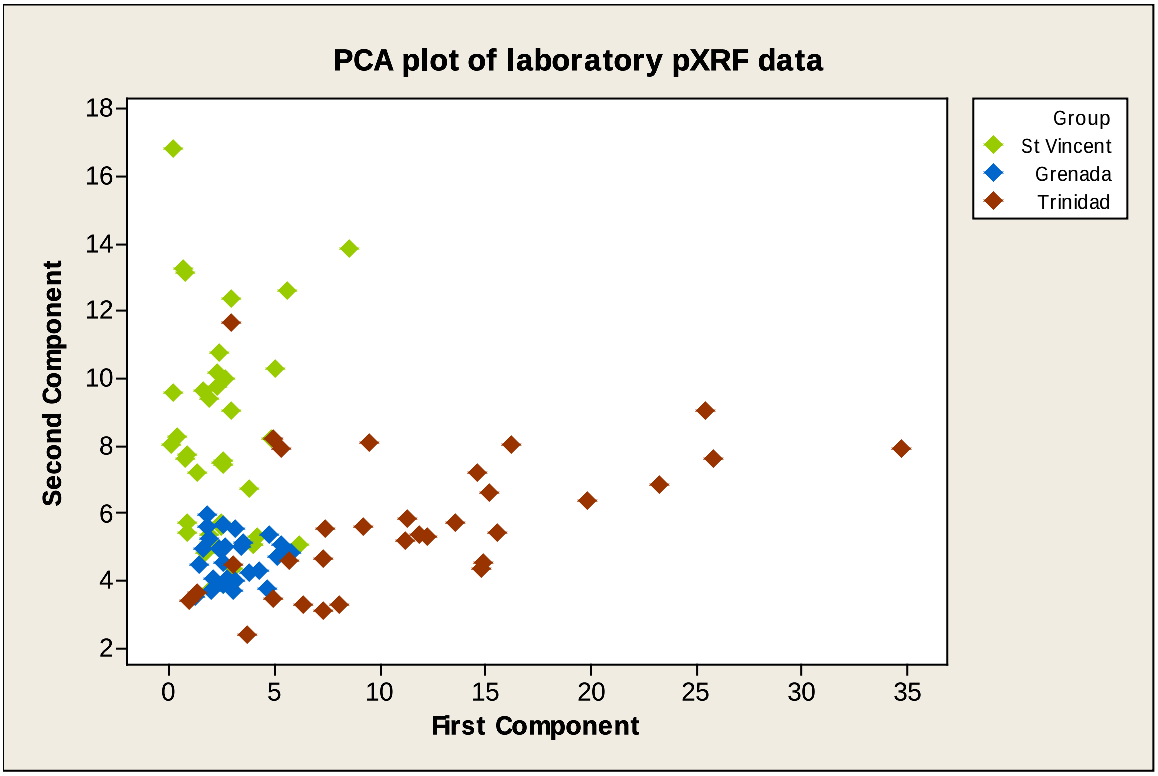

Figure 30. PCA plot indicating that the ceramics from Trinidad are more strongly influenced by PC1 while the ceramics from Grenada are more strongly influenced by PC2.

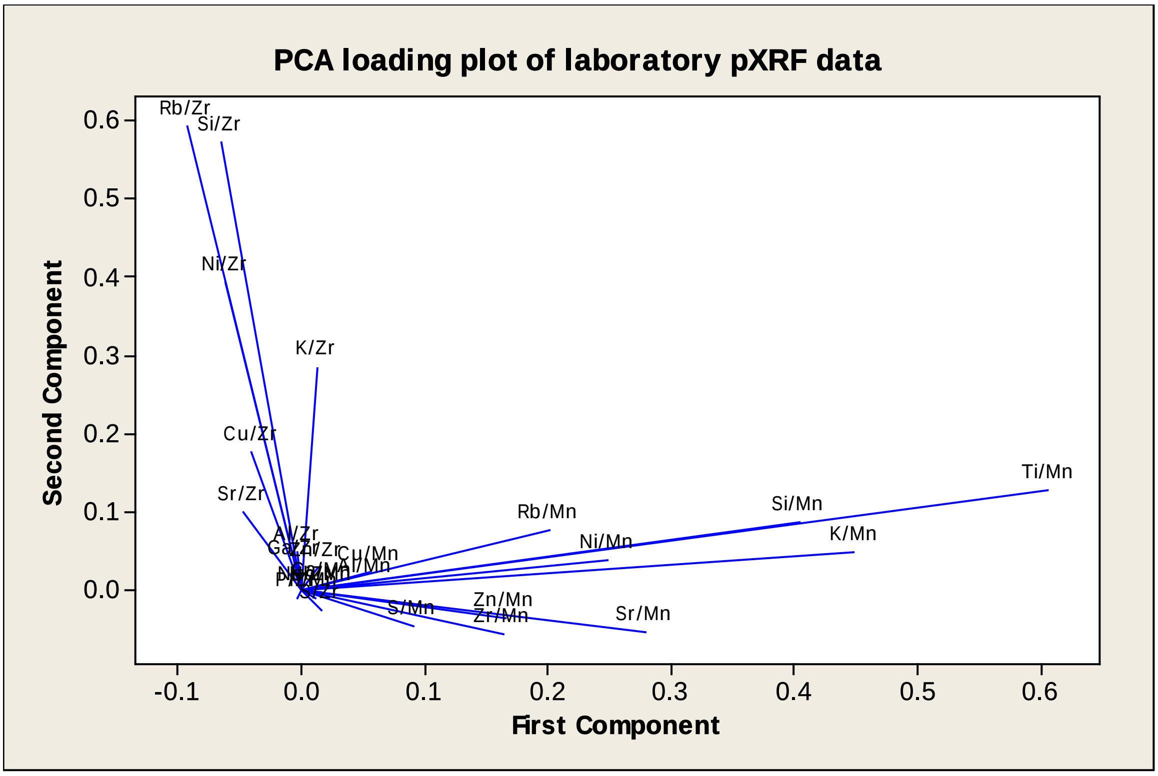

Figure 31. The loading plot shows that the ratios over Mn are more influential along PC1 while the ratios over Zr are more influential to PC2

2.3.Field Results and Discussion

Twenty-two Cayo objects from La Poterie were analysed in the field using pXRF. There were no obvious differences in the compositions of the objects based on the appearance of the spectra. The ceramic data collected in the field were compared to the data retrieved in the laboratory. Figure 32 shows that the majority of the La Poterie samples plot within the spread of the Grenada material. There are five samples (in the red oval) which plot closer to the St Vincent material in terms of Sr/Zr (DC11c, DC15c, DC10a, DC10b, DC10c).

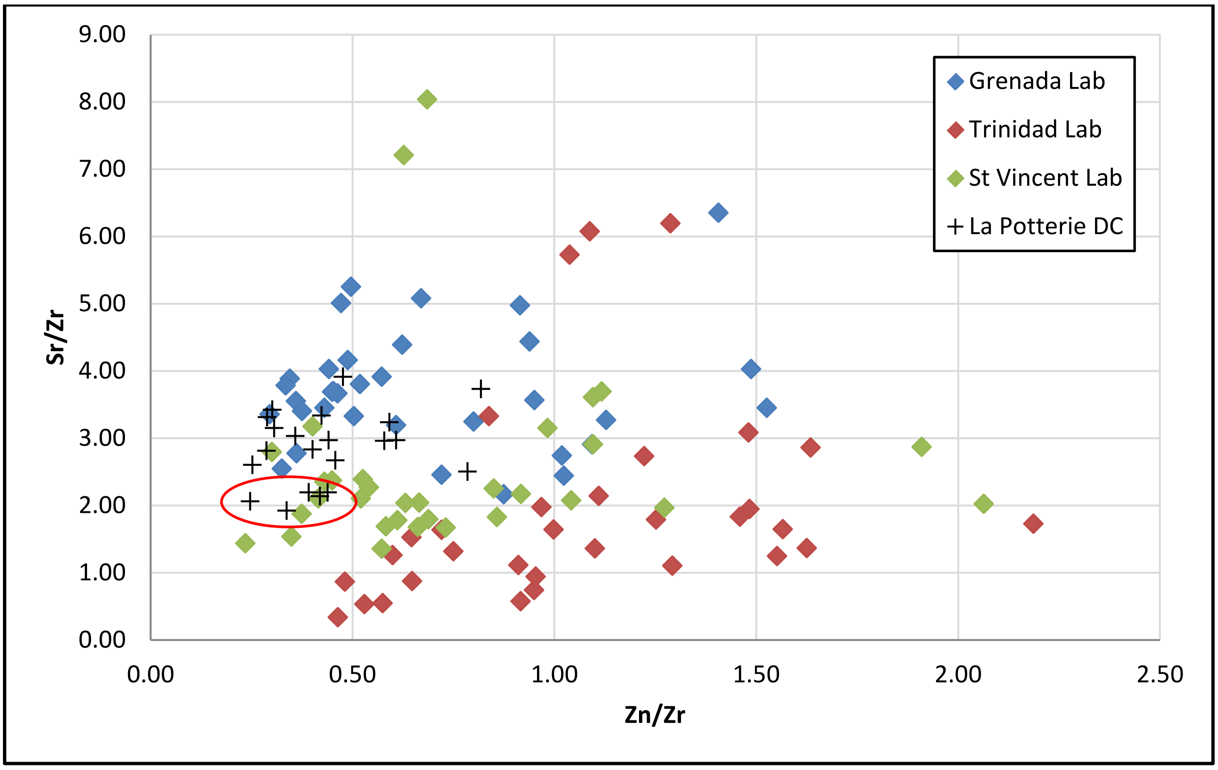

Figure 32. Five La Poterie samples have a similar Sr/Zr ratio to the St Vincent material

In order to try and determine whether these samples are more likely to come from St. Vincent or Grenada, the Ga/Sr ratios were plotted against Zn/Mn (Figure 33), and against Ti/Zr (Figure 34). Grenada ceramics typically have a Ga/Sr ratio of ≤0.06, while for St. Vincent material this is typically ≥0.1. From Figure 33, it can be seen that only four of the above samples have Ga/Sr ratios ≥0.1 (DC15c, DC10a, DC10b, DC10c). Only DC15c has Ti/Zr >5 which is characteristic of St Vincent material, however, from Figure 36 it is clear that the other samples (DC10a, DC10b, DC10c) all plot with a small group of St Vincent outliers. Figure 36 shows samples DC15c, DC10a, DC10b, and DC10c.

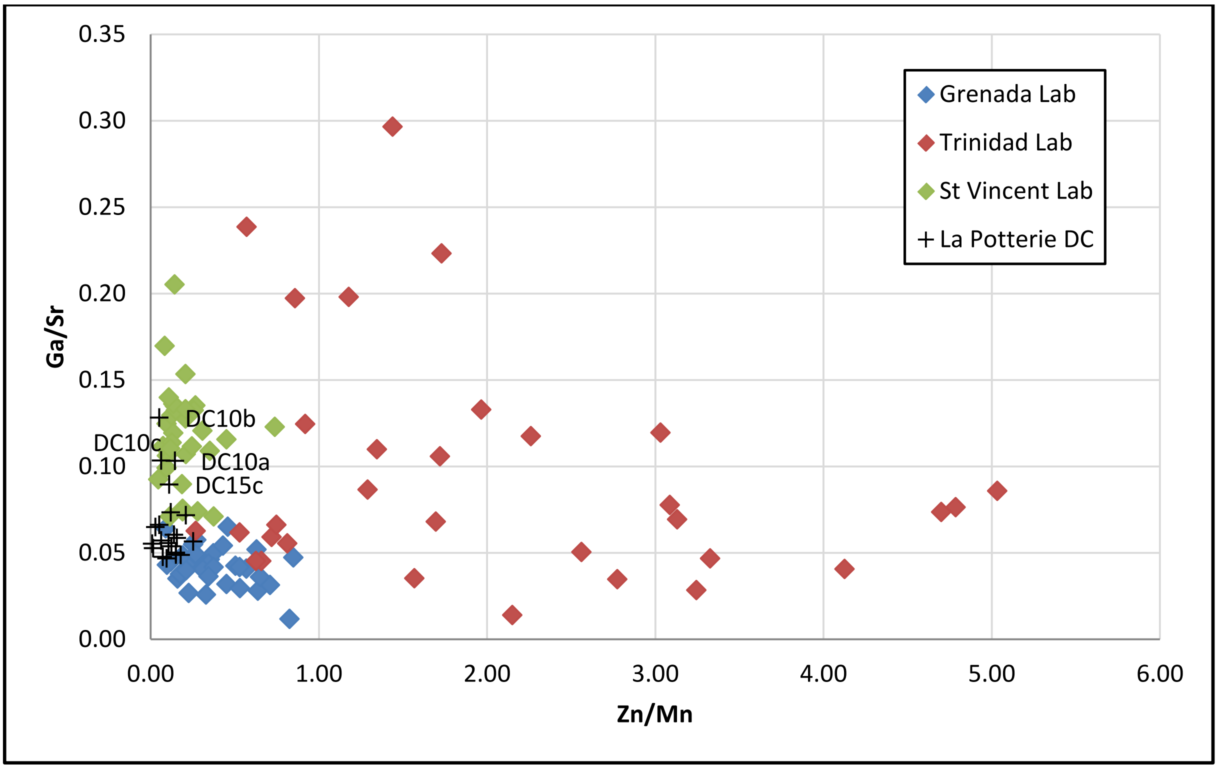

Figure 33. The Ga/Sr ratio indicates that the majority of the La Poterie samples group with the Grenada material, four samples (DC15c, DC10a, DC10b, DC10c) plot with St Vincent material

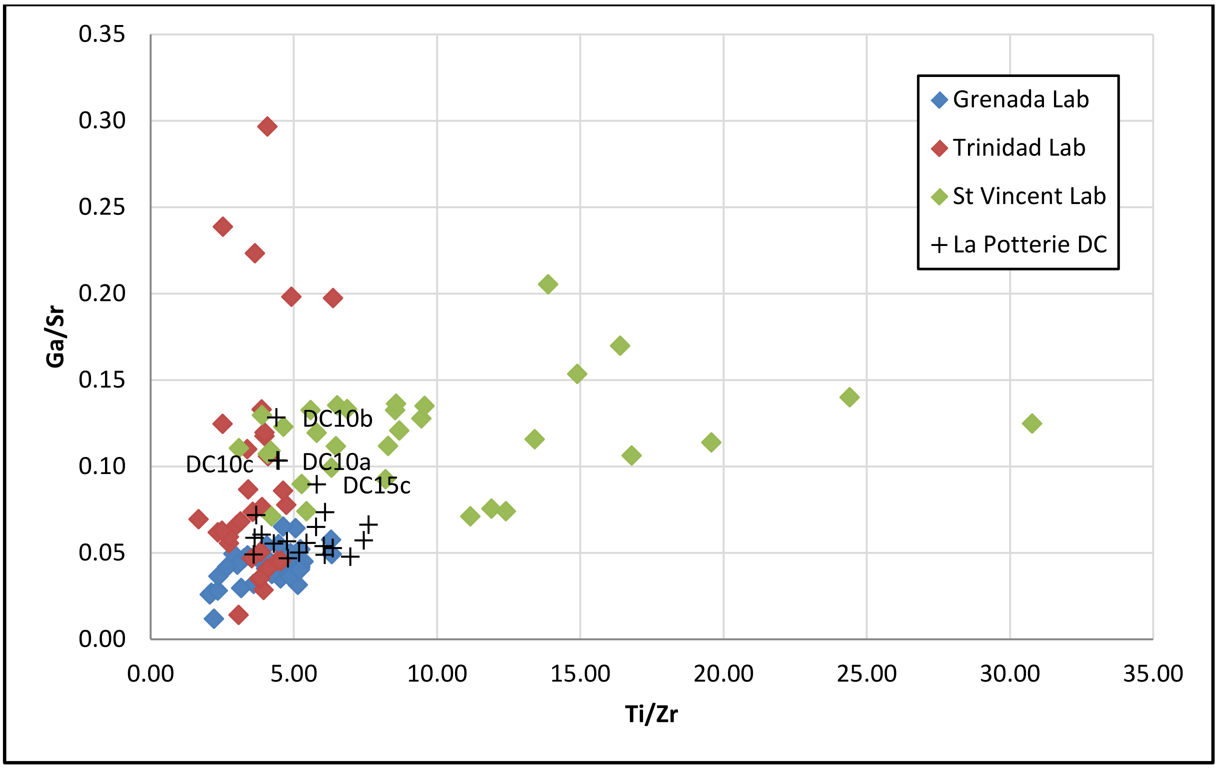

Figure 34. DC15b plots with the St Vincent material in terms of Ga/Sr and Ti/Zr. Samples DC10a, DC10b, and DC10c plot with St Vincent outliers in terms of these ratios

Figure 35. In the upper image DC10a is top left, DC10b is top right, DC10c is bottom centre. DC15c is the small two-tone ceramic, measurements were conducted on the red part

The pXRF analyses of ceramic material conducted in the laboratory indicated that there was a certain degree of overlap between the compositional groups. This is partly due to the nature of pXRF analysis; a non-destructive surface technique will not give the same sensitivity as destructive chemical analyses. A comparison of the laboratory data with petrographic analyses allowed general compositional groups for three regions to be determined, Grenada, Trinidad, and St. Vincent. When the field data from the La Poterie collection was compared to the laboratory data is was clear that the majority of the samples belong in the Grenada compositional group. A small number of samples in Figure 32 (DC11c, DC15c, DC10a, DC10b, DC10c) appear to overlap with St. Vincent material due to the Sr/Zr ratios, Figures 33 and 34 show that DC11c is also likely to be from Grenada. In order to try and further distinguish whether the samples from the La Poterie collection belong to the Grenada compositional group, PCA (Figure 36) was performed (using the same ratios as for the Figure 30 analysis).

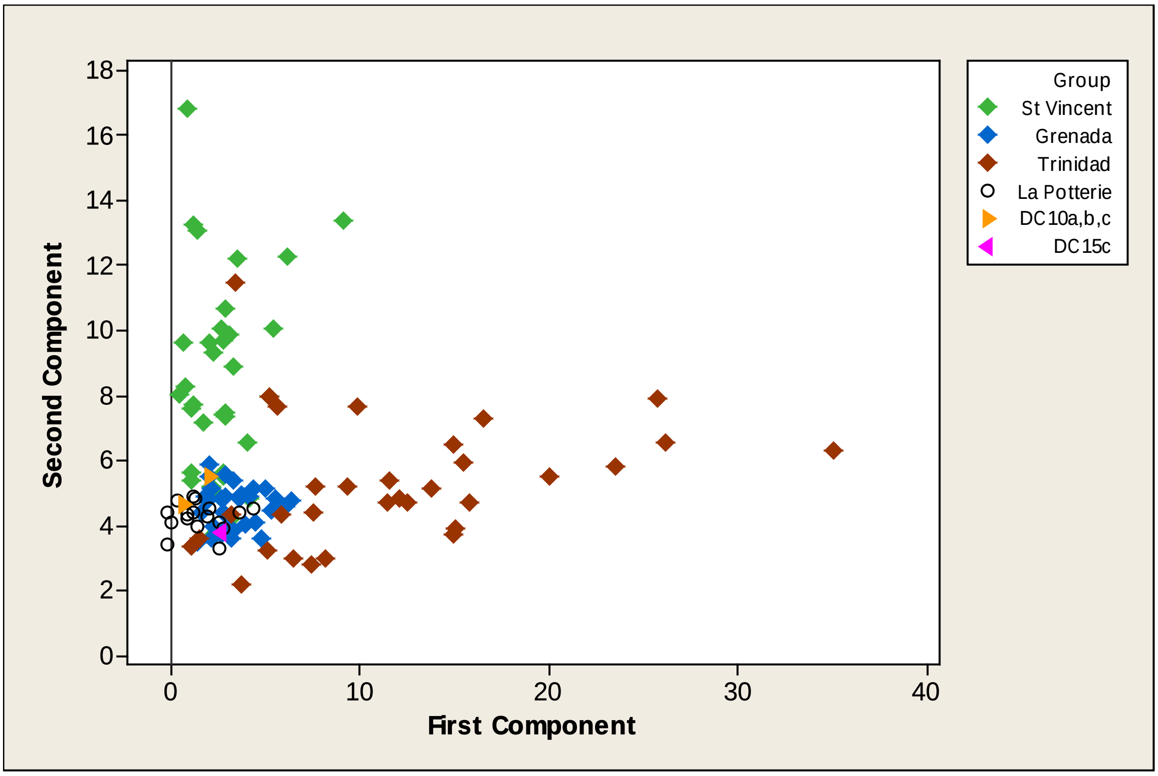

Figure 36. PCA plot of the laboratory and field data. The orange triangles represent samples DC10a, DC10b, and DC10c, the pink triangle represents DC15c. All of these samples are statistically similar to the Grenada material

Figure 36 indicates that the results of the PCA, while samples DC10a, DC10b, DC10c, and DC15c appear statistically similar to the Grenada compositional group, it is still possible that these samples may be from St Vincent (or an as yet undefined source).

Samples of fired clay from St. Vincent and Grenada were also measured with the pXRF and the resulting spectra were compared with the ceramics from the La Poterie collection (Figures 37 and 38). St. Vincent clay has a high Ca peak, low Ti peak, and low Fe, while Grenada clay has low Ca, high Ti, and high Fe.

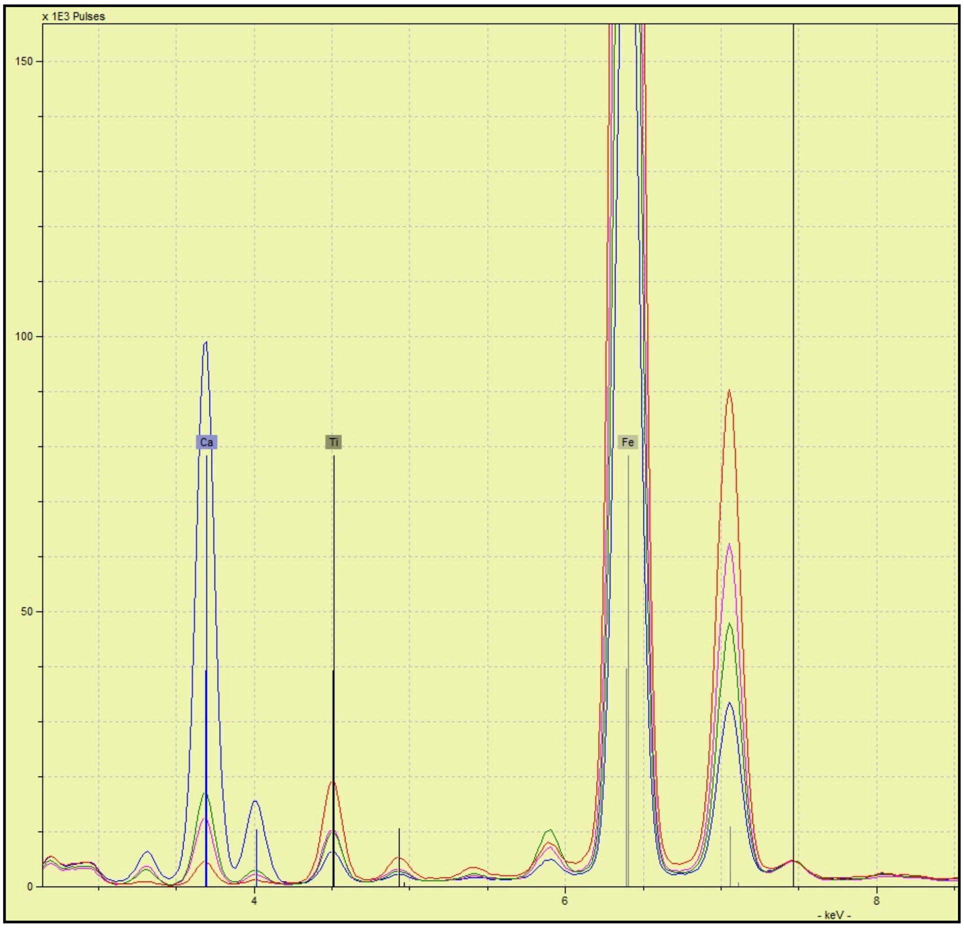

Figure 37. The red spectrum is Grenada fired clay, the blue spectrum is St Vincent fired clay, the green spectrum is DC5 and the pink spectrum is DC13. In this instance DC5 and DC13 are used to represent the bulk of the La Poterie collection for ease of viewing

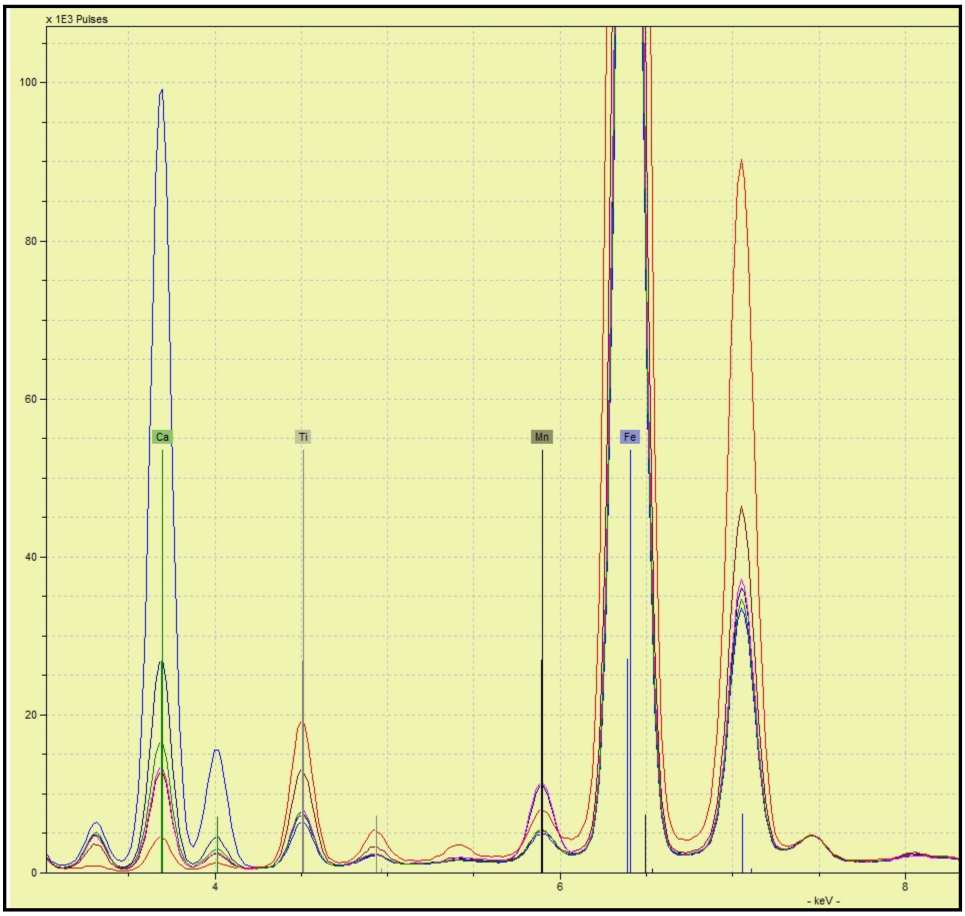

Figure 38. The red spectrum is Grenada fired clay, the blue spectrum is St Vincent fired clay, the green spectrum is DC10a, the pink spectrum is DC10b, the navy spectrum is DC10c, and the brown spectrum is DC15c.

The high Fe and Ti contents of the Grenada clay (Figure 37) mean that this is more likely to be the source of clay used for the ceramics in the La Poterie collection. Although the ceramics have higher Ca contents than the Grenada clay sample, this element can be added during manufacturing processes. The addition of a Ca-rich temper to the clay would have the effect of diluting the Fe and Ti signals in the clay. Neyt's petrographic analysis noted that ceramics from Grenada contain hornblende. The presence/addition of this mineral to the ceramic would add Ca, although it is impossible to identify the presence/absence of hornblende from pXRF spectra. Although the St Vincent clay has high Ca, if this clay were used, the addition of material to dilute the Ca would also dilute the Ti and Fe further, making this clay an unlikely source material for the ceramics in the bulk of the La Poterie collection. Samples DC10a, DC10b, DC10c, and DC15c are more problematic. Figure 38 shows that while DC15c follows the same trend as the other La Poterie samples, DC10a, DC10b, and DC10c have more in common with the St Vincent fired clay i.e. low Ti and low Fe peaks. Although the PCA analysis determined that all the La Poterie samples were statistically similar to the Grenada material, there was still overlap between the St. Vincent and Grenada data. Samples DC10a, DC10b, DC10c, and DC15c have characteristics similar to the St Vincent material, yet also have affinities with material from Grenada. Without an analysis of all the possible workable clay sources on Grenada it is impossible to completely exclude these samples as coming from Grenada. A destructive petrographic analysis would indicate whether DC10a, DC10b, DC10c and DC15c fit the Grenada signature.

2.4. Conclusion

The majority of the La Poterie collection form a consistent compositional group, and this group plots with the Grenada material measured in the laboratory. This interpretation is also confirmed by PCA. A few examples of St. Vincent and Trinidad material do overlap compositionally with Grenada, but for most of the samples in the La Poterie collection this overlap can be resolved. Samples DC10a, DC10b, DC10c and DC15c are the exceptions, while these samples have characteristics of the Grenada material, they also share many of the characteristics of the St. Vincent material. It is therefore possible that these samples may be from an alternative source. Based on the results of the PCA and the comparison with the clay pXRF spectra, DC15c is probably an outlier to the Grenada material (although a St. Vincent origin cannot be excluded), whereas DC10a, DC10b and DC10c could potentially be from a St. Vincent source. A destructive petrographic analysis would be the best way to confirm to which groups these ceramics belong.

3. Isotope Analyses of Faunal Remains from the Cayo Site of La Poterie, Grenada, Synopsis of the 2014 Report

By Jason Laffoon, postdoc Leiden University

3.1. Isotope Analyses of Faunal Remains from the Cayo Site of La Poterie, Grenada

Final Report 2014

Dr. Jason Laffoon, Prof. dr. Menno L. P. Hoogland*, Prof. dr. Gareth Davies**,*

*and Prof. dr. Corinne L. Hofman**

** Faculty of Archaeology, Leiden University, The Netherlands*

*** Faculty of Earth and Life Sciences, VU, Amsterdam, The Netherlands*

Corresponding author: Dr. Jason Laffoon email: j.e.laffoon@arch.leidenuniv.nl; phone: +31 (0)71 527 3486; Address: Faculty of Archaeology, Leiden University, P.O. Box 9515, 2300 RA Leiden, The Netherlands

3.2. Introduction

This report summarizes the results of multiple isotope analyses on the faunal remains from the site of La Poterie, northeast coast, Grenada that were taken to the Faculty of Archaeology by Prof. dr. Corinne Hofman, Caribbean Research Group, Leiden University in the winter of 2013 and were shipped back to Grenada in September of 2013 in the context of an agreement between the Leiden Faculty of Archaeology and the Government of Grenada in the person of Mr. M. Jessamy, Heritage Officer.

The aim of this research was to investigate whether the suspected nonlocal origin of several of the specimens could be determined using isotope analysis and if so whether the isotope results could contribute to an assessment of the geographic origins from where the animals ultimately derived. To date, we have conducted an inventory, and catalogued and photographed all of the different skeletal elements within this study collection. In addition, we have conducted an initial zooarchaeological analysis of these skeletal remains in collaboration with specialist researchers from the Laboratory of Archaeozoological studies, Faculty of Archaeology, Leiden University and the Naturalis Biodiversity Center, Leiden. Although it was not possible to securely identify most of these elements to the level of species owing to their isolated and fragmentary condition, we have made preliminary identifications and will continue to try to identify the individual taxa represented by combining the recorded descriptions, photographic evidence, and further collaboration with various specialists. For the isotope analyses we have extracted approximately 3-5 milligrams of bone or enamel per sample and analyzed each for strontium, oxygen, and carbon isotope composition. The analyses were carried out by Dr. Jason Laffoon at the Department of Earth Sciences of the VU, Amsterdam.

3.3. Materials

As previously mentioned, it was not possible to securely identify all of the analyzed specimens. As such, the listed identifications should be considered tentative and confirmed through subsequent zooarchaeological analysis by a specialist. In general, for a number of reasons, including the presence of morphologically distinct characteristics and better states of preservation, the teeth identifications should be considered more secure than those for the bone samples. In total, we have identified seventeen separate skeletal elements: five individual teeth, four combined elements (contained both teeth and portions of the mandible and/or maxilla), and eight separate bone elements. The specimens with teeth are represented by the following elements and taxa: two isolated tapir (*Tapirus terrestris*) teeth (1 incisor & 1 canine, both upper); one peccary (*Tayassu pecari* or *Pecari tajacu*) incisor (lower); four separate dog (*Canis familiaris*) specimens including a right mandible (with 3 teeth in situ), a left maxilla (with 2 teeth in situ), and two deciduous canines with undeveloped roots (unerupted); a matching right maxilla and mandible (with all teeth in situ) from an opossum (*Didelphis marsupialis*); and a partial maxilla (with 1 incisor in situ) of an agouti (*Dasyprocta* sp.).

Dog, tapir and peccary teeth submitted for isotope analyses, La Poterie (coll. D. Charles)

Figure 39. Perforated dog, tapir and peccary teeth submitted for isotope analyses. These teeth were found at La Poterie in 2010 by D. Charles

The specimens comprised only of bone elements include (Figure 39): one (possible) dog (*Canis familiaris*) vertebra; three long bones (two femora and one humerus) tentatively identified as cottontail rabbit (*Sylvilagus* sp.); a distal phalanx possibly from a sea turtle; a distal phalanx possibly from an unidentified taxa of anteater, and two long bones (1 tibia and 1 humerus), possibly from birds. In terms of biogeography, it is noteworthy that several of these taxa, including the tapir, peccary, rabbit, and anteaters have never been documented or reported as living on the island of Grenada and thus most likely represent individual animals (or their remains) that were intentionally brought to Grenada by indigenous peoples from the mainland. One further observation supports the notion that the deposition of these remains are a result of human agency is that there are clear cut marks on both the (sea turtle?) distal phalanx and the unidentified tibia.

3.4. Methods

For samples of dental enamel, teeth were mechanically cleaned to remove any encrustations, calculus, staining, and the outer layer of surface enamel and to expose the inner core enamel. For bone samples, a similar process was applied involving the mechanical removal of the outer layers with samples of bone powder taken from the innermost portion of the underlying bone tissue. Approximately 2-4 mg of core enamel or bone was extracted using a hand-held drill equipped with a pre-cleaned, diamond-tipped rotary burr. The drill bit was cleaned with ethanol, 1% HNO3, and ultra-pure H2O before and between each sample extraction. Extracted enamel samples were: 1) leached briefly with 1N acetic acid (CH3CO2H); 2) washed in demineralized, deionized water (H2O); and 3) dissolved in 3N nitric acid (HNO3). Bone samples were subjected to additional pre-treatment steps between steps 1 and 2 involving the application of a 50% bleach (NaOCl) solution to remove organic components and this step was followed by an additional rinse with demineralized, deionized water (H2O) that was repeated four times.

For Sr isotope analyses, samples were loaded onto cation exchange columns comprising Sr-specific crown ether resin for separation of strontium ions from the sample matrix. After separation, strontium samples were loaded onto pre-cleaned, degassed rhenium filaments and 87Sr/86Sr was measured with a ThermoFinnigan MAT 262 RPQ plus, thermal ionization mass spectrometer (TIMS) at the Faculty of Earth and Life Sciences, VU University Amsterdam. Long term measurements of the standard reference material (NBS-987) produced a mean 87Sr/86Sr of 0.71026 ±0.00003 (1σ) and the typical analytical error for all samples reported here is ~0.00001. The strontium yield of blanks are consistently low (< 100pg) and negligible relative to the overall amount of strontium in the samples. A correction was applied to each 87Sr/86Sr measurement equaling the difference between the in-run measurement of the standard reference material and the generally accepted value of 0.710240.

Oxygen and carbon isotope compositions of the bioapatite (carbonate) component of teeth and bones were measured on a Finnigan DeltaPlus Isotope Ratio Mass

Spectrometer, following reaction of the carbonate sample with orthophosphoric acid (H_3PO_4) [100%] and isolation of the produced carbon dioxide (CO_2) with a Gasbench II universal automated interface (Faculty of Earth and Life Sciences, VU University Amsterdam). The long term reproducibility of the standard reference material (NBS-19) for $\delta^{18}O$ is <0.2‰ and for $\delta^{13}C$ is <0.1‰. Measurement drift is additionally monitored through the analysis of an in-house carbonate standard (VICS-1). All $\delta^{18}O$ and $\delta^{13}C$ values referenced herein are reported in the delta (δ) notation, in parts per thousand (‰) relative to the international PDB (Pee Dee Belemnite) standard, unless noted otherwise.

	Type	**common name**	**Taxa**	**Element**	**87Sr/86Sr**	**13Cca**	**18Oca**
‰ VPDB				‰ VPDB			
LPG-fa1	enamel	tapir	*Tapirus terrestris*	incisor	0.713190	0.9	-4.6
LPG-fa2	enamel	tapir	*Tapirus terrestris*	canine	0.710123	-1.7	-3.6
LPG-fa3	enamel	peccary	*Tayassu pecari*	incisor	0.715233	-12.9	-5.6
LPG-fa4	enamel	dog	*Canis familiaris*	premolar	0.707635	-10.6	-4.7
LPG-fa5	enamel	dog	*Canis familiaris*	molar	0.707800	-11.7	-4.8
LPG-fa6	enamel	opossum	*Didelphis marsupiali s*	incisor	0.707828	-11.1	-5.2
LPG-fa7	enamel	agouti?	*Dasyproct a sp.*	incisor	0.706645	-12.5	-5.5
LPG-fa8	bone	anteater?	?	distal phalanx	0.708691	-7.5	-5.7
LPG-fa9	bone	sea turtle?	?	distal phalanx	0.708768	-5.5	-5.6
LPG-fa10	bone	dog	Canis familiaris	vertebra	0.708568	-12.4	-6.0
LPG-fa11	bone	?	?	humerus	0.708185	-13.1	-4.4
LPG-fa12	bone	?	?	tibia	0.707705	-13.2	-4.7
LPG-fa13	bone	rabbit?	Sylvilagus sp.?	femur	0.707744	-12.0	-4.1
LPG-fa14	bone	rabbit?	Sylvilagus sp.?	humerus	0.707453	-15.2	-6.4
LPG-fa15	bone	rabbit?	Sylvilagus sp.?	humerus	0.708216	-13.0	-4.7
LPG-fa16-1	enamel	dog		*Canis familiaris*	dec. inc.		0.707708
LPG-fa16-2	enamel	dog		*Canis familiaris*	dec. inc.		0.707705

Table 4

3.5. Results and Discussion

The results of the isotope analyses are listed by sample in Table 4. The results of the strontium isotope analyses will be presented first followed by the oxygen and carbon isotope results. Interpretation of the Sr isotope results are made in reference to the range of bioavailable 87Sr/86Sr for the island of Grenada and expected ranges of bioavailable 87Sr/86Sr from northern South America (Bataille, et al. 2012). For the island of Grenada itself, bioavailable 87Sr/86Sr data is limited to five modern plant samples reported in Laffoon (2012) and Laffoon et al. (2012). These samples display an absolute range in values from 0.70622 to 0.70740 indicating that the bioavailable Sr on this island is predominantly a mixture of Sr weathered from the underlying volcanic bedrock and Sr deposited from precipitation and sea spray. Although efforts were made to collect these plant samples from different geographic and geological settings on Grenada, it is unlikely that they represent the full range of Sr isotope variation on the island. The mean ± two standard deviations of these values can be offered as a more realistic estimate of this variation until a larger and more representative data set for the island is available. This proposed estimate for the extent of bioavailable 87Sr/86Sr variation ranges from approximately 0.706 to 0.708. Local samples are defined here as those that fall into this range. As expected most of the analyzed samples fall within this range, indicating either that they are actually local to the island of Grenada or originate from a location with a similar range of Sr isotope variation. These include six enamel samples; four dogs, one opossum, and one agouti; and three of the bone samples.

Interpretation of the bone samples is somewhat more complicated owing to the much greater likelihood that bone material has been contaminated by diagenesis (post-burial) and that the treatment protocols have been insufficient to remove all of the non-biogenic Sr. As such, it is interesting to note that seven of the bone samples fall outside of the proposed range of local 87Sr/86Sr variation. One possibility is that the actual range of variation for the island of Grenada greatly exceeds our proposed estimate. Alternatively, if our estimate is accurate, then it would seem that at least 70% (7 of 10) bone samples are nonlocal. This is particularly interesting considering the increased susceptibility of bone material to diagenesis, a process which should make the samples appear isotopically local (even if they were not). Additionally, if we assume some degree of contamination, it also possible that all ten of the bone samples are nonlocal. In any case, we cannot propose specific places of possible origin for the analyzed bone samples as it is likely that they contain some unknown combination of biogenic and diagenic Sr. However, it is worth stressing that the identification of nonlocal 87Sr/86Sr values in archaeological bone material is quite rare and allows us to tentatively reject the common assumptions that: 1) Sr in archaeological bone solely represents post-mortem contamination; and 2) that because of issues of diagenetic contamination, there is no utility in measuring Sr isotope composition in (archaeological) bone samples.

In addition to several of the bone samples, three dental enamel samples possess nonlocal 87Sr/86Sr ratios. These three samples include both of the tapir teeth and the single peccary tooth, all three of which are perforated likely indicating their use as items of personal adornment (i.e. as pendants). These results are more straightforward to interpret owing for the general tendency of enamel samples to be more resistant to diagenetic alteration and because the measured 87Sr/86Sr ratios greatly exceed not only the range of values for Grenada but also the bioavailable 87Sr/86Sr range for all of the Antilles. The fact that these three samples have 87Sr/86Sr ratios that are higher than the range for the Antilles is entirely consistent with mainland South American origins.

Interestingly, the 87Sr/86Sr ratio of the tapir incisor (0.71012) is very similar to the 87Sr/86Sr ratio obtained from an incised and perforated tapir tooth pendant (Laffoon, et al. 2014) recovered from Huecoid contexts at the site of La Hueca-Sorce, Vieques (Narganes Storde 1985). The similarity in 87Sr/86Sr ratios is not conclusive of shared origins but the possibility exists that they both derive from a similar region on the mainland. Based on comparisons with predicted bioavailable variation for the broader region (Bataille et al. 2012), the nearest location from Grenada where such 87Sr/86Sr values are expected is on the Paria Peninsula of northern Venezuela. This sample's 87Sr/86Sr ratio, however can also be expected in a number of different locations across northern South America more broadly, including a large area along the north-central coast of Venezuela and in isolated pockets in the northern Andes. The 87Sr/86Sr ratio of the tapir canine is slightly higher (0.71319) than that of the previously discussed tapir incisor sample and its expected distribution on the mainland is also somewhat different. Namely, such higher 87Sr/86Sr ratios have a more limited distribution with the nearest location to Grenada in the Guiana Highlands (south of the Orinoco River). Other locations on the mainland also occur, including also large but isolated pockets in the northern Andes. Lastly, the peccary incisor has the highest 87Sr/86Sr ratio (0.71523) amongst the samples analyzed for this study. On the mainland, the locations with expected bioavailable 87Sr/86Sr similar to this value are very similar to that already discussed for the tapir canine with the exception that the former is possibly more widely distributed within the Guiana Highlands.

The results of the oxygen isotope analyses are more equivocal and more complicated to interpret than the strontium isotope results for a number of reasons. These include 1) the fact that there is simply less oxygen isotope data from the Caribbean region available for comparative analysis; and 2) oxygen isotope measurements (especially of archaeological bone) are generally less precise than strontium isotope measurements. Nonetheless, analysis of these data do reveal some interesting patterns in relation to investigations of geographic origins. In terms of comparative data, oxygen isotope values ($\delta18Oca$) derived from archaeological human dental enamel in the Caribbean (Laffoon, et al. 2013) ranges from approximately -1‰ to -4‰, VPDB (mean = -2.5‰, SD = 1.5, n = 98). $\delta18Oca$ derived from archaeological faunal dental enamel in the Caribbean displays a similar range (excluding three outliers) from approximately -1.5‰ to -4.5 ‰, VPDB (mean = -3.2‰, SD = 1.2, n = 44). These ranges are very comparable and suggest that if there are any systematic differences in oxygen isotope fraction between human and non-human animals in the Caribbean that these are not substantial. For this study, there are three (perforated) teeth from species that must derive from the mainland based on taxonomic grounds (i.e. two tapir teeth and one peccary tooth). The two tapir teeth have $\delta18Oca$ values of -3.6‰ and -4.6‰ respectively. The former falls within the range of variation for the Antilles and the latter just outside the range of variation (at 1σ). Given that their nonlocal origins have already been confirmed from the Sr isotope results these values likely indicate an origin on the mainland from an area that is fairly similar to the Antilles in terms of climate. As altitude is one of the primary influences on $\delta18O$ variation of water (and thus skeletal bio-minerals) in the tropics (Terzer, et al. 2013), this probably indicates a coastal or low altitude (as opposed to inland/highland) origin for these two samples. The peccary tooth sample's $\delta18Oca$ value of -5.6‰, is more than one per mil lower than the minimum of the range of faunal values for the Antilles and similar to values obtained from a jaguar and a tapir tooth pendant from the site of La Hueca-Sorcé, Vieques (Laffoon et al. 2014). This value is in concordance with the Sr isotope measurement from this peccary tooth in that both values are consistent with an origin in either the Guiana Highlands or in isolated pockets of the northern Andes, as previously mentioned.

The δ18Oca values of the dog (-4.7‰ and -4.8‰), opossum (-5.2‰), and agouti tooth (-5.5‰) samples are all lower than the range of faunal δ18Oca for the Antilles. Considering that these same samples fell just within or at the edge of Sr isotope variation for the island of Grenada, these samples possibly represent a good example of the interpretive power of combining multiple isotope analyses. More specifically, if these δ18Oca results truly represent nonlocal origins then it is quite possible that the samples whose 87Sr/86Sr values are isotopically local are actually examples of false negatives (i.e. nonlocals originating from places which are isotopically similar to the local range in terms of 87Sr/86Sr). If these samples did in fact originate from mainland South America their 87Sr/86Sr ratios, ranging from roughly 0.7076 to 0.7078 (excluding the agouti), are consistent with expected bioavailable 87Sr/86Sr ranges from much of north-central Venezuela.

Interestingly, the δ18Oca values of most of the unidentified bone samples also fall outside of the range of δ18Oca variation for the Antilles. There are several, non-mutually exclusive explanations for this observed patterning. Firstly, it is possible that the extant dataset for the Antilles does not capture the entire range of variation for this region. This is possible, owing to the dearth of data from the island of Grenada and the Windward islands more generally. We are currently in the process of obtaining more oxygen (and strontium) isotope data of different sample materials to better characterize the nature of isotope variation for this region. A second possibility is that the samples may have been contaminated via diagenesis. This explanation is more likely for bone samples more generally, but in principle diagenic alteration should make samples appear more and not less similar to the local range and thus should make nonlocal samples appear local, and not vice versa. A third possibility is that these the obtained results reflect the true biogenic signals and that the range of regional variation is well characterized and thus that nearly all of the samples from this collection are nonlocal. While taken at face value, this may seem unlikely, it is not an unfeasible possibility given that some of the samples are of known exotic taxa and if they derive from similar archaeological contexts they may reflect large-scale importation of mainland faunal resources to the island of Grenada by indigenous peoples.

In summary, the δ18Oca signals from the tapir and peccary samples contribute to narrowing down the geographic origins of these specimens within mainland South America. The δ18Oca signals from the dog, opossum, and agouti samples seem to indicate nonlocal origins while their 87Sr/86Sr ratios were generally equivocal in reference to origins. We tentatively interpret the combined isotope data for the dog and opossum samples as indicating nonlocal origins but with all of the previous caveats concerning the oxygen isotope measurements and their interpretation in mind this should be tested by further research. Lastly, several of the bone samples also possess δ18Oca values that are consistent with nonlocal (mainland) origins. Such an interpretation would also be in agreement with the initial taxonomic identification of the samples as deriving from non-native taxa. However, we would advise further testing before supporting the conclusion that the bone samples are of South American origin in light of the high susceptibility of bone material to diagenic alteration.

Carbon isotope data was generated in conjunction with the oxygen isotope measurements. While these data are not generally indicative of geographic origins they can provide an additional line of evidence for interpreting the isotope data more generally. The majority of the δ13Cca data fall within the range of roughly -10‰ to -16‰. These values are consistent with what would be expected from terrestrial mammals consuming primarily C3 plant resources. Two of the bone samples (both distal phalanges) returned substantially higher values of -7.5‰ and -5-5‰ (tentatively identified as sea turtle and anteater, respectively). These elevated values could be interpreted as indirectly supporting the taxonomic identification for both samples, owing to the consumption of sea grasses for the former and C4 terrestrial protein resources (i.e. ants that consume tropical C4 grasses) for the latter. Lastly, the two tapir teeth had the highest δ13Cca signals (-1.0‰ and -1.7‰) amongst the entire sample set analyzed for this study. These samples are clearly highly enriched in 13C and suggest very substantial contributions of C4 plant resources to the diets of these organisms. Unfortunately, no published comparative carbon isotope data could be found in the literature to determine if this feeding behavior is typical of South American tapir species.

3.6. Conclusions

In summary, the results of the isotope analyses of the bone samples from La Poterie are inconclusive in regards to origin, but at least some of them appear to be nonlocal based on our current assessment of the range of 87Sr/86Sr variation for Grenada. The 87Sr/86Sr results from the dog, opossum, and agouti samples are all consistent with a local origin, but their enamel δ18Oca values are more consistent with nonlocal origins. These patterns are not necessarily contradictory and do not preclude that some (or all) may be nonlocal. Lastly, the combined isotope results from the three culturally modified tooth pendants of exotic (mainland) taxa (tapir and peccary) can be summarized as follows: 1) the Sr isotope results of these three samples are consistent with mainland South American origins; 2) the absolute differences between these 87Sr/86Sr ratios are relatively large and thus not very consistent with a single location of origin for all three but more likely at least two (or even three) different regions of origin; and 3) based on comparisons with the expected spatial variation of bioavailable 87Sr/86Sr on the mainland, we can tentatively narrow down the most likely places of origin to much more circumscribed areas of northern South America for all three of these samples.

3.7. Acknowledgements

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4. Grenada 2016 Survey Report of Amerindian Sites

By Samantha de Ruiter, PhD candidate Leiden University

4.1. Introduction

As part of the archaeological research campaign, several archaeological surveys have been undertaken in Saint Patrick and the northern part of Saint Andrew districts in order to extensively map known archaeological sites and to record new ones. Using the archaeological site and excavation at La Poterie as a base camp, the surveys were conducted along the northeastern coastline, moving counter-clockwise to Sauteurs on the northern coast. This area was prioritized because of the known presence of Cayo ceramics, indicating an Amerindian presence in early colonial times.

4.2. Surveys

The surveys were *informant based*, using the knowledge and information of local residents about the presence of archaeological sites in specific areas. Mr. Dolton Charles has gratuitously shared his extensive knowledge of the archaeology in the study area, and has accompanied and guided the research team on these surveys. The team consisted of at least the author and Mr. Charles, accompanied variably by students, Grenadian volunteers at the La Poterie excavation, and other researchers affiliated with Leiden University and the CARIB project. In order to analyze the continuity and changes in settlement patterns variables such as the environmental setting, for example the vegetation, slope, and proximity of resources, the archaeological data, such as the site type and approximate date range, and viewsheds and intervisibility of sites and islands are recorded and studied. In this way the sites are characterized in their archaeological and environmental setting. Since data from previous studies often do not contain exact information on the location or extent of a site several previously known sites have been visited and mapped during the surveys. These site are:

- Savanne Suazey (Figure 40)
- Levera Beach
- Sauteurs

- Telescope Point
- La Filette

The latter are written in italics since the exact location or extents are unclear. In the case of Telescope Point, the geographical location appears to be defined. However, the complete site (area) is altered by erosion and re-landscaping activities. In the case of La Filette, the known description of the site location points to a different location than recorded in January, while the contents of the actual site description match the recorded site perfectly. In other words, the site is most likely the known site of La Filette.

Figure 40 A view from the Savanne Suazey site to its southern extents at the Salle River. High Cliff Point is visible in the back.

In addition to these known sites the following unknown, undocumented or unpublished sites were recorded as well:

- Artiste Point
- South of River Antoine
- Boulang
- High Cliff Point
- Mt. Horne

Mt. Horne was at first presumed to be an unkown site, while after investigation, it seems most likely to be the known site of La Filette. A small representative surface collection was gathered at these sites in order to study the archaeology of the sites in terms of, for example, chronology. The site extents were mapped with a handheld GPS device based on the presence of archaeological materials at the surface level. Environmental settings such as vegetation, geology and landscape settings were noted for each site. This data culminates in the maps below, displaying the survey and site areas, and currently known site locations.

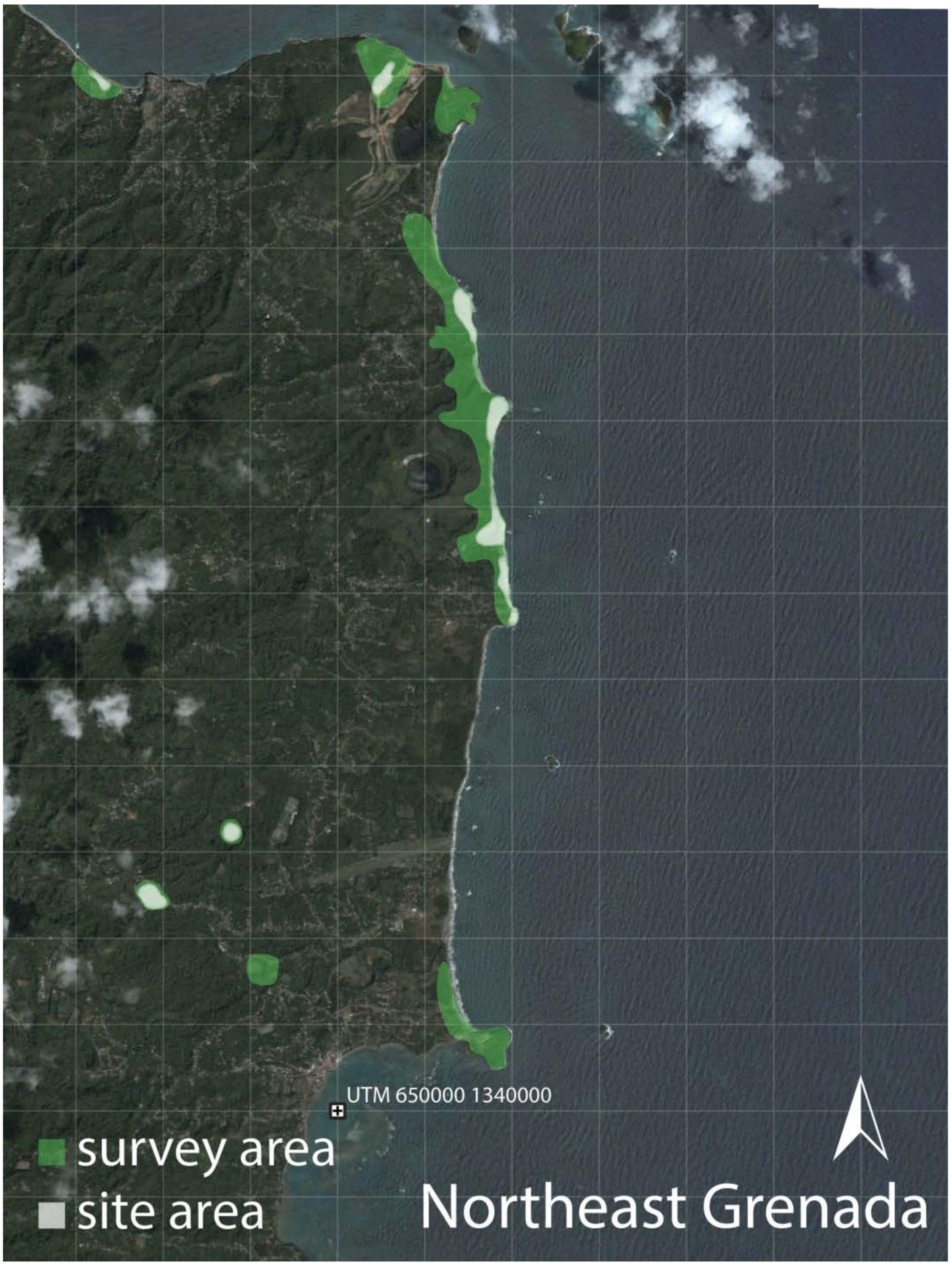

Figure 41 A map of northeast Grenada with a 1 km grid, shownig the survey areas and recorded site areas

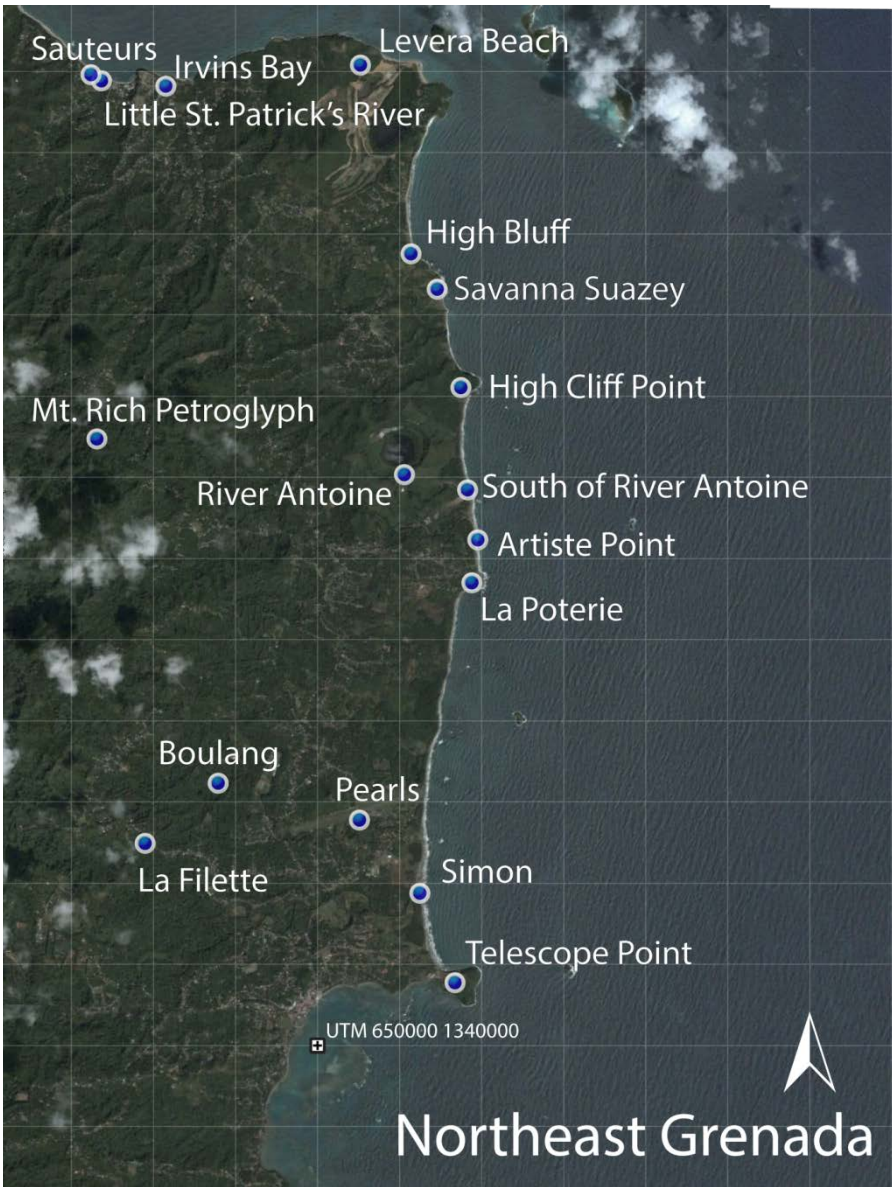

Figure 42 A map of northeast Grenada with a 1 km grid, showing all currently known sites in the area

4.3. Conclusions and Future Directions

One of the most striking observations during the surveys in January 2016, is the vast amount of earlier Amerindian sites in the study area. Their extent, almost continuously following the coastline, and the immense presence of archaeological material, even at the surface, indicates an extensive habitation of these coasts in the past. The site of Pearls is the most well-known example of such large and archaeologically rich earlier period (i.e. pre 1000 AD) site. Furthermore, it must be noted that several sites display a continuity through time, containing ceramics from earlier as well as later periods – up to early colonial times. These observations must be placed in the larger context of the whole island and even in the larger scale of the Lesser Antillean island arc. Further studies on the presence of early colonial Amerindian sites in other areas of the island(s) are currently undertaken and will reveal more detailed insights into the changes and continuity in settlement patterns over time.

5. Grenada 2016 Visibility Survey

By Tom Brughmans, Postdoc Konstanz University

An innovative network science and GIS method has been developed for studying hypotheses of visibility in research contexts with fragmented data. These methods are applied here to study the transformations of Amerindian social networks in Grenada across the historical divide. In January 2016 a visibility survey was performed in Grenada which aimed to visit a number of known site locations, and determine how environmental factors affect visibility on the island. In total, 278 observations were made from/to 118 locations. Each observation concerns a line of sight from an observation location to an observed location. Descriptive attribute information was collected for each observation (e.g. lighting, size, weather, distance) and photos were taken at each location. All collected data has been checked for errors after the survey and is ready for archiving. All locations and observed lines of sight are shown in the figures below. On all three figures the locations visited or observed are represented as points. Each line represents an observation: an uninterrupted line of sight from an observation location to an observed location.

Preliminary results of this survey suggest that visibility is diverse and highly variable across Grenada: different areas of the island would have afforded past Amerindian communities different ways of observing humans, settlement structures and natural features. It is the aim of the newly developed network science and GIS method to explore these visual properties of the Grenada landscape, whether known Amerindian settlement locations were located in areas of exceptional visibility, and how this transformed through time. To make this possible, both qualitative and quantitative results of the Grenada visibility survey will be used to inform the further development of the method and the creation of critical experiments reflecting archaeological hypotheses about the role of visibility for partly explaining Amerindian settlement locations.

Qualitative results of the survey revealed a general pattern: the bays and beaches along the northeastern coast offer particularly exceptional views (Sauteurs Bay, Bathway Beach, Antoine Bay, Great River Bay, Grenville Bay, and Marquis Bay). From the beaches along this coastline vast coastal areas can be observed, humans and structures remain clearly visible over long distances, and up to Telescope Point the Grenadine islands of Carriacou and Petite Martinique are visible. Moreover, this coastline is dotted with outcrops that offer the most exceptional views: Laurent Point, Leapers Hill, Bedford Point, High Cliff Point, Artiste Point, Telescope Point, Soubise Point, and Great Bacolet Point. The only other coastal area in Grenada offering similar exceptional views is that between Point Salines near the airport and Point Molinere. The remaining coastal areas along the western side of Grenada offer more restricted views, often limited to a single bay and the valley leading inland. Particularly limited are the views from the bays and outcrops all along the south coast of Grenada: from Point Salines south of the airport to Grand Bacolet Bay. Visibility of both land and sea is significantly more limited immediately inland from the coastal areas, and is often restricted to a single valley. The mountain ridges at the centre of the island are an exception to this: the ridges around Grand Etang Lake (Mount Quaqua), offering dominating views on both the southwestern coast (St. George's) and the northeastern coast (Telescope Point).

The quantitative results of the survey will be used to design appropriate experiments by informing the selection of values for the following variables: maximum visible distance of humans, trees, buildings, smoke columns. Humans were clearly visible over distances of 1.5km and in two instances could be observed at distance up to 3km (from Bathway Beach and Savanna Suazey Cliff to Sandy Island). At distances over 1.5 km humans could only be identified when they contrasted with the skyline. This information will be used in experiments to study the visibility of humans approaching Amerindian settlements, extracting resources, or navigating along the coast. Buildings were clearly visible up to 15km, and up to 17km in a single instance (from a hill on the southern point of Carriacou to Union Island). This information will be used in experiments to study the visibility of Amerindian settlement structure. Individual trees could be clearly distinguished up to 4km, but usually when they highly contrasted with the skyline. A smoke column could in one instance be observed at a distance of 13km, although smoke columns of smaller garden fires could only be observed up to 8km. This information will be used in experiments to study the use of possible fire and smoke signaling in communication networks between Amerindian settlements.

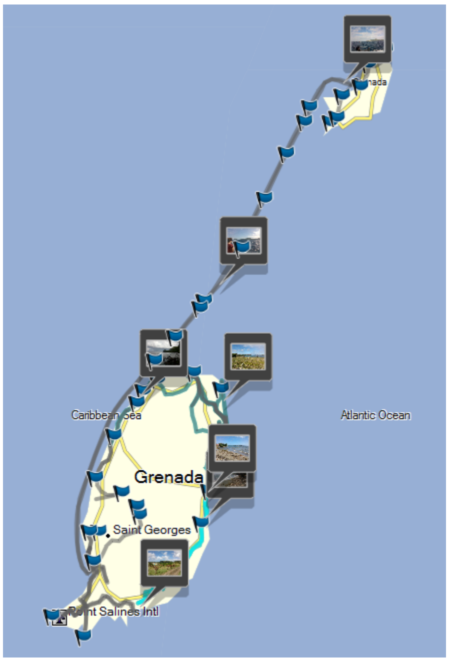

Figure 43. Survey GPS observation points, tracks and photos

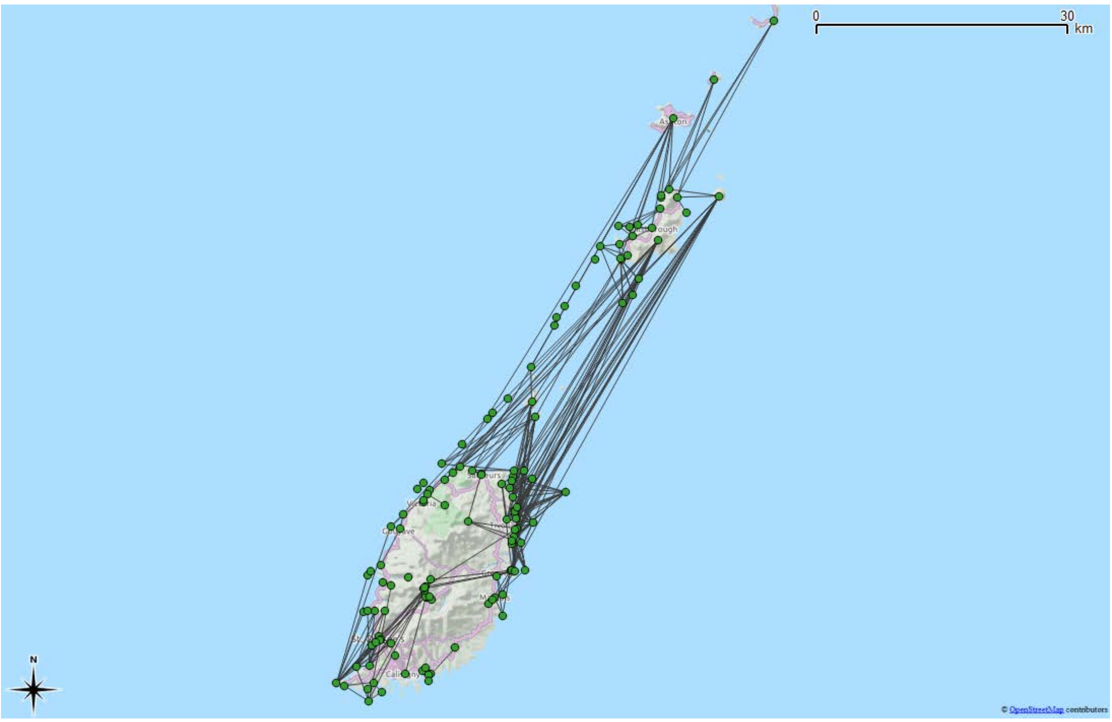

Figure 44. All survey points and lines of sight recorded

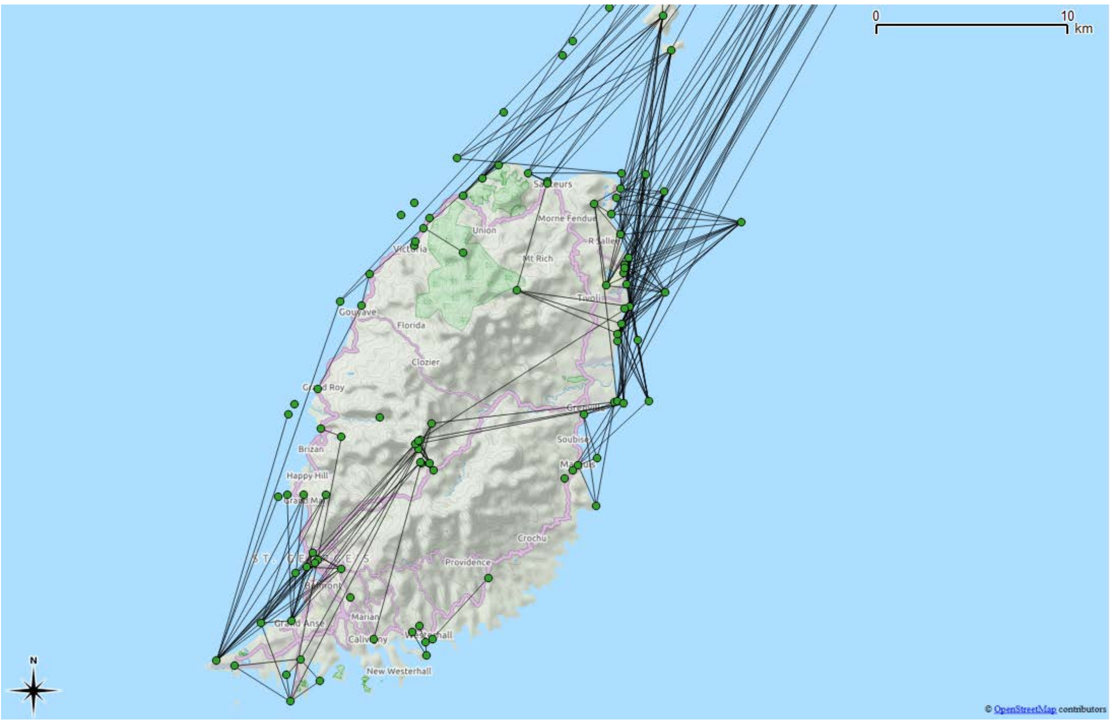

Figure 45. Survey points and lines of sight recorded Grenada

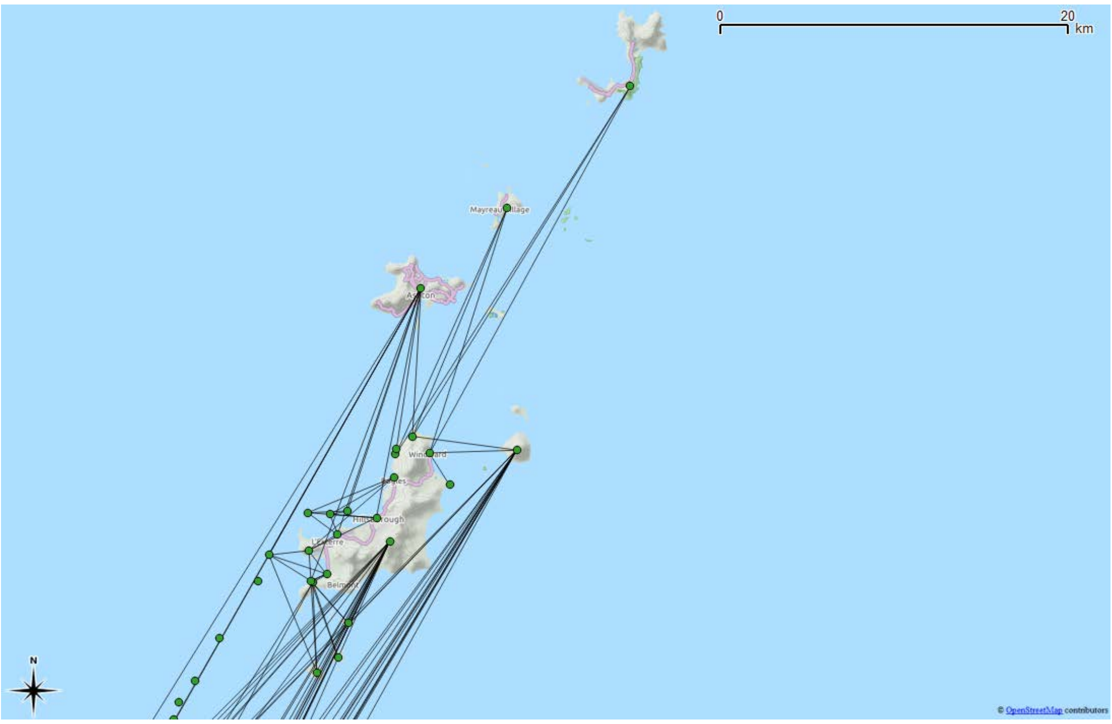

Figure 46. Survey points and lines of sight recorded Carriacou

6. Grenada 2016 Survey Report historical sites

By Mark W. Hauser, northwestern University, Chicago

6.1. Introduction

This report summarizes and documents the survey phase of research activities conducted through Leiden University in January 2016. The goal of this research was to establish the presence and chronology of colonial settlements in Grenada through the documentation and delineation of cultural deposits located at the village of La Poterie.

6.2. Survey Region

River Antoine Enclave is in the north-east corner of Grenada and contains the communities of La Poterie, River Antoine, Belmont, Conference and Tivoli. The region was chosen based on four factors. Leiden University had initiated testing of a previously identified site with material culture dating to the 16th century at the site of La Poterie. An intensive survey of the region would be able to situate contexts revealed from those excavations in a broader archaeological landscape. Second, oral histories and local informants had suggested a density of sites in the region that contained materials from the relevant time period (AD 1500 - AD 1800). As such, community involvement would facilitate reconnaissance during the initial phase of survey. Third, the area remains largely devoted to the agricultural sector and has received less attention by the tourist industry. In addition, there is less intensity of infrastructure development compared to the rest of the island. As such, this would suggest a greater likelihood of site integrity. Fourth, initial reconnaissance suggested that the entire archaeological landscape of Grenada would be represented in this reasonably compact region.

The geology of the region is dominated by volcanic deposits associated with pleistocene igneous event that formed Lake Antoine. The remainder are alluvial deposits associated with River Antoine and beach sand. The underlying geological context has informed a relatively homogenous soil profile Including Woburn clay loam, Capitol Clay loam, Belmont clay loam and Perseverance clay. The perseverance clay appears to be the source material used by eighteenth centuries potters working at pottery for which the property was named (Figure 47).

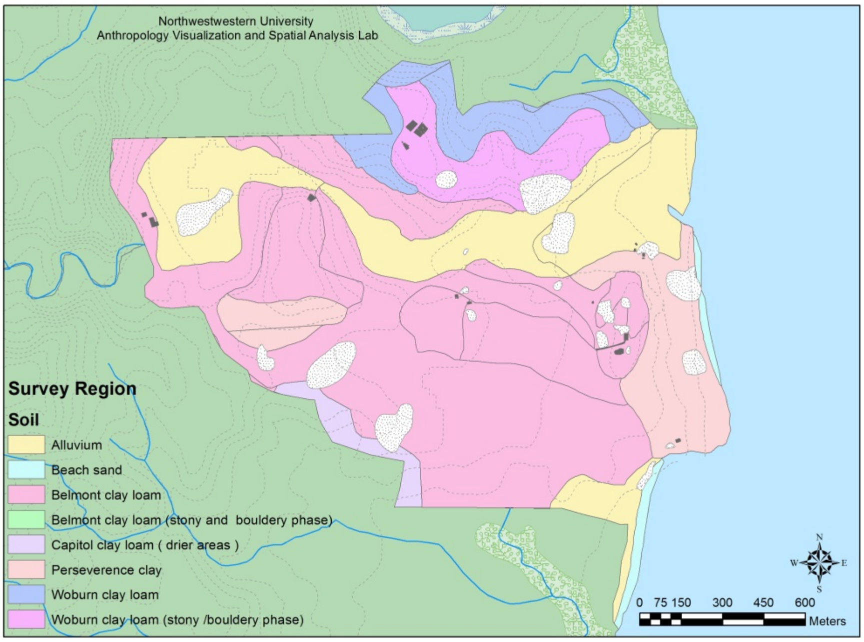

Figure 47. Soil profile

6.3.Survey Procedures

Approximately 215 hectares were surveyed in the region. 35 hectares were excluded from the survey due to inability to secure permission to gain access to the property (Figure 47). Ground visibility varied considerable due to the density of forest cover and foliage. In cases where ground cover was too dense to see the surface, a 1x1 meter area was cleared every ten meters. While these methods did yield some results, clearest ground scatter was located in plowed fields.

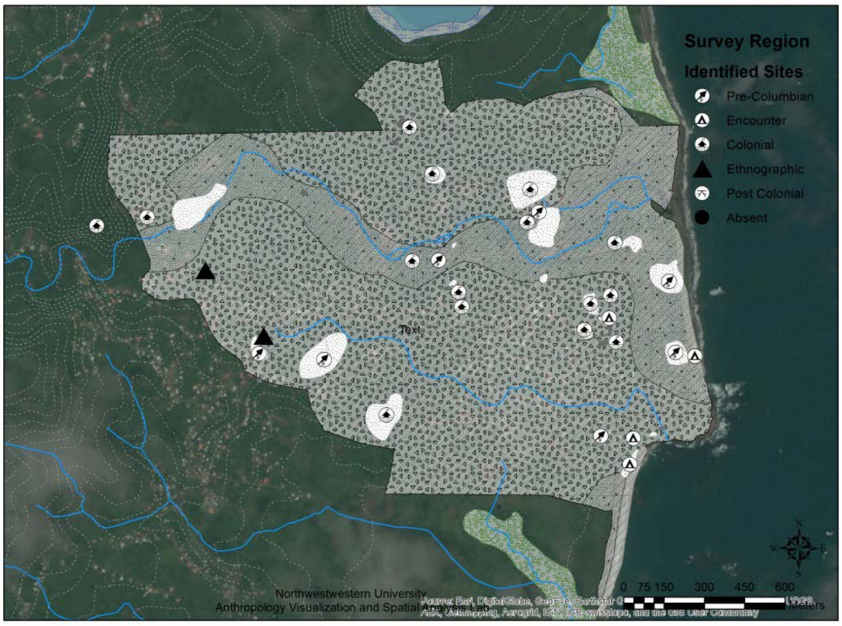

Figure 48. Survey Region

We employed standard archaeological procedures for surveying fields. These procedures included walking fields in transects at 10 meter intervals. Given the continuous occupation of the region, we adopted the following criteria. Ground scatters were considered any area that had greater than 10 artifacts per square meter. Once documenting a ground scatter, the extent of it would be mapped using a handheld GPS. When weather permitted, and the ground was visible, aerial photographs were taken of the scatters along with the surrounding landscape. This allowed for a creation of high resolution orthorectified images.

Diagnostic artifacts were used to help establish chronology (Table 5 Appendix). Non diagnostic artifacts were noted but not photographed or mapped. Unless necessary, artifacts were not collected, rather they were photographed in situ. When necessary, artifacts were bagged, washed and identified by the site name along with the locus (the term “locus” describe a location of archaeological interest which might be a component of a larger settlement or site or constitute a settlement or site in and of itself).

Identification of artifacts were made by a combination of Hauser, Hofman and Hoogland.

6.4.Results

The survey identified nineteen artifact scatters, three water mills, four boiling houses, two estate houses in ruins, three gardens and two pottery kilns (See Table 6 Appendix). Identified landscape features included mostly-modern water ditches, a possible clay mine, and residues of past agricultural practices. In total, the results provide a glimpse of Grenada's history from 200 AD to the present (Figure 49).

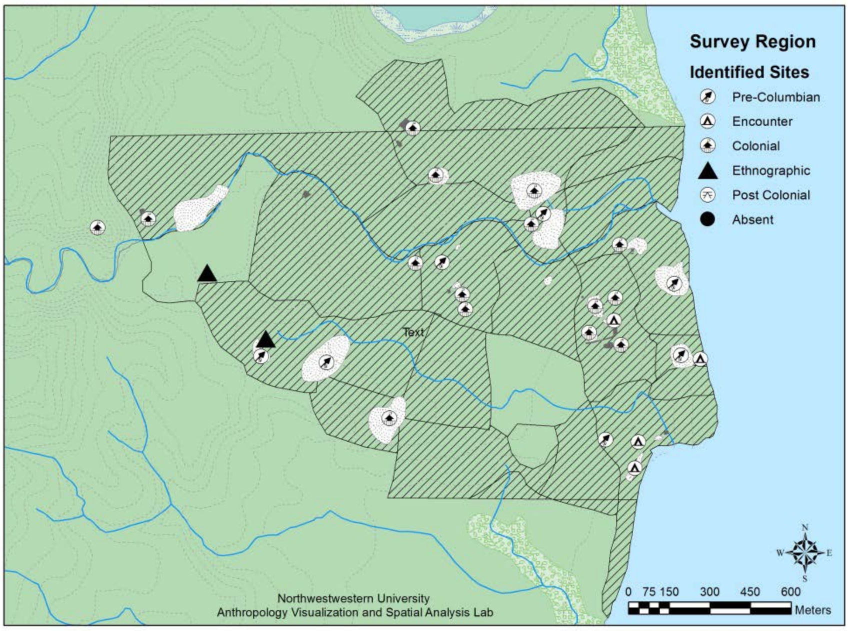

Figure 49. Survey Region. Identified Sites

Ten of the scatters, if not more, are pre-Columbian. In some cases, the team leader, Dr. Hofman was able to make conclusive identification based on diagnostic materials. Tree of the loci contained Saladoid material (Locus 4, 8, 10). One site contained Troumasoid material and two loci contained Cayo material (Locus 4, 5). The survey also identified scatters that contained non-diagnostic Amerindian materials (Locus 1, 2, 6, 11, 12, 32). The earliest indication of habitation in the documentary record came before the French landed in Grenada in 1649 (Nicolas-Francois Blondel). A number of precise indications of Amerindian settlements are depicted in Grenada. For example, in 1656, John Hawkins related the tale of the French privateer and slaver

Captain Jean Bontemps of the ship *Dragon Vert* who "came to one of those Islands, called Granada, and being driven to water, could not do the same for the cannibals, who fought with him very desperately two dates." (Hakluyt, 1552)

Figure 50. Locus 1

Figure 51. Locus 8

Nearly a century later, Commander Jan Jansz van Hoorn and his fleet anchored at a bay along the southwest coast of Grenada on 12 June 1629. The Amerindians of the island are described as being a very malicious people, who ran off upon the arrival of the Dutch. They could not be made to come and converse, but displayed extreme animosity, firing poisoned arrows at the crew from the thickets. The fleet departed again, laden with fresh water, ballast and lumber, but no victuals." The crew of Dutch ships "set foot on shore and had dig a number of holes on the beach to acquire fresh water. They had also gone a little inland to visit two villages where many Amerindians lived, who had received them in friendly fashion. These warned them of another group of Amerindians who lived on the other side of the island in the hills, who were evil and showed animosity to strangers and even them." (De Laet)

The survey also documented two potential encounter sites. The first was the locus of the excavation (locus 5) and then a scatter that dates to the latter half of the 17th century (locus 1). This latter scatter is located north of the abandoned primary school and is most likely the location of the Carbet document on the 1667 map. The French had landed in Grenada in 1649. Nicolas-François Blondel visited the West Indies in July 1666, under commission of Colbert, to look for harbors, make maps, and plan fortifications. The map he made of Grenada is located in the Bibliothèque Nationale. It shows a sparsely populated northeastern Grenada. On the southern bank, near River Antoine's mouth, Blondel depicted a small structure. The symbol used is similar to other icons signifying Carbets for 'Caribs' on the under colonized part of the Island. By April 1654, tensions had reached such an aggravated state when 14 French are killed in renewed attacks by the *Kalinago.* In June the French carry out an attack against the *Kalinago* on the eastern coast, killing 80 Amerindians, burning cabets and destroying gardens and canoes. This could have been at the cabet in the River Antoine area. Indeed, by 1688, Father de la Mousse estimated that only "two or three kabays of the Carib Indians, who are free, masters of themselves and separated from the French" existed on the island (Martin, 2013).

There are many late French scatters located in the survey region (1700-1763). Locus' 8, 30, and 33 all contain a high density of faience as well as French utilitarian pottery including Vallauris. These scatters are associated with a pottery kiln complex on the south side (feature 13,15, and 16). While this kiln was most likely in operation through the very earliest part of the British occupation, it appears to have been quickly abandoned in favor of growing and processing sugar. Feature eight is located on the north side of the River Antoine sugar estate on the north side of the river. The place name “Antoine” from which the river and estate are named is after a Kalinago captain who resided in the area.

The survey also document many artifact scatters created in the early British occupation (1763-1807) and late British occupation (1807-1838). Loci 2, 3, 7, 9, 31, and 34 all appear to be sheet midden deposits create in villages where enslaved laborers lived. Between 1640-1680, African slaves were introduced as labor in the British Caribbean for sugar production. More specifically, slaves were working in Grenada starting around 1675. In 1724, 68 years later, the plantation was owned by Cousin de la Blenerie who sold the property to Englishman Captain Grant in the mid-1760s. By the time the British annexed the island, in 1763, the property boundaries for River Antoine, Conference, Tivoli, Poyntzfield and La Poterie Estates were already established. A map published in 1763 entitled a New Plan of the Island of Grenada, held at the National Archives, UK, indicates property boundaries and estate function. This map indicates 3 water mills associated with sugar estates (Upper Conference, Tivoli, and River Antoine, one pottery (La Poterie), and one coffee estate (Poyntzfield).

Figure 52. Locus 34

The survey identified two loci with materials easily identified as post-emancipation (Locus 42, Locus 30). These scatters might be associated with villages established by indentured labor immigrating from South Asia. On 1 August 1838, apprenticeship was abolished, thus Grenada has the holiday Emancipation Day. Many workers continued on the Estate, some purchasing lands on the periphery and/or became, after 1897, peasant proprietors producing agricultural products from small plots of land. 1857 was the year the first East Indian migrants of indentured workers came to Grenada. By 1862 over 2,000 indentured servants had been introduced to Grenada from Malta, Madeira and India. Many of these indentures worked the land at River Antoine (River Antoine Estate).

Figure 53. Locus 42

In addition to systematic survey of the area of investigation, opportunistic reconnaissance was also conducted by the team at La Digue, Boulogne, Telescope, Lower Pearls, and Grand Bras, St. Andrew's Parish; Bedford Point, Savanna Suazey, Levara, David Point. These followed a multi-staged process, increasing in intensity from pedestrian survey and shovel test pit strategy. While the spectrum of archaeological remains was considered, special focus was placed on the recording and analysis of plantation sites and associated deposits.

One site was given special attention. During the 1795 rebellion, Fedon and his associates set up a base camp on the central spine of the island. A team composed of Mark Hauser, Evan Bhola, Angus Martin, Glaston Fletcher and Isaiah Peters travelled to the putative location of this camp to take aerial photographs. Upon reaching Second Camp, the team began to identify a number of artifacts: enlacing lead shot, pottery and glass bottles. These artifacts were found on the path and every attempt was made not to disturb their presence. The lead shot was mostly unused, although one appears to have been fired. Ceramics include French faience, Creamware, and Pearlware. Bottle Glass was also recovered. The bottle bases appear to have been dip molded. These ceramics and glass are consistent with an occupation dating to the last quarter of the 18th century. The lead shot, while not unique to military sites, are consistent with that function.

6.5. Discussion

The archaeological survey of La Poterie, Grenada was successful in three domains. It has developed baseline data to develop questions about the changes in settlement patter in the immediate aftermath of colonial encounters in the 16th century. Second we identified discrete deposits for future investigations that might help answer these questions. Finally, the survey provided an inventory of La Poterie's cultural heritage.

- By documenting the archaeological sites, as well as the heritage of the region we can begin to understand the broader counters of colonial encounters in the region and its enduring impacts. Specifically, we have developed several hypotheses that further investigation will help answer. We hypotheses that there is a general movement inland by Amerindian populations in the wake of colonial encounter. We also hypothesize that many of the European settlements, La Poterie and River Antoine were located on top of the most recent manifestations of indigenous settlement. Finally, we hypothesize that there was interaction between Amerindians and Africans informing many of the practices that remain in Grenada today?
- There are four sites that merit immediate attention.
  - o We hypothesize that locus 1 is the site of the Carbet depicted on the 1667 map. Area excavations, following procedures employed in 2016, would reveal the layout of the structure and the materials recovered from these excavations would confirm its chronology.
  - o River Antoine Estate is a multi-component site with occupations as early as 200 AD continuing up until the post emancipation era. We suggestion immediate attention be paid to the late French and early British slave villages. We suggest a strategy of shove test pits to define the size and chronology of the villages followed by targeted house area excavations to establish village layout and artifact content.
  - o Conference Estate contains one of the few examples of an early 18th century French estate house and an artifact scatter consistent with an indentured laborers village. We suggest targeted excavations testing

both phases to help develop a long term picture of La Poterie's heritage.
    - We highly recommend a project to survey and map Fedon's Camp. This is a site outside of the La Poterie Heritage zone but is of enormous significance to Grenadian, Caribbean and World History. We know very little about the size and content of camps like these throughout the Caribbean. To map this site would be the first step in developing an important heritage site for the Caribbean.
- Archaeological Survey has revealed four domains worth further exploration in the La Poterie Heritage Zone.
    - The Amerindian Past. Given the differential preservation of sites associated with Grenada's first inhabitants and a general tendency to emphasize the colonial past, there is little known about the continued contributions of Grenada's Amerindian population on the present. A combination of archaeological, oral historical, and ethnographic information can be marshaled in highlighting this part of the past.
    - Slavery and its Legacy. Slavery and its legacy is a major part of the archaeological landscape of Grenada. There has been no research on slavery and its aftermath in Grenada as it relates to the archaeological record. This is a shame since many of the unique and important traditions developed in Grenada were formed during this time period. By focusing on slave life, rather than slavery, Grenadians can explore their unique contribution to Caribbean history. This not includes highlight the African contribution but the contribution of indentured laborers as well.
    - There is an opportunity to ethnographically document many important traditions in La Poterie. Basket Weaving, Pottery making, Drumming, Dancing, and Singing are all practiced today or have been practiced in living memory. A systematic investigation of these cultural elements would be important for support the heritage zone efforts, but also the interpretation of archaeological sites in the region.

6.6. References

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6.7. Appendix

Type	Phase	Terminus Post Queum	Reference
Saladoid	Pre columbian	200	
Suazoid	Precolumbian	1200	
Cayo	Encounter	1400	
Seville Blue on Blue	Encounter	1550	
Ligurian Blue on Blue	Encounter	1550	
Olive Jar	Encounter	1490	
Saintonge	Early French	1630	
Albisola	Early French	1650	
Delft Blue on White	Early French	1630	
Faience Provence	Late French	1700	Waselkov and Walthall 2002
Faience Britanny	Late French	1750	Waslekov and Walthall 2002
Faience Normandy Blue on White	Late French	1685	Waslekov and Walthall 2002
Faience Rouen Blue on White	Late French	1690	Waslekov and Walthall 2002
Faience Rouen Polychrome	Late French	1740	Waslekov and Walthall 2002

Type	Phase	Terminus Post Queum	Reference
Dip Mold Blown Bottle	Late French	1730	Jone 1983: 168
Faience St Cloud Polychrome	Early, Late French	1675	Waslekov and Walthall 2002
Creamware	Early British	1762	Noel-Hume 1962
Pearlware	Early British	1779	Miller 1987
Variegated P/Cware	Early British	1782	Noel-Hume 1962
Willow Pattern	Early British	1792	Noel-Hume 1962
Whiteware	Early British	1802	Noel-Hume 1962

Table 5. Diagnostic Artifacts used in survey to identify site

	Type	Diagnostic	Phase
1	Scatter	Amerindian, Delft, Albisola, Faience	Encounter/Early French
2	Scatter	Amerindian, Creamware, Pearlware	Pre-Columbian, British
3	Scatter	Creamware, Pearlware, Dip Molded Bottle Glass	British
4	Scatter	Salidoid, Cayo (Possible)	Precolumbian
5	Scatter	Cayo, Spanish Majolica, Whiteware	Encounter
6	Scatter	Amerindian	Encounter
7	Scatter	Creamware, Pearlware, Mortar, Dip Molded Bottle Glass	British
8	Scatter	Albisola, Faience, Saladoid, Sugar Ware	Precolumbian, Late French

	Type	Diagnostic	Phase
9	Scatter	Creaware, Pearlware, Whiteware, Dip Molded Bottle Glass	Early British
10	Scatter	Saladoid, Troumasoid, Amerindian	Pre Columbian
11	Scatter	Amerindian, Ethonographic	PreColumbian
12	Scatter	Amerindian	Pre Columbian
13	House		Late French
15	Kiln		Late French
16	Kiln		Late French
17	Water Mill		Early British
18	Boiling House		Early British
19	Home		Modern
20	Cistern		Early, Late British
21	Home		Early, Late British
22	Garden	Pearlware	Early, Late British
23	Garden	Pearlware	Early, Late British
24	Garden	Whiteware	Early, Late British
25	School		Modern
27	Scatter	Sugar Ware, Tile	Early British
28	Clay Mine	Sugar Ware	Late French, Post Emancipation

	Type	Diagnostic	Phase
29	Mud Oven		Modern
30	Scatter	Faience, Creamware, Pearlware	Early British
31	Scatter	Faience, Creamware	Late French, Early British
32	Scatter	Amerindian	Pre-Columbian
33	Scatter	Sugar Ware	Late French
34	Scatter	Creamware, Whiteware, Pearlware, Ironstone	British
35	Scatter	Whiteware, Ironstone, Molded Glass	Post Emancipation
36	Boiling House		Early British
38	Boiling House		Early British
39	Water Mill		Early British
40	House		Late French
41	House		Early British
42	Scatter	White Ware, Molded Glass	Post Emancipation
43	Scatter	Pearlware, Whiteware	Late British

Table 6. Loci, Feature Type, and Diagnostic wares

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