Mapping sites, mapping expectancies, mapping heritage: the archaeological maps of St. Eustatius, Saba and Sint Maarten.

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Managing our past into the future

Archaeological heritage management in the Dutch Caribbean

EDITED BY

Corinne L. Hofman & Jay B. Haviser

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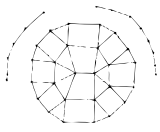

TABOUI NO.3
COLLECTION D'ARCHÉOLOGIE CARAÏBE
DIRIGÉE PAR BENOÎT BÉRARD

IN MEMORIAM

Willem J.H. WILLEMS

(1950-2014)

A dear friend and colleague

Champion of archaeological heritage management

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Chapter 18

Mapping sites, mapping expectancies, mapping heritage

The archaeological predictive maps of St. Eustatius, Saba, and Sint Maarten

Maaike S. de Waal, Jochem Lesparre, Jay B. Haviser, Menno L.P. Hoogland, Ryan Espersen and Ruud Stelten

Introduction

In March 2011, an archaeological values map was compiled for St. Maarten, the Dutch-side of the island of St. Martin. The mapping project was part of a broader cooperation program between St. Maarten and the City of Amsterdam, with involvement of the Bureau of Monuments and Archaeology, Amsterdam (BMA). The creation of the St. Maarten archaeological map was seen as a necessity within the construction of planning policies for the recently autonomous (2010) St. Maarten government, Planning Office (Ministry of VROMI). In 2012, the Dutch Ministry of Education, Culture and Science provided the St. Eustatius Center for Archaeological Research (SECAR), Oranjestad, St. Eustatius (Caribbean Netherlands) with the task of creating archaeological predictive maps for the islands of St. Eustatius and Saba.

The creation of archaeological maps, displaying archaeological values known to be present and outlining areas where such values might be expected, fits well in the system of Dutch heritage management which has set as primary goal that archaeological values should be preserved *in situ*. The creation of archaeological maps provides the first impetus for allowing archaeologists as well as planning officers to know which archaeological values are actually present in an area, and in which areas as yet unidentified values might be expected, to allow effective measures to be taken to preserve these remains *in situ*.

In the Netherlands, three different types of archaeological maps are being created and used. The first and most commonly known one is the archaeological map, or archaeological values map. This map displays the locations of sites identified in a specific area. The contours of the sites are usually outlined, in order to display their actual location and boundaries as accurate as possible, but maps with point locations (for example, showing the location of the center of an archaeological site) also occur. Archaeologists can also add expectancy zones to such a map, thus creating a second type of map: an archaeological predictive map. These zones indicate if there is a high, medium or low likelihood that archaeological sites could be present in an area. Such a map can be consulted in order to see if archaeological values might be expected. Finally, local governments and the Dutch Cultural Heritage Agency (Ministry of Education, Culture and Science) can also add advices and regulations to sites and zones displayed in archaeological predictive maps. By this, a third type of map is created, the so-called heritage policy map (*beleidsadvieskaart*). These advices and regulations are added in order to enforce specific actions aiming at further research or measures aiming at direct protection of sites and areas, to be acknowledged by developers and archaeologists, in order to ensure effective *in situ* preservation of the local archaeological heritage. The St. Eustatius, Saba and St. Maarten maps are archaeological predictive maps, all having expectancy zones added to the overview of archaeological values.

The creation of archaeological site inventories of St. Eustatius, Saba and St. Maarten

The first scholar who started to make an archaeological inventory for St. Eustatius was Jan P.B. De Josselin de Jong (1947). In the early 1980s Norman Barka continued the island site inventory, introducing the site identification system that is still being used today (Eastman 1996). While conducting an archaeological fieldschool in St. Eustatius for students from the College of William and Mary, Williamsburg, Barka started numbering archaeological sites present on the island, starting with SE1, being a warehouse site excavated in Lower Town, Oranjestad (Eastman 1996). Jay Haviser (1985a) made an initial island-wide field survey inventory in 1983, for the Archaeological-Anthropological Institute of the Netherlands Antilles (AAINA), while John Eastman (1996) made an inventory of all sites known in 1996. An official government Monuments Ordinance was established on St. Eustatius in 1989, with the goal of preservation for the most important of heritage sites (Haviser & Gilmore, 2011). The past decade, archaeologists of Leiden University and SECAR have continued mapping heritage sites on St. Eustatius using SE codes. Each time a new site is discovered, SECAR hands out a new site number, thus continuing Barka's and Eastman's numbering system. SECAR also keeps the data base with site records, which lists up to several hundreds of SE numbers until now, referring to sites on land as well as underwater.

Similarly to St. Eustatius, pioneering archaeological research on Saba was conducted by De Josselin de Jong (1947). An initial archaeological sites inventory was compiled by Haviser (1985b) again for the AAINA. Albeit the small village areas of the island were not inventoried in this first survey, he initiated the SB

code system of registry for the Saba sites. From 1987 till 1990 Hofman and Hoogland conducted a survey program in the Spring Bay area, Giles Quarter and The Bottom (Hoogland 1996). Subsequently, Frans Brugman (1995) published a detailed inventory of the historical monuments on Saba, including within the small villages. Into the 21st century, archaeologists of Leiden University and later the Saba Archaeological Center (SABARC) have continued to identify heritage sites for the island, all using the standardized SB code and registry system. Although the Saba government publicly recognizes the importance of monuments, it has yet to establish an official Monuments List.

The initial island-wide archaeological sites inventories for St. Maarten were more complicated due to the bi-national Dutch-French status of the island. Nonetheless, once again for the AAINA, Haviser (1988) conducted an initial field survey inventory of the archaeological sites for the entire island. He initiated the SM code system for sites on the Dutch St. Maarten sites registry, and some of the French side sites. However, later intervention by French archaeologists, with particular reference to the extensive work of Dominique Bonnissent (2008), required a separate registry system for the French side sites. It is in part due to the separate registry and recording systems, that until now an archaeological values map for the entire island, Dutch-French sides together, has not been compiled. The ongoing registry of heritage sites on St. Maarten, is predominantly being conducted by the St. Maarten Archaeological Center (SIMARC), as the government authority for this service. In 2000, the St. Maarten government established a Monuments Ordinance, with an official Monuments List registry.[35]

Starting point and approach

The starting point for the creation of the St. Eustatius and Saba maps was formulated by SECAR. First, the maps were supposed to provide overviews with archaeological site locations and expectancy zones to be used by planning officers and archaeologists. A first version of the maps would not need to distinguish between pre-colonial and historic sites or between pre-colonial and historic expectancy zones. Secondly, as conservation of archaeological heritage at the islands is at risk as a result of the continuing development of the islands, a quickly made first version of the maps was required, to be fine-tuned in later updates. Finally, SECAR preferred the maps to be visually similar to the predictive maps created by the Dutch Cultural Heritage Agency (Ministry of Education, Culture and Science) for the Netherlands.[36]

The archaeological maps of St. Eustatius and Saba were created by ARGEO*graph* (Maaike S. de Waal and Jochem Lesparre), based on information provided by SECAR (Ruud Stelten), SABARC (Ryan Espersen) and Leiden University (Corinne L. Hofman, Menno L.P. Hoogland and student Pieter Soffers).

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35 http://dcnanature.org/wp-content/uploads/2012/09/D10-SXM-MonumentsOrdinance-AB2000-01.pdf.

36 In the Netherlands this type of map is called *Indicatieve kaart archeologische waarden* (Indicative Map of Archaeological Values); (http://archeologieinnederland.nl/bronnen-en-kaarten/amk-en-ikaw).

The bases of the St. Eustatius and Saba maps consist of topographic information that is a selection of the GIS classes that have been provided by the St. Eustatius planning office in 2012. Some road sections have been added to the St. Eustatius map using local knowledge of Stelten and the satellite image. In both maps, a satellite image of the complete island served, together with the topographic information, as reference for mapping sites and expectancy zones.[37] The satellite image information turned out to be crucial in the creation of the maps, as it allows archaeologists to better pinpoint the locations of archaeological sites and zones of expectancy, as they have much more detail about the physical environment when compared to the topographic information available for both islands.

The St. Maarten Heritage Map, as the first of these three maps, was created from a cooperation between the St. Maarten Ministry of VROMI (Planning Office), the SIMARC (Jay Haviser) and the BMA (Jerzy Gawronski). The National Archaeological-Anthropological Museum (NAAM) on Curaçao provided some initial contact assistance. The technical aspects of the actual map compilation were coordinated by BMA (Bas van Sprew and Sander IJzerman). The concept of the St. Maarten archaeological value map was to have an easy-access reference source for heritage sites, as well as an expectancy model for potential heritage sites on the island, in order to facilitate planning permits, zoning, and inspections approvals for the government. The intention of the St. Maarten archaeological map was the integration of archaeology databases into the spatial planning goals of the Ministry of VROMI, as a part of the zoning plans. This was intended for compliance with the Valetta Convention, and allowing the government of St. Maarten to maintain high-standards for cultural heritage preservation.

Creating the St. Eustatius map

The St. Eustatius map contains 7 classes. These consist of 1) archaeological sites, 2) excavated archaeological sites, 3) archaeological walls (with an uncertain position), 4) historical city, 5) high archaeological expectancy, 6) medium archaeological expectancy and 7) low archaeological expectancy (Figure 18.1).

The archaeological site inventory of SECAR (version March 2013) provided a starting point of which sites needed to be mapped. The sites are displayed as complexes (such as plantations), not showing individual structures such as houses or cisterns. Wall complexes have also been indicated as sites, where possible. Isolated walls are marked individually. Most of the archaeological sites and walls were mapped by RTK GPS surveys or by satellite image mapping using local knowledge of Stelten and Hoogland. The RTK GPS surveys were carried out by Leiden University students in 2011 and 2012 (Gilmore *et al*. 2011). As reference, a list of horizontal coordinates of DP reference points was used, with height information from a 1963 topographic map.[38] Walls mapped during the 2008 Northern Hills

37 The St. Eustatius satellite image is a WorldView-2 satellite image of 18 February 2011, purchased by SECAR from MapMart. The Saba satellite image is a Ikonos-2 orthorectified satellite image of 23 November 2007 14:55 GMT, purchased by ARGEOgraph from e-GEOS.

38 *St. Eustatius topographic map by KLM Aerocarto*, published by the Cadastral Survey Department of the Netherlands Antilles in 1963.

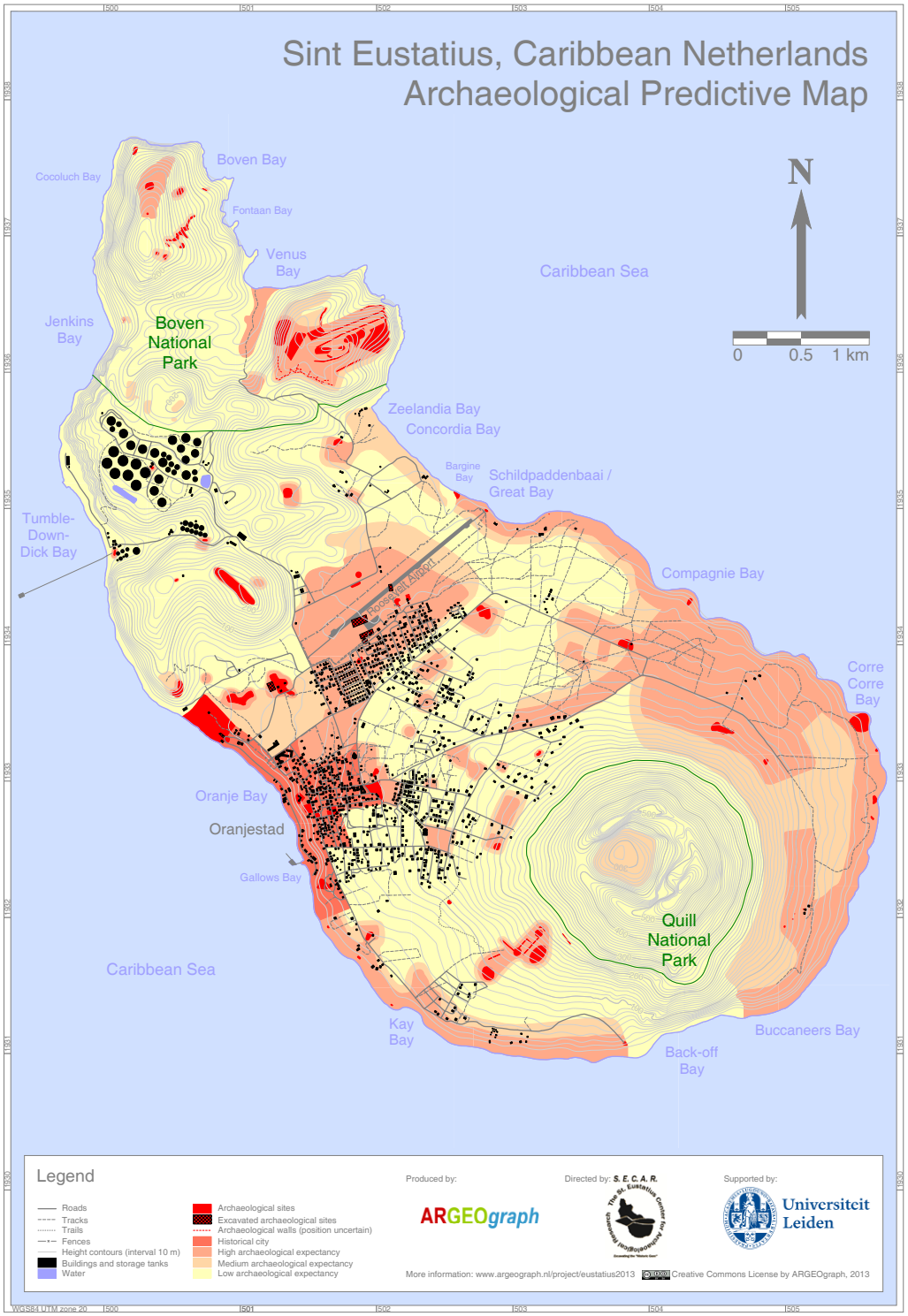

Figure 18.1: Archaeological Predictive Map, St. Eustatius, Caribbean Netherlands, March 2013 (ARGEOgraph, SECAR and Leiden University); (size reduced to fit page, scale unknown).

survey by Grant Gilmore (then SECAR archaeologist) have also been added to the map, representing dotted lines suggesting their approximate handheld navigation GPS location in the landscape if these walls could not be retraced in the field in 2012 due to accessibility problems and if they could not be retraced in the satellite image of the island either. Last but not least, the Golden Rock site location has been copied from the Golden Rock report (Versteeg & Schinkel 1992).

A special class on the map is taken by the historical city of Oranjestad. The historic city has a high expectancy and can be considered to be one large site, as long-term and relatively intensive habitation has occurred here over the centuries. The historic city has been mapped using the city outlines of the 1781 and 1916 maps of the island.[39]

Finally, the expectancy zones have been added to the map. Zones have been labeled as having a high expectancy for archaeological values when they directly border known archaeological sites of which the limits have not yet been well established, and the archaeological remains can be expected to expand beyond the indicated site boundaries. They have also been labeled as having a high expectancy when they offer attractive conditions for pre-colonial habitation or exploitation (based on expert knowledge of Stelten, Soffers and De Waal). Finally, if areas are indicated on the 1781 map (note 39) as being the location of a plantation, of which the remains have not (yet) been discovered, these areas have also been awarded a high expectancy.

Zones have been labeled as having a medium expectancy for archaeological values when they immediately surround a zone of high expectancy, thus creating a buffer area towards low expectancy zones, taking local topography into account. Other zones of medium expectancy have been identified on the presence of mediocre conditions for pre-colonial habitation or exploitation (based on expert knowledge of Stelten, Soffers and De Waal). Areas appearing on the 1742 map of the island, giving the approximate location of a plantation, of which the remains have not (yet) been discovered, have been assigned a medium expectancy too.[40] Finally, areas labeled as sites during the 2008 Northern Hills survey mentioned above, even though these site locations could not be retraced in the field in 2012, have been labeled to have a medium expectancy too. One additional area has been assigned a medium expectancy: the crater of the Quill volcano. Even though no material cultural remains have been found as yet at this location, quite surprisingly ecological signs of human presence have been discovered (fruit trees that were possibly planted by run-away slaves).

The remainder of the island has been classified as having low expectancy for archaeological values.

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39 Topographic map St. Eustatia, Topographically Drawn & Humbly Dedicated to his Excellency General Vaughan Commander in Chief of His Majestys Forces in the West Indies created by P.F. Martin in 1781, obtained from William L. Clements Library University of Michigan Manuscripts Division, John Vaughan Papers, Maps 7-F-8; Topographische kaart van Sint Eustatius, schaal 1:20.000. Map printed by J. Smulders & Co. in 1916.

40 Plaan van St. Eustatius, map created by an unknown carthographer in 1742, obtained from Algemeen Rijksarchief 4.MIKO 339.

Creating the Saba map

The Saba map contains 5 classes. These consist of 1) archaeological sites, 2) historical city, 3) high archaeological expectancy, 4) medium archaeological expectancy and 5) low archaeological expectancy (Figure 18.2).

The archaeological site locations shown on the map were based on surveys carried out by Haviser in the 1980's (Haviser 1983, 1985b), by Hoogland and Hofman from the 1980's until 2013 (Hoogland, pers. commun. 2014 and 2015) and by Espersen from 2008 until February 2015 (Espersen, pers. commun. 2014 and 2015). Similarly to the St. Eustatius map, the sites are displayed as complexes (such as plantations), not showing individual structures such as houses or cisterns. Differently from the St. Eustatius map, excavated areas have not been indicated. Extensive terracing (possibly related to the agricultural periphery of Palmetto Point, on the northwest of Saba) is indicated as a site. Individual terraces have not been mapped. The archaeological sites are mapped by satellite image mapping using expert knowledge of Espersen and Hoogland or by handheld navigation GPS survey data acquired by Espersen during surveys in 2013 and 2014.

The class 'historic city' has been mapped using the outlines of The Bottom as indicated by Espersen, based on expert knowledge. These outlines have been checked on the 1816 and on the 1850 maps of Saba.[41] This class has a high expectancy and can be considered to be one large site, as long-term and relatively intensive habitation has occurred here over the centuries.

Similarly to St. Eustatius, on the Saba map zones have been labeled as having a high expectancy for archaeological values when they directly border known archaeological sites of which the limits have not yet been well established, and the archaeological remains can be expected to expand beyond the indicated site boundaries. They have also been labeled as having a high expectancy when they offer attractive conditions for pre-colonial habitation or exploitation (based on expert knowledge of De Waal and Hoogland). A specific type of attractive condition on a steep island like Saba is the presence of flat or relatively flat areas. These areas, identified using contour lines (as provided in the St. Eustatius planning office GIS data) and Google Earth views (consulted in April 2014), have also been assigned a high expectancy. Finally, if areas are indicated on the 1850 map (note 41) as being the location of activity of which the remains have not (yet) been discovered, these areas have also been awarded a high expectancy.

Similarly to the St. Eustatius, on the Saba map zones have been labeled as having a medium expectancy for archaeological values when they immediately surround a zone of high expectancy, thus creating a buffer area towards low expectancy zones taking local topography into account. Other zones of medium expectancy have been identified on the presence of mediocre conditions for pre-colonial habitation or exploitation (based on expert knowledge of De Waal and

41 The Island of Saba, by Capt E.H. Columbine, RN. With view of part of the Island. About 2½ inches to 1 mile. Published by the Admiralty, 1816. Held by the National Archives, Kew; West Indies, Leeward Islands, St. Christopher and Nevis, surveyed by Capt. E. Barnett, assisted by J. Ward & W.F.B. Edwards, H.M.S. Thunder, 1848. Eustatius and Saba, surveyed by Lieut. G.B. Lawrance, Lieut. W. Mooney and J. Parsons, H.M.S. Scorpion, 1850. National Maritime Museum, Greenwich, London.

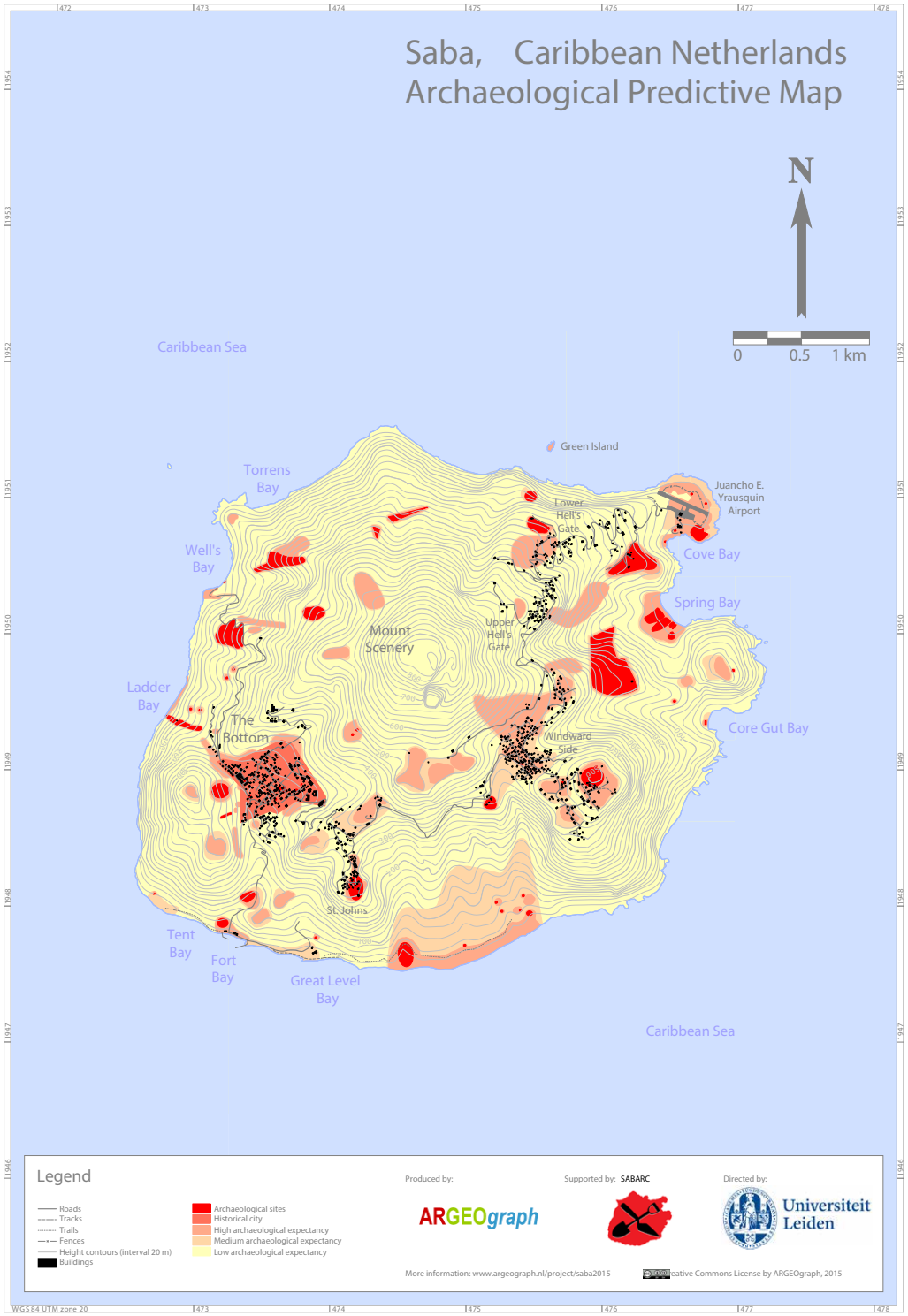

Figure 18.2: Archaeological Predictive Map, Saba, Caribbean Netherlands, February 2015 (ARGEOgraph, Leiden University and SABARC); (size reduced to fit page, scale unknown).

Hoogland). In addition, an area between English Quarter and the trailhead to Spring Bay, referred to in a book of sales records, between 1815-1875, as being a location to be used as government burial ground for the poor (Espersen, pers. commun. February 2015), has also been labeled to have a medium expectancy.[42]

The remainder of the island has been classified as having low expectancy for archaeological values.

Creating the St. Maarten map

There are three basic heritage database maps assembled into the St. Maarten Heritage Map, each laid over the topographic map of 1987 (Figure 18.3). The primary heritage map represents a detailed compilation of historical and archaeological data sets by the SIMARC (Haviser). It includes all heritage research results that were known in 2011, including the 50 registered monuments and various other known heritage sites for the Dutch-side of the island. In addition to tangible heritage sites, locations of significant intangible heritage were also noted on the map. This primary heritage database map was then complimented by the historical Werbata Map from 1916 which indicates unique features of the cultural and natural landscape, such as dry-stone boundary walls, wells, and house structures present in 1916.[43] The database includes images of specific monument sites, site descriptions and GPS coordinates. The second and third map consist of a pre-colonial expectations value map and a historical expectations value map, each with the intention to delineate zones of high or medium expectation values, based on the compiled data sets and the 1916 Werbata map indicators. High expectancies for archaeological values have been indicated for areas that had concentrations of house structures in 1916, and for areas where shoreline access is most feasible. These high-value designations require an archaeological inspection report to be submitted to VROMI for any development or building plans within those areas. The usefulness of these various layers of specific heritage data and the expectation values mapping has proven to be very significant for the Ministry of VROMI in evaluating development policies and controlling specific planning projects.

Precision: the St. Eustatius and Saba maps

Due to the use of satellite images, handheld GPS and RTK GPS without reference station data, and recent and historic topographic maps, the precision of most of the St. Eustatius map has been estimated to be less than 10 m, whereas the precision of most of the Saba map has been estimated to be about 10 m. This is acceptable for mapping at scale 1 : 10 000 as it corresponds to 1 mm in the map.

For many sites on St. Eustatius, and a few on Saba, handheld navigation GPS survey data were available. Their precision is less than 10 m, which is acceptable for mapping sites. Many sites on St. Eustatius had been positioned using RTK GPS survey data, obtained in 2011. These have a precision of less than 0.1 m, which

42 Saba Sales Records 1815-1875, Will Johnson Collection, Saba: 20/1/1873.

43 *Topografische kaart van Sint Martin (Nederlandsch gedeelte)*, scale 1:20,000, created by J.V.D. Werbata, 1916. Lith. J. Smulders & Co., Den Haag.

Figure 18.3: Heritage Map. Sint Maarten: Archaeological map, March 2011 (Ministry VROMI, SIMARC, NAAM, BMA); (size reduced to fit page, scale unknown).

is more precise then needed for mapping sites. Some problems with the reference station during the 2012 RTK GPS survey resulted in degradation of precision. The precision of these coordinates is less than 0.1 m for points where reference station data was available and less than 10 m for points where reference station data was not available.

For almost all sites in Saba, and for a few in St. Eustatius, no coordinates were available. The locations of these sites have been drawn in the map manually, using the terrain features visible in the satellite image, based on the expert knowledge of researchers familiar with the archaeology and the physical environment of these islands. However, it is obvious that mapping a site in a densely vegetated area may turn out to be less precise when compared to mapping a site in an area with recognizable topographic features one can rely on for orientation. The Saba satellite image is an orthorectified, pansharpened RGB image with 0.8 m resolution. Its 19 degree off-nadir viewing angle is orthorectified with an accuracy of 10 m. This results in mapped points with at best comparable precision, provided that nearby features are recognizable in the image. Many mapped points, however, are situated in densely vegetated areas and are expected to be less precise. The satellite image of St. Eustatius, however, is a non-orthorectified, pansharpened RGB image with 0.5 m resolution. Its less then 1 degree off-nadir viewing angle gives a predicted maximum relief displacement of 5.8 m. This results in mapped points with a precision of less then 10 m, provided that the points to be mapped are recognizable in the image.

The GIS data of the topographic layers for St. Eustatius, obtained from the St. Eustatius planning office, deviates from the satellite image and from the RTK GPS measurements. The mean offset is 15 m in northing and 3 m in easting, probably due to inaccurate transformation from a different coordinate reference system. The amount of offset of the topographic layers was estimated at 7 triples of corresponding points in the satellite image, mainly corners of buildings. The offset has been corrected graphically in the PDF maps.

The available historical maps could not be used without precaution either. It turned out to be difficult to geo-reference the 1742 and 1781 historic maps of St. Eustatius and the 1850 Saba map (notes 39-41), as the outlines of the islands and the local topography had not been mapped accurately. The maps have been used by applying as many control points as possible, but the inaccuracy of the historic maps could not be completely overcome. The 1916 map (note 39) could be geo-referenced more accurately. This map has a precision of less than 10 m due to it's scale.

Several other historical maps of the islands were too inaccurate to be geo-referenced at all, and could thus not be used. They have only been consulted as a general source of information.[44] Maps and site location sketches from Haviser's 1983 field notes and 1985 publication on his Saba surveys (Haviser 1983, 1985b), as well as maps from Hoogland's PhD thesis on pre-Columbian Saba (Hoogland 1996) could not be geo-referenced either. These maps have thus not been used,

44 These maps have not been listed in this publication, but full lists of sources consulted have been listed in the colophons that accompany the St. Eustatius and Saba maps (http://www.argeograph.nl/projecten.htm).

which is also why information on excavated areas is lacking from the Saba map, but they have been consulted as a general source of information instead.

The mapping of areas with high expectancies for colonial habitation and use has been based on the study of historical maps and known historic sites. For mapping areas with high expectancies for pre-colonial habitation and use, the landscape itself was considered. As described elsewhere (De Waal 2006:20), mapping areas with attractive conditions for pre-colonial habitation usually concentrates on identifying "factors related to physical aspects of the landscape [...] associated with subsistence, extraction or exploitation of natural resources and other environmental factors such as the presence of flat areas that may allow habitation, accessibility by sea through the presence of canoe landing spots, and viewpoints and strategic locations that may be considered important for defence and observation". It is acknowledged that social, political and ceremonial factors have not been taken into account when assessing areas for the possibility of having been used by people in the pre-colonial past, simply because these factors are unknown. The focus on physical natural characteristics has provided a standardized way of evaluating attractiveness during pre-colonial times.

The distinction between attractive and mediocre conditions for pre-colonial habitation or exploitation admittedly remains a subjective one. Most important, however, is that areas where archaeological remains might be expected are on the map, in order to make sure that they will not be neglected. Expectancy zones indicated need to be tested, verified, monitored and, if necessary, modified on the map.

Precision: the St. Maarten map

For the St. Maarten map, no recent digital topographic map was available, the available and usable topographic map, dating from 1987, clearly reflects several topographic features that either no longer exist or have been altered. In addition, post 1987 features are not indicated on the map. The St. Maarten map is also lacking SIMARC's Heritage Tree GPS database as a result of measurement inconsistencies.[45]

Results

For St. Eustatius and Saba archaeological predictive maps have been created (Figures 18.1 and 18.2). The maps are entitled 'Archaeological Predictive Map, Sint Eustatius, Caribbean Netherlands (March 2013)' and 'Archaeological Predictive Map, Saba, Caribbean Netherlands (February 2015)'. The St. Eustatius map displays all archaeological information available in March 2013, whereas the Saba map is up to date as recently as February 2015.

45 SIMARC has compiled a handheld navigation GPS database of Heritage Trees for the Dutch side, identifying over 280 tree locations for trees having trunks over 1 meter diameter.

Both archaeological maps have been made available in a directly printable PDF format, one at B1 paper size for printing at scale 1 : 10 000 and one at A3 paper size for printing at scale 1 : 25 000.[46] In addition, the digital archeological map classes as listed in the legends of the maps, have been provided as ArcGIS shape files to the planning officer of St. Eustatius and to the archaeologists of SECAR and SABARC. These GIS files will help planning officers and archaeologists to combine the archaeological data with other geographic maps and satellite imagery in GIS software. Planning officers can thus advise developers about the archaeological values present in areas they wish to develop, before they start disturbing the areas. As with all GIS data however, the user should be aware of the limitations by the precision of the data when zooming in. Archaeologists can use the maps in studying site patterns and landscape use in the past, but they can also use the maps to fine-tune their investigations to areas where sites might be expected, but have not been identified yet. In short, the maps display practical overviews of the locations and boundaries of the archaeological sites that were known on the islands at the moment the maps were produced, and they provide information on areas to be investigated for the actual presence of archaeological remains as they have high or medium expectancies for archaeological values.

For St. Maarten an archaeological predictive map, entitled 'Heritage Map St. Maarten (March 2011)', has been created. This map displays all archaeological information available for the Dutch side of St. Martin in March 2011. It consists of three maps that have appeared in a directly printable PDF format on A0 paper size for printing at scale 1 : 10 000. These include the archaeological values map (Figure 18.3), a predictive map for pre-colonial heritage and a predictive map for historical heritage. The St. Maarten Heritage Map has become officially incorporated as an essential element in the Ministry of VROMI implementation of cultural heritage preservation, through its placement (including a site database), directly in the main-frame computers for the Ministry. Thus, the various sectors within the Ministry VROMI, such as the Permits Office, Planning Office, Inspections Office, Policy Office and Public Works Office, each have direct access to the data, and they are utilizing that access regularly for more effective and efficient heritage preservation. Thus, the St. Maarten archaeological map is a spatial planning instrument, which includes an explicit predictive function, thereby allowing the integration of archaeology in the early stages of building and development plans for the island. It has already proved to be an effective means to control the loss of heritage sites. Furthermore, the St. Maarten Heritage Map is also utilized by the Monuments Council, SIMARC, and other Ministries within the St. Maarten government, such as the Ministry of Culture and Education, for public education and heritage awareness programs. Finally, as noted earlier, the dual system of data sets and recording systems for the Dutch and French sides of the island resulted, for timing and logistical reasons, in only the Dutch side being represented on this map. It is hoped that into the future, a complete island-wide archaeological map will eventually be composed, as a bi-national project.

46 The St. Eustatius map can be downloaded from http://www.argeograph.nl/project/eustatius2013/beschrijving.htm. The Saba map can be downloaded from http://www.argeograph.nl/project/saba2015/beschrijving.htm.

Heading for the future

By pointing attention to presence of archaeological sites and the location of possible areas of interest used in the past, which are worth being remembered and taken care of, archaeological maps are great tools for archaeologists, planning officers, developers and the interested public. As they provide knowledge to all parties about where sites and areas of interest are located and about what their boundaries are, they can also serve as tools that help monitor and protect archaeological areas. In addition, they form a valuable educational tool for community involvement with their heritage.

It is important to realize, however, that archaeological maps are not representing static situations. They reflect the current state of knowledge at a specific moment in time. As the state of knowledge will increase and new field observations will become available, the maps need to be adjusted accordingly. The St. Eustatius and Saba maps have been created with the idea that a first quick map version should appear and that map updates should be made within one year after release. In addition, the creators of all three of these maps have recommended additional updates at least every five years following the refined map versions, in order to keep up with the ever extending knowledge about cultural heritage and past use of the landscape. However, due to budget limitations no updates are expected within the time frames mentioned above.

For the updates, besides mapping newly discovered sites or updated information on known sites and zones of expectancy, the creators of the maps have already recommended several improvements, including adding underwater archaeology sites, Second World War sites, monumental trees and places of remembrance. In addition, adding site data to the GIS layers, including site ID's and digital site information, mapping excavated areas (on Saba) and distinguishing between pre-colonial and historic sites and pre-colonial and historic expectancy zones (on St. Eustatius and Saba) will improve the usability of the maps.

Another important aspect to realize is that unlike the St. Maarten Heritage Map, the St. Eustatius and Saba maps have no legal status yet. The St. Eustatius map, for example, has been made available to the town planning office, both in GIS and pdf formats. This was requested by the Ministry of Education, Culture and Science when initiating the mapping project. Using the map, planner officers can accurately inform developers about chances that archaeological remains are, or can expected to be, present in areas to be developed. However, no archaeological sites or areas within the landscape have been assigned a status as (protected) archaeological monuments by the island government yet, and there is no archaeological research agenda for the island with outlined and detailed requirements for archaeological research that should be undertaken when considering development of specific areas on the island.[47] As long as such local government regulations and archaeological

47 The Dutch Cultural Heritage Agency (Ministry of Education, Culture and Science) formulated specific research agendas for all different archaeological regions in the Netherlands. These agendas list the current state of affairs, crucial research questions, sets of research regulations and best practices for all regions. The region of the Caribbean Netherlands is not included (http://archeologieinnederland.nl/bronnen-en-kaarten/archeoregios-0).

advice for different areas in St. Eustatius are lacking, no effective actions can be enforced upon developers in order to protect the islands cultural heritage. Creating the maps has been a first step. A second and crucial step must now be taken, to harness the islands archaeological heritage with actual legally enforced protection, with strict guidelines connected to the areas indicated on the archaeological maps, in order to ensure heritage continuity for future generations.[48]

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48 The maps of St. Eustatius and Saba were created by ARGEO*graph* in MapInfo. M. Verbruggen (MA), director of RAAP Archeologisch Adviesbureau (the Netherlands), was so kind as to allow ARGEO*graph* to use one of RAAP's MapInfo licenses.

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