HURRICANE SANDY DISASTER RELIEF GRANT
PHASE I AND PHASE II ARCHAEOLOGICAL SURVEY
BLOCK ISLAND, NEW SHOREHAM, RHODE ISLAND

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MANAGEMENT ABSTRACT

Block Island is highly susceptible to erosion from large storm events and was heavily impacted by Hurricane Sandy on October 29, 2012. Sustained wave heights in excess of 29 feet (ft) were recorded at a buoy southeast of Block Island, with the largest individual wave heights recorded at 47 ft. Combined with the three-day duration of the storm and a 5-ft storm surge, Hurricane Sandy had a devastating impact on the Block Island shoreline, undercutting bluffs and removing sand dunes that protected many of the coastal archaeological sites. As a result, the entire coastline of Block Island on the seaward side, and to a lesser extent the interior salt ponds, was affected.

The Rhode Island Historical Preservation and Heritage Commission (RIHPHC), supported with funding from the Hurricane Sandy Relief Grant Program, awarded a contract to the Mashantucket Pequot Museum and Research Center to conduct Phase I (Site Identification) and Phase II (Site Examination) archaeological surveys of the Block Island coastline to identify archaeological sites damaged by Hurricane Sandy and to evaluate their eligibility for listing in the National Register of Historic Places (National Register) (RFP #7536370, Archaeological Survey of Block Island).

A Phase I Site Identification was conducted from April to October 2014. The survey consisted of a walkover reconnaissance of 25.7 miles (41.3 kilometers [km]) of Block Island coastlines, including 16.3 miles (26.3 km) of seaward and 9.3 miles (15 km) of salt pond shorelines, to identify any artifacts and features (HDADs–Hurricane-Damaged Archaeological Deposits) eroding from the bluffs and beaches. A total of 163 HDADs were identified during the Phase I survey. The HDADs were fairly evenly distributed along the seaward and salt pond shorelines with the exception of the extreme northeast and northwest seaward coastlines, where very few or no HDADs were identified.

A sample of 33 HDADs was selected for Phase II testing within five geographic regions. Selection criteria for Phase II sites included an assessment of archaeological potential, site complexity, integrity, and susceptibility to further damage (threat). Evaluated sites range in age from the Middle Archaic Period (8000–6000 years Before Present [B.P.]) through the Contact Period (circa [ca.] 350 B.P.), although the majority of the sites surveyed during the Phase II testing are associated with Early through Late Woodland period occupations (ca. 2700–450 B.P.).

The archaeological surveys of Block Island sites affected by Hurricane Sandy benefitted from parallel investigations of shoreline change on the island. The Rhode Island Shoreline Change (Beach) Special Area Management Plan (SAMP) conducted research on the rates and magnitude of coastal erosion pre- and post-Hurricane Sandy. SAMP analyzed the erosion of bluffs along the shorelines of Block Island, Rhode Island, after Hurricane Sandy using cross-sectional profiles extracted from sequential Light Detection and Ranging (LiDAR) elevation models. This research indicates that where the elevation of the bluff crest was lower than 30 ft below Mean Lower Low Water (MLLW), the entire bluff face retreated during the storm. Bluffs from 30 ft to 45 ft above MLLW had a varied response to erosion; in some cases the entire bluff face retreated. Bluffs greater than 45 ft above MLLW saw erosion limited to the toe of the bluff and lower bluff face, although significant variation in the vertical limit of erosion was observed. These data have significant implications for calculating future impacts to National Register-listed and National Register-eligible sites situated along various sections of the Block Island coastline.

One of the ironies of the Hurricane Sandy disaster was the opportunity the Hurricane Sandy Relief Grant Program provided to conduct large-scale archaeological surveys along the entire Block Island seaward coastline that had seen very few systematic archaeological surveys. Previous archaeological surveys of Block Island documented a high frequency, density, and complexity of Woodland Period (3000–450 B.P.) and Contact Period (A.D. 1500–1700) archaeological sites located on landforms immediately adjacent to the interior salt ponds, with far fewer and much less complex sites located on the bluffs along the seaward coastline. Larger and more complex permanent and semi-permanent village sites were believed to be located almost exclusively along the salt ponds with smaller temporary and task-specific sites associated with freshwater swamps and ponds throughout the interior and near coastal areas of the island. In the previous model, sites situated on the bluffs along the seaward coastline were not considered coastal sites, as their association with the shoreline was the coincidental result of erosion that brought the coastline closer. It was believed the primary focus of these sites was the exploitation of wetland resources associated with freshwater swamps and ponds. As such, it was assumed that only the numerous small and less complex temporary and task-specific sites, believed to be oriented toward the exploitation of freshwater wetland resources, were most at risk from erosion.

The identification of several large Woodland and Contact Period sites on the seaward coastline during the Hurricane Sandy surveys indicates that earlier reconstructions of Native settlement patterns on Block Island need to be revised. Complex Early Woodland through Contact Period spring seasonal fishing sites were identified, many of which are at very high risk from future storm events.

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CHAPTER ONE

INTRODUCTION

Block Island (Figure 1-1) is highly susceptible to erosion from large storm events and was heavily impacted by Hurricane Sandy on October 29, 2012. Sustained wave heights in excess of 29 feet (ft) (9.5 meters [m]) were recorded at a buoy southeast of Block Island, with the largest individual wave heights recorded at 47 ft (14.5 m). Combined with the three-day duration of the storm and a 5-ft (1.5-m) storm surge, Hurricane Sandy had a devastating impact on the Block Island shoreline, undercutting bluffs and removing sand dunes that protected many of the coastal archaeological sites. As a result, the entire coastline of Block Island on the seaward side, and to a lesser extent the interior salt ponds, was affected. President Barack Obama declared a state of emergency under the federal Stafford Act (42 U.S.C. 5121-5207) for the most heavily affected sections of Rhode Island, particularly Washington County, which includes Block Island. The declaration authorized federal agencies to begin immediate and coordinated assistance to the state, municipalities, and Rhode Island citizens. In the following months, major federal disaster recovery programs were funded through congressional appropriations, including the Emergency Supplemental Historic Preservation Fund (ES-HPF) administered by the U.S. Department of the Interior's National Park Service.

The Rhode Island Historical Preservation and Heritage Commission (RIHPHC) received federal funding through the ES-HPF and contracted with The Mashantucket Pequot Museum and Research Center (MPMRC) to conduct Phase I (Site Identification) and Phase II (Site Examination) archaeological surveys of Block Island's seaward and salt pond coastlines to assess and document Hurricane Sandy's impacts to cultural resources. The study area consisted of 16.3 miles (26.3 kilometers [km]) of seaward and 9.3 miles (15 km) of salt pond shorelines. This report presents the results of the archaeological surveys and serves as Deliverable 2: Hurricane Sandy Block Island Survey Technical Report, as outlined in the MPMRC's scope of work for the Hurricane Sandy Block Island Project ("Block Island Project" or "Project").

Authority

On January 29, 2013, the U.S. Congress enacted Public Law 113-2 authorizing emergency disaster relief appropriations to the states most affected by Hurricane Sandy. A total of $50 million was initially appropriated to the U.S. Department of the Interior's National Park Service for direct assistance to State and Tribal Historic Preservation Offices to address historic properties that were affected by Hurricane Sandy. The RIHPHC, supported by the federal ES-HPF-funded Hurricane Sandy Disaster Relief Grant Program, is directing and administering archaeological surveys and evaluations of archaeological sites damaged by Hurricane Sandy along Rhode Island's south coastal mainland and Block Island (Town of New Shoreham). The surveys along Rhode Island's south coast were conducted by The Public Archaeology Laboratory, Inc. (PAL) and the results were submitted in a separate report. Archaeological surveys of Block Island's seaward and salt pond coastlines were conducted under archaeological permits issued by the RIHPHC and undertaken on federal (United States Coast Guard [USCG]); United States Fish and Wildlife Service [USFWS)], state (Rhode Island Department of Environmental Management [RIDEM]), Town of New Shoreham, and private lands. Archaeological surveys conducted on National Wildlife Refuge (NWR) properties were conducted under an Archaeological Resources Protection Act (ARPA) Permit issued by the USFWS.

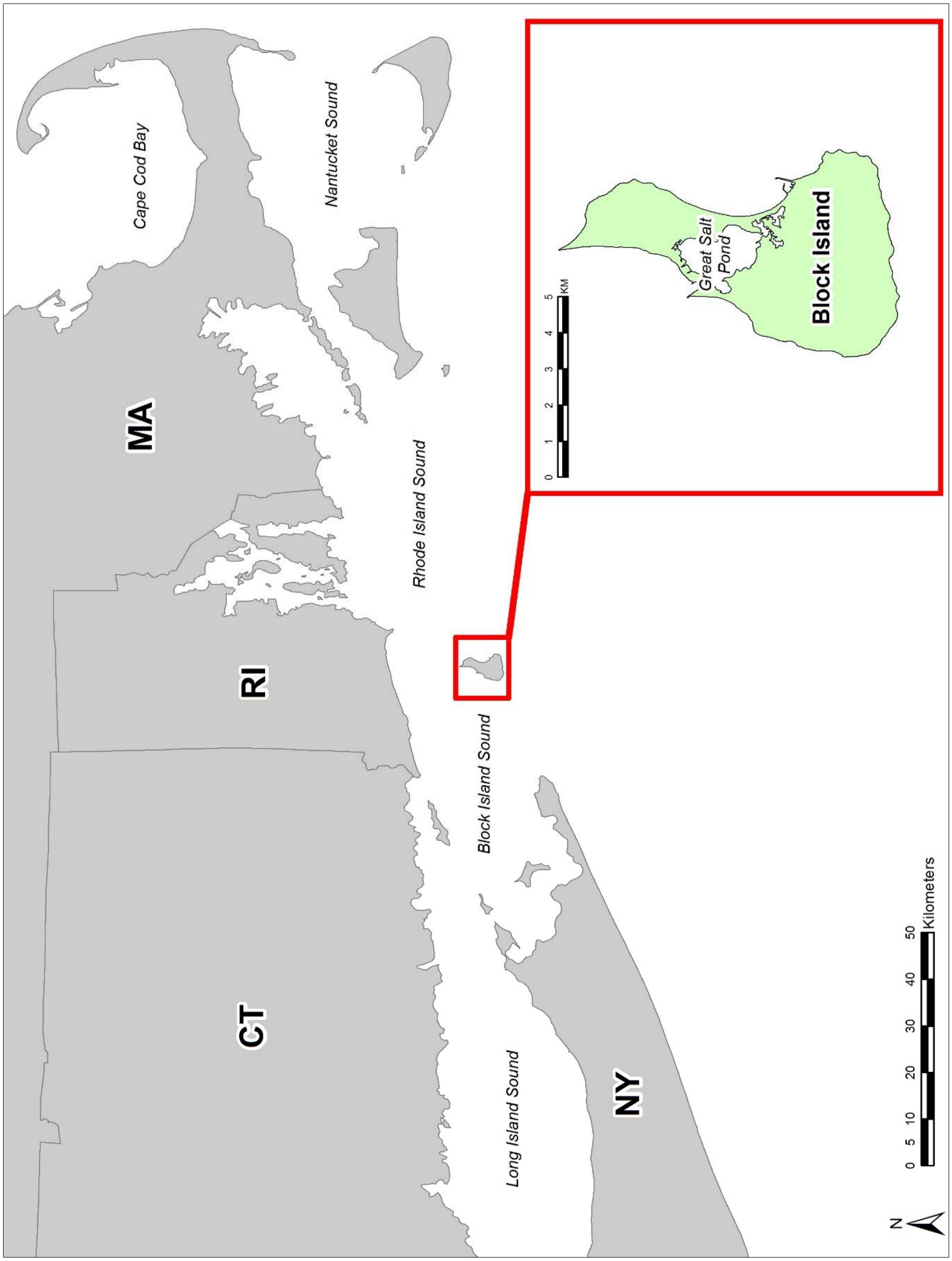

Figure 1-1. Location and geographic setting of Block Island.

Project Description

The RIHPHC, with funding from the Hurricane Sandy Relief Grant Program, directed that Phase I (Site Identification), hereafter Phase I, and Phase II (Site Examination), hereafter Phase II, surveys of archaeological sites in Rhode Island that were damaged by Hurricane Sandy on October 29, 2012, be conducted. The RIHPHC noted that a number of National Register-eligible archaeological sites were located along the South Coast (Washington County) and Block Island shorelines where Sandy's impacts were particularly intense and that damaged site areas were exposed to imminent erosion and collapse. The RIHPHC concluded that a broad systematic archaeological survey of these areas was necessary to identify archaeological sites damaged by Hurricane Sandy, to determine the full extent of damage to archaeological sites on Block Island, and to evaluate the National Register of Historic Places (National Register) eligibility of damaged sites according to their current conditions. The coastlines to be surveyed were to include private and public (federal, state, and municipal) lands.

MPMRC Scope

The RIHPHC identified the following tasks to be conducted as part of the Phase I and Phase II archaeological surveys:

1. Determine which portions of the Block Island study area will be reconnoitered for evidence of archaeological sites damaged by Hurricane Sandy. The Block Island study area was identified as Block Island's seaward and salt pond coastlines. Conduct background research in consultation with the Narragansett Indian Tribal Historic Preservation Office (NITHPO) to confirm the locations of previously recorded sites, identify archaeologically sensitive zones, and identify sites and areas of spiritual, cultural, and historic significance to the Narragansett Tribe. The RIHPHC determined that glacially deposited coastal fronts, such as banks and bluffs, were to be considered archaeologically sensitive, while barrier beaches and artificially reinforced shorelines were not considered sensitive;

2. Secure property access for those portions of the Block Island Project area that were selected for reconnaissance. Coordinate with appropriate federal, state, and local government agencies to access government-owned land. Obtain individual landowner permissions to access privately owned land, and obtain signed permissions for access and agreements to donate any artifacts recovered to the RIHPHC;

3. Conduct a Phase I survey along the beaches and below bluffs to identify and locate evidence of archaeological sites damaged by Hurricane Sandy.[1] Any locality where archaeological deposits, such as artifacts, features, and/or structural remnants were visibly exposed in a hurricane-damaged context were recorded as a *Hurricane-Damaged Archaeological Deposit* (HDAD). The Phase I survey was to be conducted in three-person teams, with two members inspecting for HDADs and another recording data. Standard RIHPHC site forms were to be completed for each HDAD and the location of each HDAD was to be recorded using a Differential Global Positioning System (DGPS) with sub-meter accuracy. If an HDAD was less than 5 m long, a single GPS point was to be taken in its center. If an HDAD was greater than 5 m long, GPS points were to be recorded at the mid-point and two ends. Two photographs were to be taken of each HDAD: one that depicts its soil matrix and another showing its position within the greater landscape. No excavations were to be carried out during the Phase I survey, although exposed soils were superficially trowel-scraped for inspection, and small geological cores/probes used. Artifacts were only to be collected if they had already eroded onto the beach below;

[1] RFP #7536371 used non-standard terminology for the phases of archaeological surveys in Rhode Island. At the request of RIHPHC, the survey terminology used in this report follows current RIHPHC guidelines.

4. Produce a summary memorandum of the results of the Phase I survey and submit it to the RIHPHC for review. The memorandum would locate and characterize all HDADs recorded in the Block Island study area, and provide recommendations on which HDADs should be subject to Phase II surveys. The memorandum would be reviewed in consultation with the NITHPO and the RIHPHC prior to Phase II surveys at selected HDAD localities. Phase II surveys were to be conducted across as many geographic settings as possible to maximize evaluation of the larger coastal archaeological record;

5. Coordinate with the RIHPHC in their consultation with the Rhode Island Coastal Resources Management Council. Obtain property owner permissions to conduct the Phase II surveys authorized by the RIHPHC, clearly informing landowners of the nature of the survey work;

6. Perform intensive archaeological fieldwork (Phase II surveys) to enable National Register evaluations of archaeological sites damaged by Hurricane Sandy. Fieldwork was to be confined to the immediate coastal margin that experienced Hurricane Sandy's impacts. Subsurface archaeological testing would be conducted within a testing corridor extending 10 m inland from the edge of coastal landforms, avoiding areas that remain naturally stabilized, such as those beneath sand dunes or those consolidated by dense root systems. Testing should begin at HDAD localities and expand along the testing corridor to define site areas. Test pits measuring 50-x-50 centimeters (cm) would be excavated at 5-m intervals to define site (and/or site locus) boundaries and to assess internal character. Metal detector surveys would be used in tested areas to increase the probability of identifying ephemeral Contact Period site components. A limited number of Excavation Units (EU; 1-x-1 m) would be used to investigate features and artifact concentrations. Soil samples from feature contexts would be collected for flotation and subsequent analysis. Phase II investigations would be sufficiently intense to fully evaluate the features being investigated and would target areas that are part of larger archaeological sites. Sufficient geospatial data would be collected in the field to map all archaeological test pits and excavation units in GIS with sub-meter accuracy. Maps of the physical area of damage to each site caused by Hurricane Sandy would be created using a DGPS with sub-meter accuracy, recording points at intervals $\geq$ 5 m. These geospatial data would be combined with archaeological testing plans to help assess the current physical condition of the sites.

The Phase I survey was conducted from April 25 to November 1, 2014, under archaeological permit No. 14-5 issued by the RIHPHC on April 25, 2014. During the course of the fieldwork, the MPMRC coordinated and communicated with the RIHPHC, the NITHPO, and PAL. The Phase I survey required access to the USFWS's NWR. The survey on NWR properties was conducted under an ARPA Permit and a NWR System Special Use Permit. The RIHPHC permit was subject to special conditions, including the requirement for the MPMRC to coordinate effectively with the Narragansett Indian Tribe and to secure written landowner permission before beginning work on any particular property.

The RIHPHC staff reviewed a summary memorandum of the results of the Phase I Reconnaissance Survey prepared by MPMRC and submitted on August 15, 2014, which included recommendations on how to implement Phase II investigations to assess the nature and extent of damage to a sample of identified HDADs and evaluate their National Register eligibility. The RIHPHC concurred with the MPMRC's recommendations regarding Phase II surveys and issued RIHPHC Permit No. 14-23 on September 11, 2014, authorizing the investigations. Phase II surveys were conducted from September 14, 2014, to October 30, 2015.

The Phase I and II archaeological investigations were conducted in compliance with relevant federal, state, and local statutes and regulations pertaining to cultural resources and historic preservation including Section 106 of the National Historic Preservation Act of 1966, as amended (54 U.S.C. 306108) and Section 220 "Areas of Historic or Archaeological Significance" of the Coastal Resource Management Council (CRMC) permitting statutes. All tasks associated with the Project were undertaken in accordance with the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation (48 FR 44716–44742, National Park Service [NPS] 1983), the RIHPHC's Performance Standards and Guidelines for Archaeology in Rhode Island (2013), and the Narragansett Indian Archeological/Anthropological Committee's Standards and Guidelines for Archeological Survey (1994).

Project Personnel

Fieldwork for the Project was coordinated by Kevin McBride (project manager/principal investigator) and Julie Brodeur-Hartman and Noah Fellman (senior archaeologists). Heather Manwaring, Kathleen Boushee, Gina Dezi, David Wilson, Angel Desmarias, Allison Malloy, Michael Derdarian (archaeologists) assisted in the fieldwork and laboratory analysis. Roberta Charpentier (laboratory manager) oversaw all laboratory analysis and generated the artifact catalog for this report. Noah Fellman conducted GIS analysis. Faunal analysis was conducted by David Wilson (fish) and Nicholas Bellantoni (mammals and birds). Katie Rhinehart conducted botanical analysis. Kevin McBride, Julie Brodeur-Hartman and Noah Fellman co-authored the technical report.

Disposition of Project Materials

All artifacts (lithics, ceramics, and metals) and ecofacts (faunal and botanical materials) were brought to the MPMRC for processing, analysis, cataloging, and curation. Project documentation (field forms, photographs, maps, etc.) is on file at the Research Department of the MPMRC. The MPMRC meets the curation standards of the National Park Service and will serve as a temporary curation facility until such time as the RIHPHC designates a permanent state repository.

CHAPTER TWO

RESEARCH DESIGN AND FIELDWORK METHODS

Project Goals

The goals of the Phase I survey were to identify, inventory, and assess archaeological sites along the seaward and salt pond coastlines impacted by Hurricane Sandy. The goals of the Phase II surveys were to delineate vertical and horizontal site boundaries within the testing corridor, defined as the area falling within 10 m inland of the post-Hurricane Sandy shoreline, and to collect sufficient information to evaluate the eligibility of the affected sites for listing in the National Register. The methods and strategies employed to accomplish these goals included

- Archival research, including a review of historical literature and maps relevant to the study area;
- Development of a predictive model of archaeological site locations based on environmental, geophysical, and archaeological data;
- Development of a model of short- and long-term impacts from coastal erosion to the Block Island shoreline;
- Phase I visual reconnaissance of the entire seaward and salt pond coastlines affected by Hurricane Sandy;
- Phase II field investigations consisting of systematic subsurface testing of a sample of sites identified during the Phase I survey;
- Laboratory processing and analyses of recovered cultural materials; and
- Re-evaluation of existing models of Native American settlement patterns on Block Island.

Archival research provided the information necessary to develop environmental and historic contexts for the seaward and salt pond shorelines and to develop predictive models regarding the nature and distribution of Native American sites, archaeological sensitivity, and current and future threats. Archaeological sensitivity is defined as the likelihood for belowground cultural resources (archaeological sites) to be present and is based on the following considerations:

- Functional archaeological site types known or expected to be associated with specific environmental settings, and temporal characteristics of previously identified cultural resources in the study area and its vicinity; and
- Current local and regional paleoenvironmental and geophysical data relevant to the study area to reconstruct environmental conditions throughout the period of human settlement on Block Island.

Phase II surveys were conducted on a sample of Hurricane-Damaged Archaeological Deposits (HDADs) identified during the Phase I survey. Cultural materials recovered during both phases of survey, such as stone tools, debitage, ceramics (Native American and Euro-American), metal (brass, iron, and lead), and faunal and botanical remains were processed and identified in the laboratory and analyzed to draw conclusions about the nature and season of activities that took place at individual sites. This information was evaluated within the environmental and historic contexts developed for the Project. The result was an assessment of potential significance and eligibility for listing in the National Register.

Significance and Historic Contexts

Phase I (Site Identification), Phase II (Site Examination), and Phase III (Data Recovery) archaeological investigations are conducted according to preservation standards for the identification, evaluation, registration, and treatment of archaeological resources according to National Park Service standards (NPS 1983). An essential component of the planning and preservation process is the identification and assessment of archaeological and traditional cultural properties that are eligible for inclusion in the National Register. Archaeological properties can be a district, site, building, structure, or object (Little et al. 2000).

Traditional cultural properties are considered eligible for inclusion in the National Register because of their association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community (Parker and King 1998). Consultation with Native American or other resident communities are necessary to make recommendations about the significance and eligibility of archaeological and traditional cultural properties.

An archaeological property may be pre-contact, post-contact, or contain components from both periods. Pre-contact (sometimes termed "prehistoric") is used to refer to Native American groups (and sites) prior to contact with Europeans and written records (Little et al. 2000). In accordance with the NPS guidelines, "pre-contact" is used unless directly quoting materials that use the term "prehistoric." "Contact" or "Contact Period" is used to identify a period of time when Native societies were in direct or indirect sustained contact with Europeans, usually in the context of trade or European settlement. There is no single year that marks the transition from pre-contact to post-contact as it varied across time and space.

Post-contact (or what is sometimes referred to as "historical") also refers to the archaeology of sites and structures associated with periods during which there was significant direct contact between Native Americans and Europeans and is associated with a rich documentary record. Documentary records (explorers' accounts, correspondence between Colonial leaders, probates, etc.) can be used to better understand Native and Euro-American peoples and the sites they inhabited. NPS guidelines stipulate that "post-contact" should be used when referring to the archaeological record associated with this period, unless directly quoting materials that use "historical."

The NPS has established four criteria for listing significant cultural properties in the National Register (36 CFR 60). These criteria are broadly defined to include the wide range of properties that are significant in American history, architecture, archaeology, engineering, and culture. The quality of significance may be present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association. The criteria (known by the letters A–D) allow for the listing of properties

A. that are associated with events that have made a significant contribution to the broad patterns of our history; or
B. that are associated with the lives of persons significant in our past; or
C. that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or;
D. that have yielded, or may be likely to yield, information important to prehistory or history.

Archaeological and traditional cultural properties can be determined eligible for listing in the National Register under all four criteria, but must meet at least one (Little et al. 2000; Parker and King 1998). Archaeological properties listed under Criterion A or B must have a demonstrated ability to convey their associations with events, persons, or patterns significant to our history. Criterion C is intended to recognize properties that are significant expressions of culture or technology (especially architecture, artistic value, landscape architecture, and engineering) (Little et al. 2002:26). Under Criterion C, an archaeological property must have remains that are well-preserved and clearly illustrate the design and construction of a building or structure (Little et al. 2002:27). Archaeological properties are most often listed under Criterion D and must have the demonstrated potential to yield important information (Little et al. 2002:22). An important consideration for listing a site under Criterion D is an assessment as to whether the data derived from a site are unique or redundant, and how they relate to the current state of archaeological knowledge (research questions and topics) of a period or site(s). A property should be associated with or contain "important legitimate associations and/or information value based upon existing knowledge and interpretations that have been made, evaluated, and accepted" (McManamon 1990:15).

Another critical component in assessing the National Register eligibility of a historic property is an evaluation of its integrity. Historic properties either retain integrity (i.e., convey their significance) or they do not. The National Register criteria recognize seven aspects or qualities that, in various combinations, define integrity:

- location, the place where the historic property was constructed or the place where the historic event occurred;
- design, the combination of elements that create the form, plan, space, structure, and style of a property;
- setting, the physical environment of a historic property;
- materials, the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property;
- workmanship, the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory;
- feeling, a property's expression of the aesthetic or historic sense of a particular period of time;
- association, the direct link between an important historic event or person and a historic property.

To retain historic integrity, a property will always possess several, and usually most, of these qualities. The retention of specific aspects of integrity is vital for a property to convey its significance. Determining which of these aspects or qualities are most important to a particular property requires knowing why, where, and when the property is significant (NPS 2002).

The criteria are applied in relation to the historic contexts of the resources as follows:

> A historic context is a body of thematically, geographically, and temporally linked information. For an archaeological property, the historic context is the analytical framework within which the property's importance can be understood and to which an archaeological study is likely to contribute important information (Little et al. 2000).

For traditional cultural properties, a historic context is further defined as follows:

> A historic context is an organization of available information about, among other things, the cultural history of the area to be investigated, that identifies "the broad patterns of development in an area that may be represented by historic properties" (48 FR 44717). The traditions and lifeways of a planning area may represent such "broad patterns," so information about them should be used as a basis for historic context development. Based on federal standards and guidelines, groups that may ascribe traditional cultural values to

an area's historic properties should be contacted and asked to assist in organizing information on the area (Parker and King 1998).

The development of historic contexts is a logical first step in the formulation of an archaeological research design and is a critical component in evaluating archaeological and traditional cultural properties in the absence of a comprehensive regional survey (NPS 1983:9). Historic contexts provide an organizational framework that integrates information about related historic properties based on a historical or cultural theme, geographic limits, and chronological periods. A historic context should identify gaps in data and knowledge to help determine what significant information may be obtained from the resource. Each historic context is related to the developmental history of an area, region, or theme (e.g., agriculture, transportation, or waterpower), and identifies the significant patterns of which a particular resource may be an element. Only those contexts important to understanding and justifying the significance of the property need be discussed.

Historic contexts are developed by

- identifying the concept, time period, and geographic limits for the context;
- collecting and assessing existing information about these time periods;
- identifying locational patterns and current conditions of the associated property types;
- synthesizing the information in a written narrative; and
- identifying information needs.

"Property types" are groupings of individual sites or properties based on common physical and associative characteristics. They serve to link the concepts presented in the historic contexts with properties illustrating those ideas (NPS 1983, 48 FR 44719).

MPMRC developed the following historic research contexts and site types to organize the data relating to the archaeological resources identified within the Hurricane Sandy Block Island Project area:

Block Island Woodland and Contact Period Historic Contexts and Site Types

- PaleoIndian–Archaic Period (ca. 12,500–3000 B.P.) Native American land use and settlement on Block Island.

- Woodland Period (ca. 3000–400 B.P.) land use and settlement patterns on Block Island within the broader context of a developing maritime-focused economy:

    - Semi-Permanent and Permanent Villages occupied for all or a significant portion of the year located adjacent to the Salt Ponds
    - Seasonal spring fishing camps occupied during April and May located on elevations below the 30-ft contour along seaward bluffs
    - Temporary camps occupied for one or a few weeks in various seasons. These sites are located throughout the island away from the villages and seasonal camps and associated with the exploitation of plant and animal species associated with wetland and terrestrial habitats.
    - Task-specific camps located throughout the island occupied for brief periods of time to exploit wetland and terrestrial resources.

- The social, demographic, and economic impacts on the Native inhabitants of Block Island following the introduction and intensification of maize horticulture ca. 1000-800 B.P. The social and economic impacts on the Native inhabitants following contact and sustained interaction with Europeans:
    - Semi-Permanent and Permanent Villages occupied for all or a significant portion of the year. Not all sites are located adjacent to the salt ponds but may be reoriented toward areas with productive agricultural soils
    - Seasonal spring fishing camps occupied during April and May located on elevations below the 30-ft contour along seaward bluffs
    - Temporary camps occupied for one or a few weeks in various seasons. These sites are located throughout the island away from the villages and seasonal camps and associated with the exploitation of plant and animal species associated with wetland and terrestrial habitats
    - Task-specific camps located throughout the island occupied for brief periods of time to exploit wetland and terrestrial resources.

- The social and economic impacts on the Native inhabitants following contact and sustained interaction with Europeans:
    - Semi-Permanent and Permanent Villages occupied for all or a significant portion of the year. Not all sites are located adjacent to the salt ponds but may be reoriented toward areas with productive agricultural soils located adjacent to the salt ponds and possible topography and settings more suitable for defense.
    - Fortified places occupied intermittently throughout the year to manufacture wampum
    - Seasonal spring fishing camps occupied during April and May located on elevations below the 30-ft contour along seaward bluffs
    - Temporary camps occupied for one or several weeks in various seasons. These sites are located throughout the island away from the villages and seasonal camps and associated with the exploitation of plant and animal species associated with wetland and terrestrial habitats.
    - Task-specific camps located throughout the island occupied for brief periods of time to exploit wetland and terrestrial resources.

Archival Research

Prior to the commencement of fieldwork, MPMRC conducted extensive archival research and an examination of primary and secondary sources on the history, glacial geology, archaeology, paleoenvironmental history, and cartographic history of Block Island. Primary sources included early European accounts and narratives of Native Americans living on the island. Meetings and interviews with town officials, residents, collectors, and other knowledgeable individuals provided valuable information on locations of artifacts and sites and the ecology and environment of Block Island.

State Site Files and Archaeological Reports

Archaeological site files maintained at the RIHPHC were reviewed to identify previously reported archaeological sites on Block Island. The site files contained information on 60 previously reported sites[2]

[2] Not included in this total are several sites in the RIHPHC inventory for which no detailed or reliable locations are available.

on Block Island ranging from the Early Archaic (ca. 9000 B.P.) through the early Contact (ca. 450 B.P.) periods. Ten post-contact sites had been recorded on the island prior to the Hurricane Sandy surveys, along with 15 sites with both pre-contact and post-contact components. An additional 28 archaeological resources are shown on RIHPHC maps; they have assigned site numbers but no corresponding site forms. Other sources consulted included Cultural Resource Management (CRM) archaeological reports (McBride 2008; Waller 2013a, 2013b; Waller and Johnson 2012), unpublished archaeological site reports (e.g., Morenon 1985), National Register of Historic Places Registration Forms for archaeological sites and districts (McBride 1989a, 1989b; Robinson 1987), dissertations and theses (Bellantoni 1987; Tveskov 1992; Volmar 1998), and journal articles (Nixon 2004; Tveskov 1997).

As the data recorded on RIHPHC site forms were reviewed for content and site location, it became apparent there were discrepancies in site locations and other recorded information for multiple archaeological resources. The first challenge was to accurately determine the locations of all previously identified sites on the island. Locational data associated with many of the sites had been recorded prior to the use of GPS technology, and site proveniences were often established based on sketch maps and then plotting the location on a United States Geological Survey (USGS) 7.5-minute series map to calculate UTM coordinates which were more often than not in error. The magnitude of the errors required a thorough review of all site locations by plotting X and Y UTM coordinates recorded on all site forms and georeferencing them to USGS 7.5-minute series maps.

The results were still unsatisfactory, as the locations of a large number of sites could still not be determined with a satisfactory degree of accuracy and did not match terrain descriptions or Plat and Lot maps. To increase precision, each site's location and content were investigated further by carefully reviewing all data on sites forms, reports, sketch maps, and landowner names associated with Plat and Lot numbers. The availability and quality of this information on existing site forms varied depending on the site's investigator and the techniques used. Maps attached to files ranged from crude drawings depicting only general topographic features in the vicinity to CAD drawings indicating the exact extents of archaeological testing in great detail.

As these details were assessed, the location of each site was adjusted to the most accurate degree possible and an accuracy rating of 0 to 5 was assigned to each site as follows:

- "0" was assigned when the site's location had been assigned via a "batch georeference" technique but then not refined further. Sites assigned this rating could potentially be precisely placed, but no data could yet confirm this.
- "1" was assigned when the site's location had been investigated and found to be very general. Often this meant that the site could only be placed on the island, but its location within the island could not be confirmed.
- "2" was assigned when the site could be located to a general region, like a street or a pond, but no further.
- "3" was assigned when a site could be located to within a few parcels of land. A "3" rating was also used when a site's extents covered a very large area and stretched across multiple parcels.
- "4" was assigned when a site could be located to within a few meters. This was almost always the case when a site was professionally excavated in a CRM context. In most cases this sort of survey was carried out before the construction of a home, which could usually be located on a current aerial photograph.

- "5" was reserved for sites georeferenced by a professional, using high grade Global Navigation Satellite System (GNSS) or survey techniques that would allow for the entire site's extents to be re-created to within a few centimeters.

Collections

The Block Island Historical Society (BIHS) has hundreds of pre-contact artifacts in their collections from various collectors (lithics and ceramics) that, even though most were un-provenienced, provided information on diagnostic projectile points, lithic material selection, and the temporal range of Native American sites on Block Island. Dozens of local collectors were consulted on a regular basis throughout the Project to photograph and document recent finds of diagnostic artifacts.

Environmental Studies

The United States Department of Agriculture (USDA) Soil Conservation Service soil survey (Rector 1981) contains information about soil types and surficial deposits on Block Island. Rhode Island's Geographic Information System (RIGIS) (http://www.edc.uri.edu/RIGIS/) provided additional information on local geography, geology, ecology, and soils and historical aerial photographs of Block Island's dynamic coastline. Coastal surveys of Block Island to calculate the rate and amount of coastal erosion pre- and post-Hurricane Sandy were conducted by the Rhode Island Shoreline Change (Beach) SAMP and proved invaluable for assessing the short- and long-term impacts of coastal erosion.

Extensive environmental studies have been conducted on Block Island and the surrounding coastal waters of Rhode Island and Block Island Sound supported by the Rhode Island Ocean SAMP (CRMC 2010a, 2010b). Studies include research on deep and shallow water habitats for fish, crustaceans, sea mammals, sea turtles, migratory birds, and subsurface geomorphology. Another important source of recent research is *The Ecology of Block Island: Proceedings of the 2000 Rhode Island Natural History Survey Conference,* which contains articles on the landscape, vegetation history, and flora and fauna of Block Island and surrounding waters (Boothroyd and Sirkin 2002; Hale 2002; Hammond 2002; Rosenzweig et al. 2002). Research supported by a wide range of other institutions (Rhode Island Sea Grant, the University of Connecticut, University of Rhode Island, University of Massachusetts, Yale University, Macalester University, and Wesleyan University and others) have made significant contributions to our understanding of the ecology, paleoecology, and paleoenvironment of Block Island and adjacent islands (Bartolai 2009; Bellantoni 1987; Coleman and McBride 2008; Dunwiddie 1990; Eaton 1898; Funk and Pfeiffer 1992–1993; Nixon 2004; Sirkin 1996; Varekamp and Thomas 1998; Varekamp et al. 2005).

Requests for Information and Notifications

The MPMRC informed the NITHPO that the MPMRC had been retained to conduct the Phase I survey for Block Island and asked the Tribe for information on areas of tribal interest and concern. Kevin McBride met with Doug Harris (Deputy NITHPO) on Block Island on a number of occasions to discuss the status of the archaeological investigations and the direction of ongoing research. Mr. Harris' comments and perspectives were always useful and welcome. The MPMRC also informed the BIHS and the Town of New Shoreham of the project and requested information on known historical properties or archaeological collections from the survey area. Pam Littlefield, Director of the BIHS, was very helpful in securing landowner permissions and contacting local collectors and other knowledgeable people who provided information. The Block Island Conservancy (BIC) was informed of the project and helped to secure landowner permissions as well, because many private properties contained conservation easements held by the BIC and other conservancies on the island. The BIC staff also provided information on various ecological studies conducted on the island. The Block Island National Wildlife Sanctuary survey was coordinated with the Cultural Resources Program of the USFWS Northeast Regional Office (Region 5) in Hadley, Massachusetts.

Archaeological Sensitivity Assessment

Archaeological sensitivity is defined as the likelihood for sites to be present in any given area based on a number of factors, including the presence/absence of reported archaeological sites, known patterns of Native American and Post-Contact Period land use and settlement; previous archaeological surveys conducted within or adjacent to the study area; existing physiographic conditions (slope, aspect, drainage and distance to freshwater and salt ponds); and the degree to which previous ground disturbances and land modifications (cutting, filling, erosion, etc.) have impacted the coast. “No” or “low” archaeologically sensitive areas include those that are perennially wet or have been severely impacted by development, construction, excavation, and/or erosion. Areas of “moderate” archaeological sensitivity include those that are located in environmentally sensitive areas that have only been minimally impacted by ground alterations or erosion, are located in areas of moderate topographic relief, but are not located in proximity to natural features such as streams, wetlands, and freshwater and salt ponds although they are located in close proximity to known archaeological sites. Highly sensitive areas include those areas with minimal or no disturbance, and therefore high potential for containing intact cultural deposits, and are located in the immediate proximity to natural resources and known archaeological sites.

The Block Island shorelines span a distance of 16.3 miles (26.3 km) of seaward and 9.3 miles (15 km) of salt pond shorelines. The RIHPHC estimated in RFP #7536370 for the 2013 Hurricane Sandy Disaster Relief Grant for Block Island that 12.5–18.5 miles (20–30 km) or 50–80 percent of the seaward and salt pond shorelines would require field reconnaissance. The MPMRC conducted an archaeological sensitivity assessment of the entire 25.7 miles (41.3 km) of coastal and salt pond shorelines based on MPMRC’s expectation that coastal resources were an important element of both pre-contact and post-contact subsistence systems and that sites reflecting the use of those resources might be encountered in many different settings.

Pre-Contact Native American Archaeological Sensitivity

Previous archaeological surveys on Block Island have identified 60 Pre-Contact and Contact Period archaeological sites ranging in age from 10,000 B.P. to 350 B.P. (Figure 2-1). Based on the locations of known pre-contact resources, the most archaeologically sensitive areas were considered to be the shorelines around the salt ponds and the freshwater ponds and swamps in the interior of the island.

There is limited evidence of Native American land use and settlement on Block Island prior to the Woodland Period. Isolated finds of Archaic Period projectile points have been reported from a number of locations but, until recently, no Archaic Period occupation sites had been identified. Almost all Archaic Period projectile points have been recovered from locations also containing Woodland Period cultural deposits, suggesting some congruence between Archaic and Woodland Period site locations. Wetland locations, rather than coastal contexts, appear to have the greatest potential to contain archaeological deposits spanning the Archaic and Woodland periods, but these locations may have been selected for different reasons during each period. Sea level rise and coastal erosion substantially altered the Block Island coast since the end of the Archaic Period, submerging and/or destroying coastal landforms that would have been extant before 3000 B.P. and leaving a truncated archaeological record of the island’s earliest residents. The relatively high rate of sea level rise, particularly before 5000 B.P., may have prevented the formation of the extensive shellfish beds and rich coastal marshes that supported Woodland Period coastal economies. For this reason, Archaic Period sites are generally presumed to have been oriented toward freshwater wetland resources. There are insufficient data to determine the size, duration, and complexity of Archaic

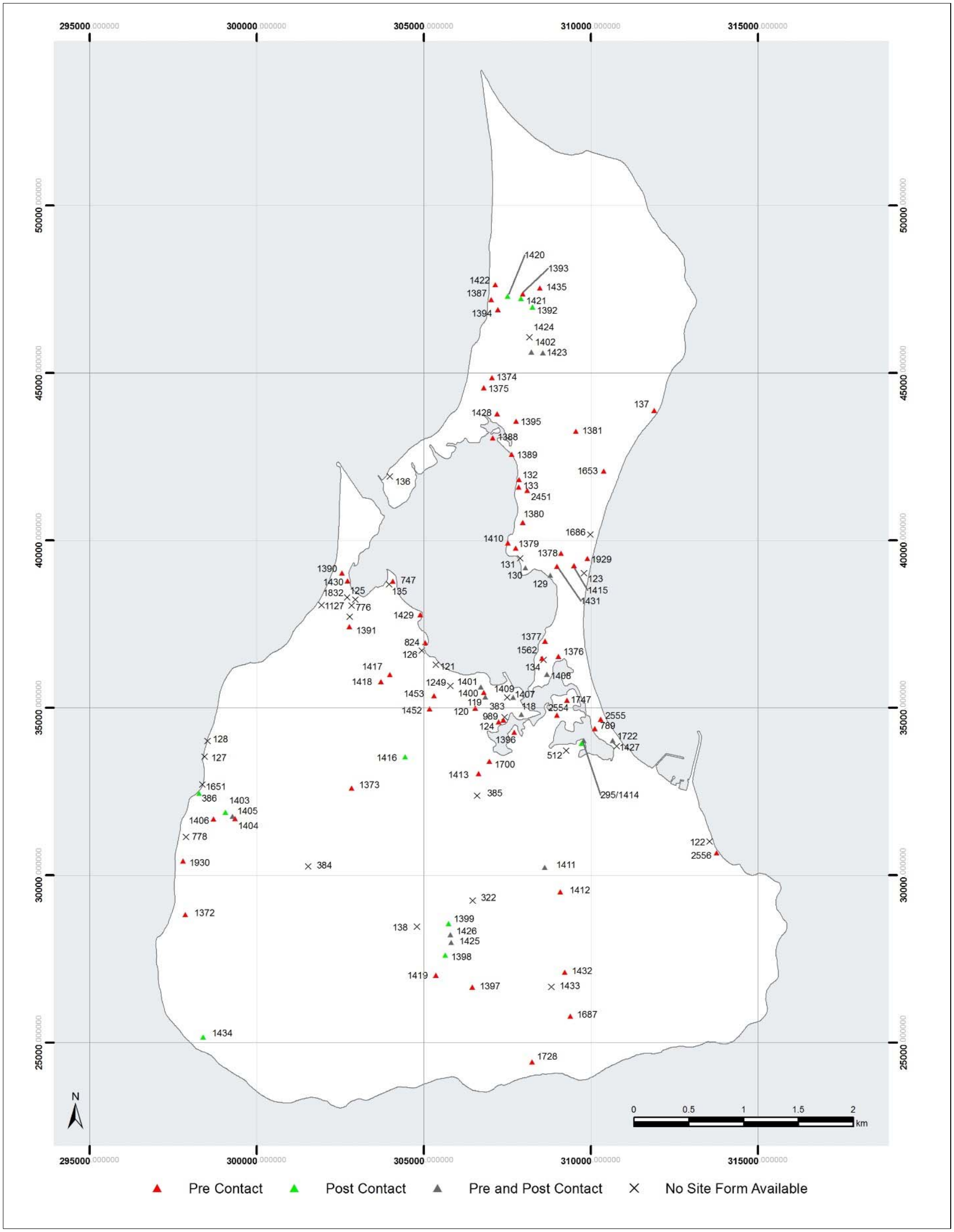

Figure 2-1. Previously reported archaeological sites on Block Island.

Period sites or to reconstruct the settlement patterns of which these sites were a part. The lack of systematic survey and the progressive transgression of the shoreline make it difficult to establish the extent to which proximity to the coast was a factor in Archaic Period site selection.

PAL's recent identification of a relatively intact Laurentian Tradition component (ca. 6000–4500–B.P.) adjacent to Harbor Pond is the first documented Archaic Period occupation site on the island (Waller and Johnson 2012; Waller, personal communication 2014). The Laurentian Tradition Harbor Pond Site lithic assemblage comprised tabular (i.e., quarried) blocks or cores and beach cobbles of Plainfield Formation quartzites ("Plainfield Quartzite"). Fine- to very fine-grained Plainfield Quartzite outcrops in extensive beds along the Honey Hill/Lake Char fault in eastern Connecticut. Cobbles of this material are widely distributed in glacial tills, outwash, and moraines paralleling the Quinebaug and Thames/Shetucket river drainages and extending to Block Island. Laurentian Tradition peoples in eastern Connecticut and western Rhode Island made extensive use of this lithic material. The presence of Plainfield Quartzite tools and debitage obtained from mainland quarries and beach cobbles at the Harbor Pond Site suggests that a resident population on Block Island ca. 6000–4500 B.P. shared a similar focus on this specific lithic material with their mainland contemporaries.

Woodland Period sites and settlement patterns are far better known than those of the preceding Archaic Period, largely due to a dramatic increase in frequency, density, and complexity of sites, and presumably an increase in population, starting ca. 3000 B.P. This development was coincident with a significant reduction in the rate of sea level rise. By 3000 B.P., sea levels stabilized, resulting in the development of extensive coastal, estuarine, and marine ecosystems throughout the region. The increase in the extent, diversity, and density of extremely productive coastal ecosystems resulted in a corresponding increase in the size and duration of occupation of Native sites all along the southern New England coast. Native people took advantage of the variety and predictability of estuarine, coastal, and marine resources such as shellfish, fish, and migratory waterfowl. The broad regional shift in settlement patterns at the start of the Woodland Period is also reflected on Block Island. The seemingly "overnight" appearance of large, complex, and year-round Early Woodland Villages on Block Island about 3000 B.P. is likely associated with the inundation of the then freshwater Great Pond by rising sea levels, creating one of the most productive coastal habitats in southern New England. Essentially a small estuary, the Great Salt Pond has several unique features that significantly increase its productivity compared to mainland salt ponds.

The Great Salt Pond is more than 45 ft (15 m) deep at its center and would have supported a wide variety of near coastal and marine fish species, including sturgeon, and a broader range of shellfish than found in mainland salt ponds. The nature, distribution, and density of Woodland Period sites that have been identified along the 8.5-mile (13.6-km) shoreline of the salt ponds clearly indicate a strong correlation between the salt ponds and large complex Woodland Period sites.

Moderate to high archaeological sensitivity is predicted for coastal bluffs in excess of 30 ft (10 m) if they are in the immediate proximity of freshwater wetlands and ponds. This assumes that the only variable in predicting archaeological site location and sensitivity is association with fresh water, not coastal resources. Prior to the Hurricane Sandy surveys, no coastal resources (shellfish, finfish, or marine mammal remains) had been recovered from sites at elevations higher than 30 ft (10 m). However, as few large-scale archaeological investigations have been conducted to locate and test sites situated on bluffs greater than 30 ft in elevation, additional research would be required to support this hypothesis. There are likely other variables that explain the nature, distribution, and density of Woodland Period sites away from the salt ponds. For example, the distribution and extent of soil types conducive for maize horticulture were likely important predictors of site location for Late Woodland and Contact Period sites. Seventeenth-century sources suggest that Contact and possibly Late Woodland Period occupations may also be located in more inland areas such as Corn Neck and around Fresh Pond, where concentrations of good agricultural soils can be found. Systematic archaeological investigations in interior areas and outside the scope of the Hurricane Sandy surveys will be needed to fully test this hypothesis.

Contact Period Archaeological Sensitivity

The first recorded encounter between Native Americans and Europeans in southern New England was in 1524, when Giovanni Verrazzano explored the coastline of eastern North America from North Carolina to Maine and spent two weeks among the Narragansett in late April of that year (Wroth 1970:134–138). Verrazano did not make landfall on Block Island but described it briefly as he sailed by on his way to Narragansett Bay:

> We discovered a triangular-shaped island, ten leagues from the mainland, similar in size to the Island of Rhodes; it was full of hills, covered in trees, and highly populated to judge by the fires we saw burning continually along the shore (Wroth 1970:137).

The fires referenced by Verrazzano likely were those of the spring fishing villages, discussed in detail in Chapter 7.

While there may have been sporadic encounters between Natives and Europeans during the sixteenth century, the first sustained contact between Natives and Europeans in coastal Long Island and Block Island Sound began ca. 1611 when the Dutch began to trade regularly with Native peoples in the region, initially for furs and later for wampum (McBride 2013). Adrien Block, for whom the island is named, and three other Dutch captains systematically explored and mapped the southern New England coastline between 1611 and 1614 and established trade relations with Native groups throughout the region (McBride 2013). The Contact Period (ca. 400–350 B.P.; ca. A.D. 1610–1675 on Block Island) defines a period of time when Natives and Europeans interacted with each another on a regular basis in the context of trade, exploration, settlement, and sometimes conflict. While Native Contact Period sites are defined on the basis of the presence of European artifacts, the documented presence of European trading posts also indicates regular interactions between Natives and Europeans.

Kempo Sybada, referred to as a "Dutchman" but who was actually an Italian pilot from Liverno working for the Dutch as a pilot, established a trading post on Block Island in 1648 that is believed to have been located somewhere along Crescent Beach (McBride 1995, 2007). The visibility of early Contact Period sites (ca. A.D. 1610–1625) on Block Island may be relatively low compared to their mainland counterparts, as the Manisses of Block Island had far fewer fur-bearing animals to trade with the Dutch. The subsequent and rapid adoption of wampum as an important commodity in the fur trade in the early to mid-1620s brought new attention from European traders.

Sybada's establishing a permanent post on the island in 1648, operated by an English couple, suggests that the wampum trade on Block Island was profitable enough to warrant such an investment. Wampum was referred to by the Dutch "as the source and mother of the fur trade," and the Dutch referred to eastern Long Island Sound and Block Island Sound as "the mint" of wampum production. The Fort Island Site (RI 118), a Native fortified place used ca. 1640–1675 situated on a small island in Trims Pond, exemplifies the increased conflicts that occurred among Native groups as they competed for control of the fur and wampum trade (McBride 1994, 1995, 2007, 2013). The trade goods recovered from the Fort Island Site include glass beads, jaw harps, kaolin pipes, iron knives and axes, signet rings, and glass bottles typical of the trade goods sought by Native people in the region (McBride 1995, 2007). However, fortified sites like Fort Island are rare, if not unique, on Block Island. The Contact Period on Block Island spanned just 65 years (1610–1675), compared to the 500–600 years' time span for creation and abandonment of Late Woodland sites; far fewer Contact Period sites are expected compared to Late Woodland sites. The lower frequency of Contact Period sites certainly increases their significance, but the measure of archaeological sensitivity based on the likelihood for sites to be present in any given area might be relatively low compared to Late Woodland Period sites.

It is likely that Contact Period settlement patterns were different from pre-maize horticulture Early and Middle Woodland sites and more similar to Late Woodland settlement patterns. The introduction and intensification of maize horticulture ca. A.D. 1000 undoubtedly altered Late Woodland settlement patterns, as horticultural villages were increasingly located away from the salt ponds given the requirements of slash and burn horticultural economies and the need for relatively large contiguous areas of soils suitable for maize horticulture. This situation may have resulted in a more dispersed pattern of villages away from the salt ponds as buffers were created to minimize competition for soils between horticultural villages. However, the congruence of Woodland and Contact Period occupations along the seaward coastlines at or below the 30-ft bluff height indicates a high degree of continuity and archaeological sensitivity in Woodland and Contact Period occupations in these contexts.

Some information on Contact Period settlement patterns can be gleaned from English accounts of the Massachusetts Bay military expedition to Block Island in 1636 and the few Contact Period sites that have been identified from archaeological surveys (Underhill 1638; Winthrop in Hosmer 1908; Waller 2013b; McBride 2007; this volume). English soldiers with orders to punish the Manisses for the murder of an English trader landed near Crescent Beach in late August 1636. As the English ranged over the island in search of the Manisses, they observed the landscape and came across a number of abandoned villages and cornfields. The landscape was describe as a patchwork of brush and secondary growth, likely the result of hundreds of years of shifting field maize horticulture. The English encountered five villages, including "two plantations, three miles in sunder, and about sixty wigwams—some very large and fair, and above two hundred acres of corn, some gathered and laid on heaps, and the rest standing" (Winthrop in Hosmer 1908:188). A second party of English described a separate set of villages two miles apart. Based on the distances between villages described in English accounts, not all the villages could have been located in the proximity of the salt ponds. Several villages were likely located on Corn Neck and perhaps the southern end of the island in the general proximity of Fresh Pond. Archaeological surveys have identified Contact Period occupations along Crescent Beach (Waller 2014), West Beach, and Scotch Beach (this volume), but these are interpreted as seasonal spring fishing camps. No Contact Period horticultural villages have yet been identified on Block Island. As such, developing a predictive model of Contact Period site locations and assessing site sensitivity in any given area will be challenging given current knowledge of Contact Period settlement patterns.

Post-Contact Period Archaeological Sensitivity

Very few Post-Contact Period Native sites (1675 and later) have been identified. The MPMRC expected such sites to be relatively rare, as it appears most of the Native population was forced off the island after King Philip's War (1675–1676). When the English settled the island in 1661 (the island was claimed by right of conquest by Massachusetts Bay in 1636), and was divided among the 16 original proprietors (Livermore 1877). After 1661, there was little mention of the Manisses except in the context of servants, laborers, or court cases, and it would appear from English records that the Manisses were becoming increasing marginalized. In 1663, Thomas Terry, one of the original proprietors, granted six acres of his land adjacent to the Fresh Pond to six Block Island sachems so they wouldn't be forced off the island (New Shoreham Town Book No. 1, p. 21, 1663).

Although it is difficult to determine how many Manisses remained on the island after 1661, or where they resided other than the six acres at Fresh Pond, they seem to have maintained the palisade at Fort Island until 1676. Samuel Niles, who was born on Block Island in 1674, related that in 1676 "sixteen men and one boy" confronted 300 Indians at Fort Island and challenged them to fight. The Indians declined, "and from this time the Indians became friendly to the English" (Niles 1837 [1760]:195–197). On the basis of this information, Native occupations dating after 1661 likely would be confined to a six-acre plot adjacent to the Fresh Pond and Fort Island. There are references to the "Indian Land" adjacent to the southwest corner of the Fresh Pond as late as 1723, but it is not known if anyone still resided there. Previous archaeological surveys near the southwestern corner of Fresh Pond and in the general vicinity of the "Indian Land" recovered fragments of eighteenth-century glass bottles, glazed earthenware, and early eighteenth-century English stoneware (RIHPHC Site Files).

The 1661 plat map of the island and subsequent deed transfers provide information on Colonial (and potentially Native) land use and the locations of English dwellings and other structures. A number of Colonial domestic sites are concentrated in an area south of the Great Salt Pond and others were scattered in various locations across the island. No Colonial domestic sites appear to have been located along the seaward coast and no seventeenth- or eighteenth-century artifacts or sites have been identified along the seaward or salt pond coastlines in previous archaeological investigations. MPMRC assessed the archaeological site sensitivity for Post-Contact Period Native and Colonial sites along the seaward shorelines as low.

GIS Predictive Modeling and Archaeological Sensitivity Ranking

Archaeological site locations re-mapped during background research, and new locations identified during Phase I and II archaeological investigations (collectively, Hurricane Sandy surveys), were digitized and entered into a GIS database: Esri™ ArcGIS Explorer Desktop GIS viewer. An important part of the pre-fieldwork phase of the project was to analyze the effects of Hurricane Sandy on Block Island. Multiple LiDAR data sets collected and developed by the U.S. Army Corps of Engineers and the USGS in 2011 and one week after Hurricane Sandy were indispensable in this effort. A comparison of these two data sets provided a very high-resolution record of the storm's effects on Block Island's variable coastline.

Earlier LiDAR data sets and various other digital elevation models also proved useful in measuring slightly longer term erosional patterns, although these were of more limited utility given the much lower resolution of the data compared to the 2011 and 2012 data sets. Additionally, a second "post-Sandy" LiDAR data set was acquired in 2013 by the USGS, but was not made available until after fieldwork had already begun. These data again proved invaluable in examining coastal erosion in the year following Hurricane Sandy, and were more in line with the conditions met in the first phase of fieldwork in 2014. MPMRC completed cut and fill, raster difference, and stack profile analyses to understand the changes that took place to island elevations along the coast between 2011, 2012, and 2013.

While LiDAR was the best tool to examine erosion and bluff face soil loss on the island, aerial photographs also proved beneficial, particularly in assessing the amount and rate of erosion occurring in the 75 years preceding Hurricane Sandy. Aerial photographs of the island were taken in roughly 10-year increments beginning in 1939. While these images lack the resolution required for specific measurements, they do provide a general picture of the changes to the island through most of the twentieth century. These earlier aerial photographs combined with the bathymetry of the waters surrounding Block Island helped to paint a broad picture of what the island may have looked like at various points in the past. Aerial photographs were also very useful in illustrating the changes in development and land use that occurred during the twentieth century.

Limitations exist with both LiDAR and aerial photography data sets. Dense vegetation can be mischaracterized as bare earth in LiDAR data sets and overhangs can be difficult to recognize. Georeferencing errors are common when integrating aerial photography into GIS data sets and catastrophically slumped sections of soil with intact flora can make a cliff face appear farther away from the shore than it actually is. While programmatic analyses like slope analysis or normalized difference vegetation index (NDVI) can provide quick and generally accurate results, greater accuracy requires the use of multiple data sets and techniques.

The LiDAR study resulted in a highly accurate depiction of the Block Island shoreline before and after Hurricane Sandy. This information was applied to the locations of known archaeological sites to assess potential damage to archaeologically sensitive areas. It also offered an overview of some of the heaviest Hurricane Sandy impacted areas, providing a list of areas on the island to search for new shoreline sites during the Phase I survey.

The study area was stratified into zones of expected archaeological sensitivity (no, low, moderate, and high). Archaeological sensitivity is defined as the likelihood for sites to be present in an area and is based on numerous factors, including the presence/absence of reported archaeological sites, known patterns of Native American and post-contact land use, previous archaeological surveys conducted within the study area, existing physiographic conditions, and the degree to which previous ground disturbances and land modifications (e.g., cutting, filling, and erosion) have impacted the coast. Approximately 95 percent of Block Island's shorelines were considered to have moderate to high archaeological sensitivity for pre-contact archaeological resources; 100 percent of the salt pond coastlines were considered to have high sensitivity. The seaward coastlines were considered to be of moderate to high sensitivity depending on bluff height and the size and proximity of a freshwater wetland. The only areas with no or low archaeological sensitivity were the barrier beaches and dunes along the extreme northwestern and northeastern tip of the island and in the developed areas adjacent to Old Harbor. Subsequent to the Phase II survey, seaward bluffs at or below the 30-ft (10-m) elevation were considered to highly sensitive as well.

Phase I (Site Identification) Survey

Following the archival research, sensitivity assessment, and the development of a predictive model (which indicated sites were likely fairly evenly distributed across all coastlines), the MPMRC conducted a walkover reconnaissance survey of Block Island's seaward and salt pond coastlines to identify HDADs eroding from the coastlines.

Prior to the commencement of fieldwork, a strategy for data collection was developed predicated on the need to inventory a large number of HDADs on a daily basis by multiple crews while ensuring consistency of data recording. A suite of applications was developed for mobile phones and tablets (iPad). These applications provided a way to record data, interact with maps, take photos, and log GPS coordinates from a single, convenient interface.

Development of a fully proprietary application was deemed financially untenable and too difficult to regularly update and distribute; instead a hybrid approach was adopted. Solutions were constructed on top of existing database management software that could provide rich data collection, tap location, and camera services on mobile devices. Automated data entry, data validation, and the ability to sync and centralize all records into a single location on a daily basis proved highly effective. While GPS data are generally only accurate to within a few meters on most devices, the use of external Bluetooth enabled GPS antennas linked to each mobile device achieved accuracy to within 50 cm over most of the shoreline of the island (considerably aided by a lack multi-path interference from trees and foliage on the coast). GPS points recorded on mobile devices were later rechecked with a Trimble GeoXH GNSS device to ensure accuracy. This process provided enough precision to document the general boundaries of archaeological resources using conventional mobile devices and obtain higher-grade GNSS accuracy where necessary.

The first weeks of fieldwork were spent traversing a sample of seaward and salt pond coastlines to test and refine the mechanics of the mobile data recording application and to refine the cultural, geographic, and ecological variables used in the archaeological sensitivity assessment. Automated data entry, data validation, and the ability to centralize all records into a single location on a daily basis proved highly effective. Adjustments were made based on observations on the ground, allowing the survey to begin in earnest.

While GPS data are generally only accurate to within a few meters on most devices, the use of GPS PRO antennas linked to each mobile device achieved accuracy to within 50 cm over 90 percent of the island (considerably aided by a treeless Block Island). GPS points recorded on mobile devices were later rechecked with a Trimble RTX GPS device to ensure accuracy. This process provided enough precision to document the general boundaries of archaeological resources and connection to external, higher grade GNSS devices when necessary.

During the Phase I survey, teams of three to five archaeologists walked the shorelines along the base of bluffs looking for evidence of artifacts, cultural features, and/or structural remains. The most efficient crew size was four to five individuals; three identified and flagged all artifacts and features (Figure 2-2) and the fourth and fifth crew members collected artifacts, took photographs of the site setting, general landscape, and features and cultural deposits, and recorded all relevant cultural and landscape information on the iPad site survey form application (Figure 2-3). Field crews moved slowly and carefully to identify and flag all artifacts that could be observed against the backdrop of a mix of sand and cobbles characteristic of Block Island beaches that could easily obscure smaller lithics, particularly quartz (Figures 2-4 and 2-5). Over a year's worth of post Sandy vegetative regrowth along impacted beaches and bluffs also hampered visibility and access. GPS points were taken at the end and mid-points of a discrete distribution of artifacts that extended greater than 5 m along the shoreline. A single GPS reading was taken at a single artifact find or if the HDAD was less than 5 m in length. A new HDAD number was assigned if there was a separation of at least 50 m between artifact distributions.

Figure 2-2. MPMRC staff flagging artifact finds along the Great Salt Pond.

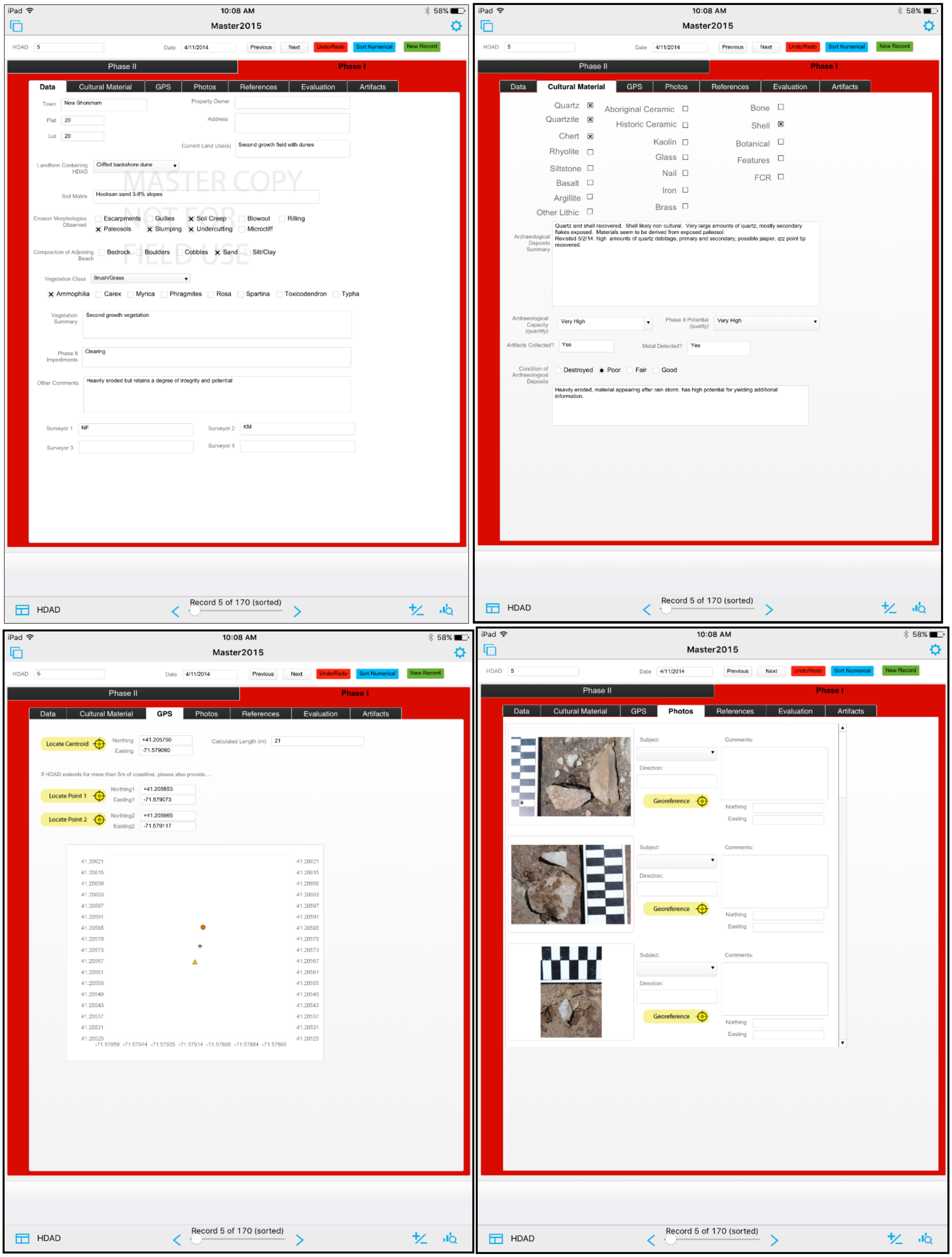

Figure 2-3. Screenshots of MPMRC's mobile data collection software.

Figure 2-4. Flagged artifact locations along collapsed bluff face.

Figure 2-5. MPMRC staff inspecting exposed paleosol and eroded beach scarp.

No subsurface testing was conducted during this phase of work. Where necessary, vertical soil exposures were troweled to assess soil stratigraphy and assist in the inspection of exposed surfaces for evidence or better definition of cultural deposits and discrete features (Figure 2-6). There was no attempt to correlate newly identified HDADs with known sites at the time due to the complex pattern of coastal erosion and the substantial size of some archaeological sites within the survey area. Formal association of individual HDADs with previously reported or newly identified sites was only made after subsurface testing was completed as part of the Phase II surveys.

Figure 2-6. Horizontal exposure of paleosol.

After each day, the entire trail that each team had walked was drawn as a polyline in a geodatabase, allowing coverage to be tracked. HDAD extents were also exported out of the field collection application at the end of each day and backed up into a separate database and uploaded into a web-based mapping service. This process allowed for a regular if not daily overview of the progression of the survey that was accessible by all the field archaeologists who were often working on different parts of the island at any given time. HDAD forms were completed for each exposed archaeological deposit in MPMRC's customized mobile data entry and validation software.

Phase II (Site Evaluation) Subsurface Testing

The goal of the Phase II survey was to determine the National Register eligibility of archaeological sites identified during the Phase I survey. Sites, not HDADs, were the unit of analysis for all National Register eligibility evaluations. Phase II archaeological testing was designed to maximize the recovery of archaeological data needed to assess those portions of the sites within the coastal zone that are threatened by continued shoreline erosion. Archaeological testing involved the excavation of 50-x-50-cm test pits along linear transects oriented parallel to the storm-exposed edge of the affected landform. Where feasible, parallel transects were placed within the survey area, which extended 10–15 m inland from the exposed shoreline edge. Surveys areas were modified to avoid disturbance or destruction of protective vegetation on eroded or otherwise unstable landforms. Depending on the vegetation, test pits were excavated at 5-m (16.5-ft) intervals along transects oriented to the cardinal directions (Figures 2-7 and 2-8).

Figure 2-7. Systematic Phase II testing, RI 2703.

Figure 2-8. Systematic Phase II testing, RI 2654.

Sampling arrays involved the excavation of 50-x-50-cm test pits at each of the cardinal directions at 2.5-m intervals around the original test pit that yielded cultural material and/or test pits that produced high artifact counts or unique finds. Where feasible, Phase II field testing at each location was extended to sterile areas to define or refine site boundaries. Excavation Units (EUs) measuring 1-x-1 m each were placed in areas of comparatively high artifact densities and/or suspected cultural features to provide additional information about stratigraphic integrity and the archaeological content and potential of each HDAD.

Selective metal-detecting surveys using a Mine Lab TDI and Whites DFX were conducted to locate potential Contact Period cultural materials (brass, lead, and iron). Metal detector surveys were generally found to be of very limited value along the seaward shorelines. In some areas, 50–100 cm of windblown sediments deposited in the 350 years since English settlement and land clearing overlay the original (seventeenth-century) ground surface. MPMRC identified post-contact features, such as stone walls, buried beneath windblown sands (Figure 2-9). MPMRC was successful in identifying potentially significant Contact Period archaeological resources along the salt pond shorelines through the metal-detecting surveys, as described in Chapter 6.

Figure 2-9. Buried stone walls.

All test pits and EUs were excavated in arbitrary 10-cm levels through natural topsoil or plowzone into sterile subsoil. Excavated soils were screened through ¼-inch hardware cloth. Recovered cultural materials and samples were bagged and labeled with appropriate provenience information (e.g., HDAD, unit, stratum, depth, and features). Profiles were drawn for all units and level plans were drawn of all cultural features and soil anomalies on standardized MPMRC excavation forms, noting Munsell soil colors and texture. The location of each EU in relation to a N0 E0 datum point on a Cartesian grid system was used to provenience all test pits and EUs. The precise location of the N0 E0 datum point was recorded by GPS using a Trimble GeoXH GNSS device.

All artifacts were recorded to the nearest 50-cm quadrant within an EU and all features were mapped and photographed. Exposed features were mapped, photographed and cross-sectioned to record profiles. Feature soil matrix was bagged for flotation and future analysis. A sample of lithic and ceramic artifacts from identified features and paleosols considered to be in good archaeological context were recovered for potential phytolith, starch grain, and lipid analysis. Ceramics with carbonized food remains adhering to the inner surface were also collected for starch grain, phytolith, and pollen analysis. In these instances, the artifact was touched only with rubber gloves or a trowel and placed in a plastic bag with a sample of the surrounding soil matrix.

A major impediment to the Phase II surveys was a lack of access and landowner permission to conduct subsurface investigations. Block Island's largely seasonal population was often difficult to reach via second and third home addresses and LLC contact data. MPMRC's approach to negotiating access to specific properties was informed by MPMRC's experience in stakeholder development and community engagement for mainland surveys in Connecticut to identify and evaluate Pequot War sites. Patience and consistent engagement with supportive property owners and other established stakeholders on the island proved effective in gaining access to several properties over the course of the Phase II surveys. The other benefit of MPMRC's approach in developing mutually respectful relationships with local residents and organizations on Block Island was MPMRC's new partners' sharing of information on newly discovered archaeological resources encountered during construction projects. Although these resources were not investigated as part of the Hurricane Sandy surveys, they are briefly summarized in this report as part of the relevant archaeological context.

A number of sites situated on landforms between the 15-ft and 30-ft (5-m and 10-m) elevations along the east and west seaward coasts were significantly impacted by Hurricane Sandy, which stripped the protective dune and vegetation cover off the sites, exposing the original ground surface or paleosol. In these instances a grid was established and the exposed surface was cleaned of loose sand and scraped to identify potential features on the horizontal surfaces (Figure 2-10). No shovel test pits were excavated on the exposed paleosol; most artifacts were contained within the uppermost 5-10 cm of the remaining paleosol and features were readily visible after scraping the remaining thin paleosol to subsoil. Although the internal complexity of a site could be assessed in most instances based on the features visible in the exposed paleosol and subsoil and the recovered artifact assemblage, site boundaries could not be determined. No test pits were placed beneath the sand dunes in compliance with CRMC policy and regulations regarding the removal and disturbance of sand dunes. In fact, if the slightest evidence was noted of vegetation trying to re-establish itself on beach sands, it was not disturbed (Figure 2-11; note isolated vegetation in foreground).

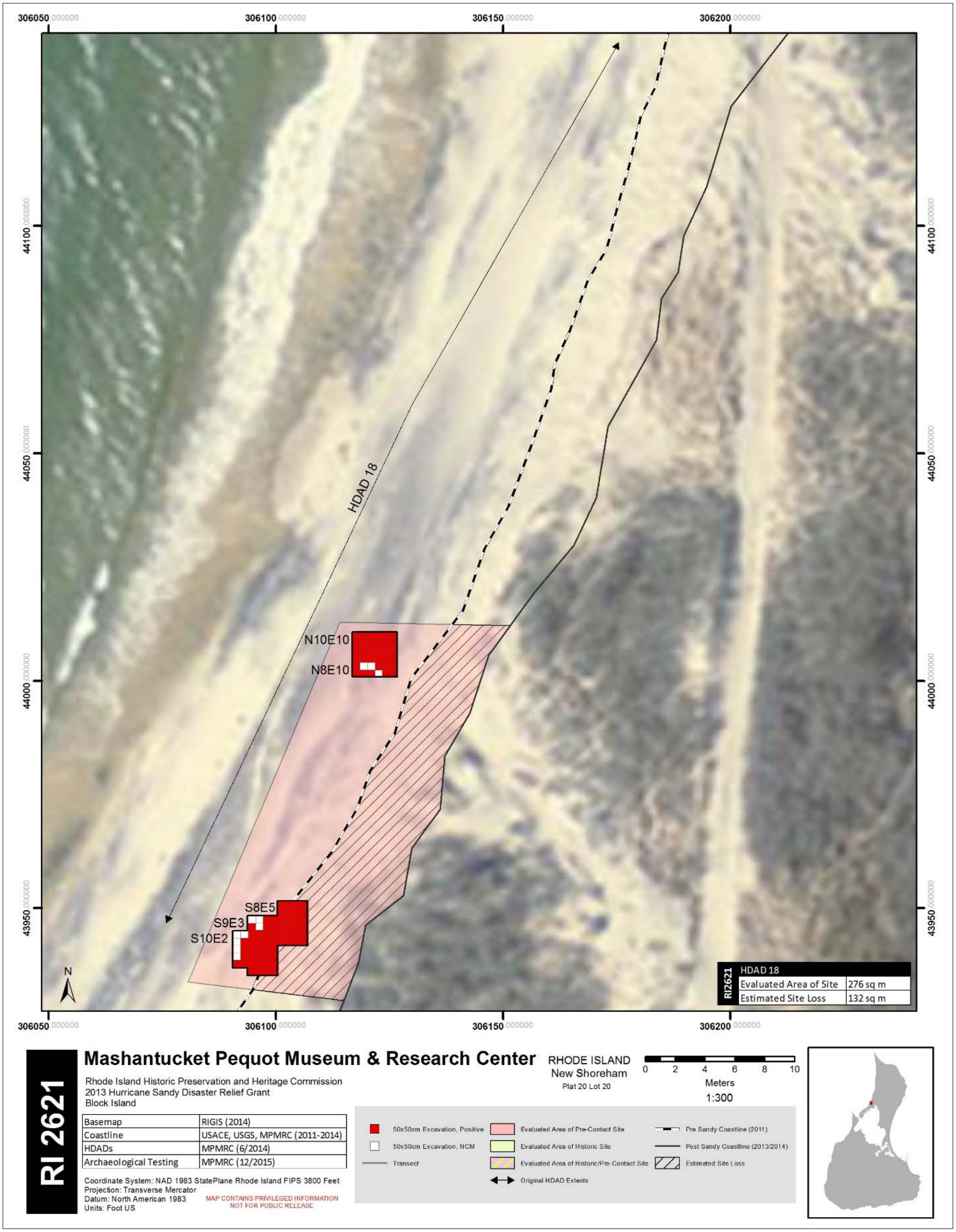

Figure 2-10. Phase II investigations on exposed paleosol, RI 2621.

Figure 2-11. Protection of vegetation during Phase II survey (note isolated vegetation in foreground).

Laboratory Processing and Analyses

Processing

All cultural materials recovered from the Phase I and Phase II archaeological investigations were organized and recorded by HDAD/RI site number and provenience. Cultural materials were transferred to the MPMRC's Research Department's laboratory facility on a weekly basis. Materials were sorted by type (e.g., lithic, ceramic, metal, or flotation sample) and either dry brushed or cleaned with tap water depending on the material or artifact type and condition. Artifacts recovered for specialty analysis were not cleaned.

Cataloging and Analyses

Cultural materials were cataloged using a customized relational database. The Microsoft Access-based database provided flexibility in cataloging a wide range of archaeological materials such as lithics, ceramics, glass, iron, brass, lead, and faunal and botanical remains. The central database was linked to GIS and Surfer applications for spatial analysis. The artifacts were placed in 2-mil-thick polyethylene re-sealable bags with acid-free tags containing provenience identification information. These bags were placed in acid-free boxes that were labeled and stored in the MPMRC's curatorial facility in accordance with current NPS standards.

Metal objects, particularly iron and brass, were brought to the Conservation Laboratory of the MPMRC and immediately refrigerated for stability and to minimize deterioration. Iron objects were radiographed to assist in identifications and to assess their condition before additional conservation procedures were conducted. If a ferrous object was considered to be an artifact (i.e., pre-dating 1950), it went through a series of conservation procedures including air abrasion and tannic acid baths.

Culturally modified lithic materials, such as stone tools and chipping debris, were identified in terms of material type, size (0–1 cm, 1–3 cm, 3–5 cm, etc.), and artifact type. MPMRC maintains a lithic material type collection containing materials from various known source areas in New England and nearby regions such as New York and Pennsylvania which was used to identify lithic material types. Although artifacts of several well-documented lithic materials were recovered during the investigations, such as Attleboro Red felsite (Figure 2-12), MPMRC found the reference collection to be of limited utility in identifying the more "exotic" or non-local material types that were found in many of the Block Island site assemblages (Figures 2-13 to 2-15). Many of these materials were not previously identified in archaeological sites and their source is currently unknown. These materials were obtained by Native Americans from glacially transported cobbles found along the Block Island beaches.

The parent bedrock sources may be dozens if not hundreds of miles to the north. Veins of cryptocrystalline quartz (chalcedonies) and jaspers have been documented at Diamond Hill in Cumberland, Rhode Island (Quinn 1971:45). The Narragansett Bay-Buzzards Bay ice lobe (described in Chapter 3) would have flowed over Diamond Hill and may have carried cobbles from the local bedrock to the terminal moraine on Block Island. The bedrock sources of Attleboro red felsite and Wamsutta Formation felsites are located along the same glacial flow corridor. Although the bedrock sources of the fine-grained stone are unconfirmed, it is clear that Block Island flintknappers could readily identify these materials in cobble form and could be highly selective, as reflected in the diverse lithic assemblages associated with many Late Woodland sites. Tim Ives, Rhode Island State Archaeologist and an experienced flintknapper, spent less than an hour cracking and examining cobbles on one small section of beach and identified a wide range of high-quality lithic materials, many of which were not familiar to him. Petrographic thin-sectioning or other analyses outside the scope of the Hurricane Sandy surveys would be required to further assess these unusual lithic materials.

Chipping debris (debitage) was classified as either primary, secondary, or tertiary flakes or angular debris and shatter. Debitage with evidence of cortex (derived from beach cobbles) was classified as a primary flake indicative of initial lithic processing. Flakes with no evidence of cortex and exhibiting evidence of a striking platform, bulb of percussion, or identifiable flake extraction from a dorsal surface were classified as a secondary flake. Flakes with evidence of a bifacial edge were classified as tertiary flakes indicative of bifacial thinning; if the bifacial edges exhibited evidence of utilization damage (smoothing, crushing, or step-hinge), they were classified as re-sharpening (maintenance) flakes. Debitage without these attributes, and exhibiting angular or blocky forms, were classified as angular debris. The edges of all form tools and debitage were examined for use wear and or intentional retouch. Artifact typologies developed for the region (Boudreau 2008; Fogelman 1992; Fowler and Hoffman 1991; Ritchie 1971) were consulted to type specific artifact types and projectile points collected from the site.

Seventeenth- though mid-twentieth-century cultural materials recovered from the Phase II surveys were cataloged according to material (e.g., ceramic, glass, coal, and synthetic) and function (e.g., plate, bowl, bottle, building material). Ceramic sherds and bottle glass were examined for distinguishing attributes that might provide more precise date ranges of manufacture and use, including maker's marks, decorative patterns, and embossed or raised lettering. Preliminary dating of post-contact archaeological materials was performed using ceramic indices developed by Ivor Noël Hume (1969), Miller (1980, 1991), Miller and Hurry (1983), and South (1977). An analysis of the different nail and bottle types was used to refine the preliminary date ranges of historical occupation generated from the ceramic analyses.

Curation

All recovered cultural materials were placed in acid-free Hollinger boxes with box content lists and labels printed on acid-free paper. Metal artifacts were placed in sealed air tight containers with silica gel to reduce moisture to 40 percent relative humidity. The cataloged artifacts and associated project documentation are

Figure 2-12. Attleboro Red felsite.

Figure 2-13. Chalcedony.

Figure 2-14. High-quality quartzite.

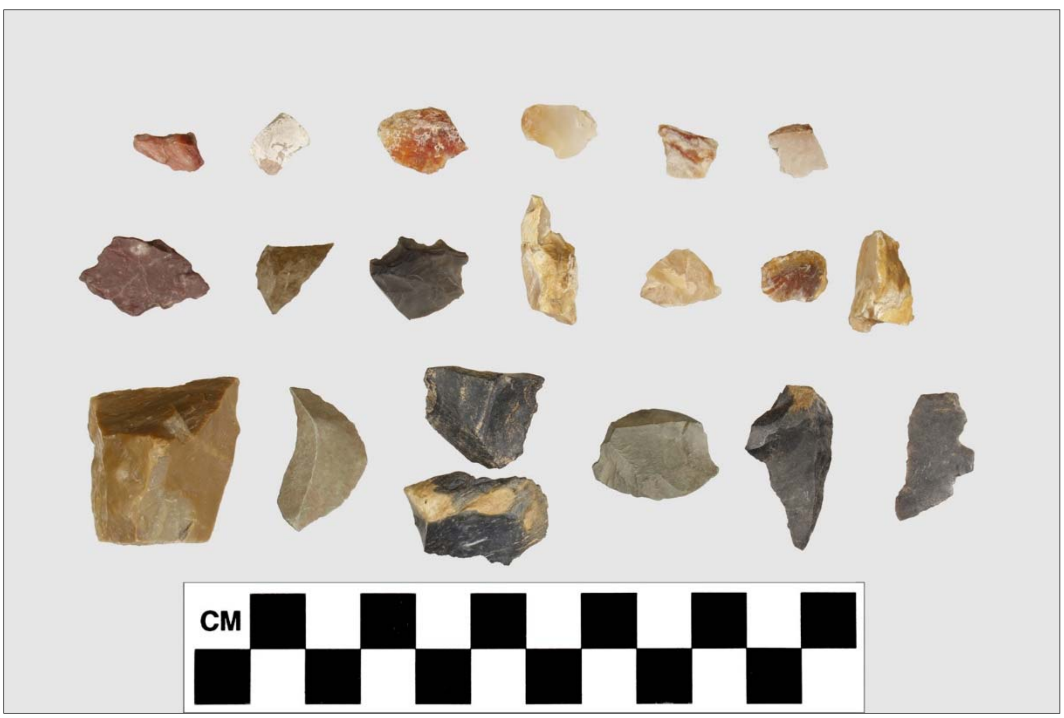

Figure 2-15. Exotic lithic materials, RI 2621.

stored in the Research Department of the MPMRC, 110 Pequot Trail, Mashantucket, Connecticut, in accordance with the Secretary of the Interior's Curation of Federally-Owned and Administered Collections (36 CFR 79), until such time as a permanent repository is designated.

Preservation Planning and Resource Management

MPMRC prepared management recommendations for the archaeological sites recommended as eligible for listing in the National Register of Historic Places. These recommendations were informed by current best practices developed by the National Park Service and the agency's partners in managing historic properties located on both private and public lands. MPMRC adapted the public stakeholder and community engagement processes implemented for the NPS's American Battlefield Protection Plan program to the Block Island coastline resources. The recommendations emphasize early identification of key interest groups and stakeholders, comprehensive management assessment, and prioritization of preservation efforts based on the threat of loss and the relative potential of the archaeological sites to provide important new information about Block Island's people and their connection to the sea, salt ponds, and coasts.

CHAPTER THREE

ENVIRONMENTAL SETTING

Block Island is located approximately 9.4 miles (15.1 km) south of mainland Rhode Island and 14.0 miles (22.5 km) northeast of Montauk Point, Long Island, New York (Figure 3-1). It is surrounded on the north, west, and east by Rhode Island Sound and Block Island Sound and on the south by the Atlantic Ocean. The island encompasses roughly 10 square miles above mean high water The island is a terminal end moraine formed about 21,000 years ago during the last glacial maximum (Figure 3-2). Block Island belongs to a chain of end moraines and glacially created islands in southern New England stretching from Long Island on the west to Nantucket on the east (Figure 3-3). At glacial maximum, sea levels were approximately 390 ft (120 m) below current levels with the shoreline 80–100 miles (130–160 km) south of Long Island (Coleman and McBride 2008; Stone and Sirkin 1996) (Figure 3-4).

Surficial Geology

The Laurentide ice sheet had advanced to its terminal position about 3–5 miles south of present-day New Shoreham at the height of the Wisconsin Glacial Period approximately 21,000 years ago (Figure 3-3) (Stone and Sirkin 1996). Glacial advance across Rhode Island during the last glacial episode flowed southeast and southwest in two lobes with Block Island located at the contact of the two lobes (Figure 3-2). The origin and direction of the lobes have important implications for the nature of lithic raw materials found in cobble form along Block Island's beaches. A variety of lithic materials from sources 50–100 miles northwest and northeast of Block Island were transported to the island by these lobes and are available in cobble form on the Block Island beaches. Glacial ice began to retreat about 18,000 B.P., resulting in complete deglaciation of southern New England by approximately 15,000 B.P., and all of New England by 12,500 B.P. (Lawson 1995; Uchupi et al. 2001).

The wasting of glacial ice after 18,000 B.P. was interrupted by several major standstills, as evidenced by the two major end moraines that occur along the southern New England coast: the Ronkonkoma-Block Island-Martha's Vineyard Moraine and the Charlestown terminal moraine complex (Lawson 1995).These moraines are composed of poorly to well-sorted glacial till that contains boulders, rocks, gravel, sand, silt, and clay. Comparatively shorter pauses in glacial retreat resulted in the formation of the Old Saybrook and Ledyard moraines (Figure 3-3). Block Island is composed of stratified morainal material deposited at the interlobate contact of the Hudson-Champlain and Narragansett Bay-Buzzards Bay glacial ice lobes (Stone and Sirkin 1996). Block Island is composed of two morainal highlands termed the Beacon Hill (south) and Corn Neck (north) moraines, which rise approximately 270 ft (90 m) above the sea floor (Sirkin 1981). The highlands are connected by a series of barrier spits or tombolo beach deposits: Crescent Beach to the east and Harbor Neck and Gunners Hill to the west (Boothroyd and Sirkin 2002; Sirkin 1981). These features later helped define the freshwater Great Pond and later the saltwater Great Salt Pond. Block Island's upper (younger) moraine zone consists of stratified Pleistocene glacial meltwater deposits, non-sorted sediment-flow deposits, and bouldery till, while the lower (older) moraine zone consists of large discontinuous blocks of Cretaceous deposits deformed and displaced by glacial activity (Sirkin 1981; Stone and Sirkin 1996:9). Flowing meltwaters and stagnant or buried blocks of ice created a variety of landforms visible on Block Island, including kettle depressions (now visible as ponds), kames, drumlins, meltwater deposits, and erosional drainage channels (Boothroyd and Sirkin 2002).

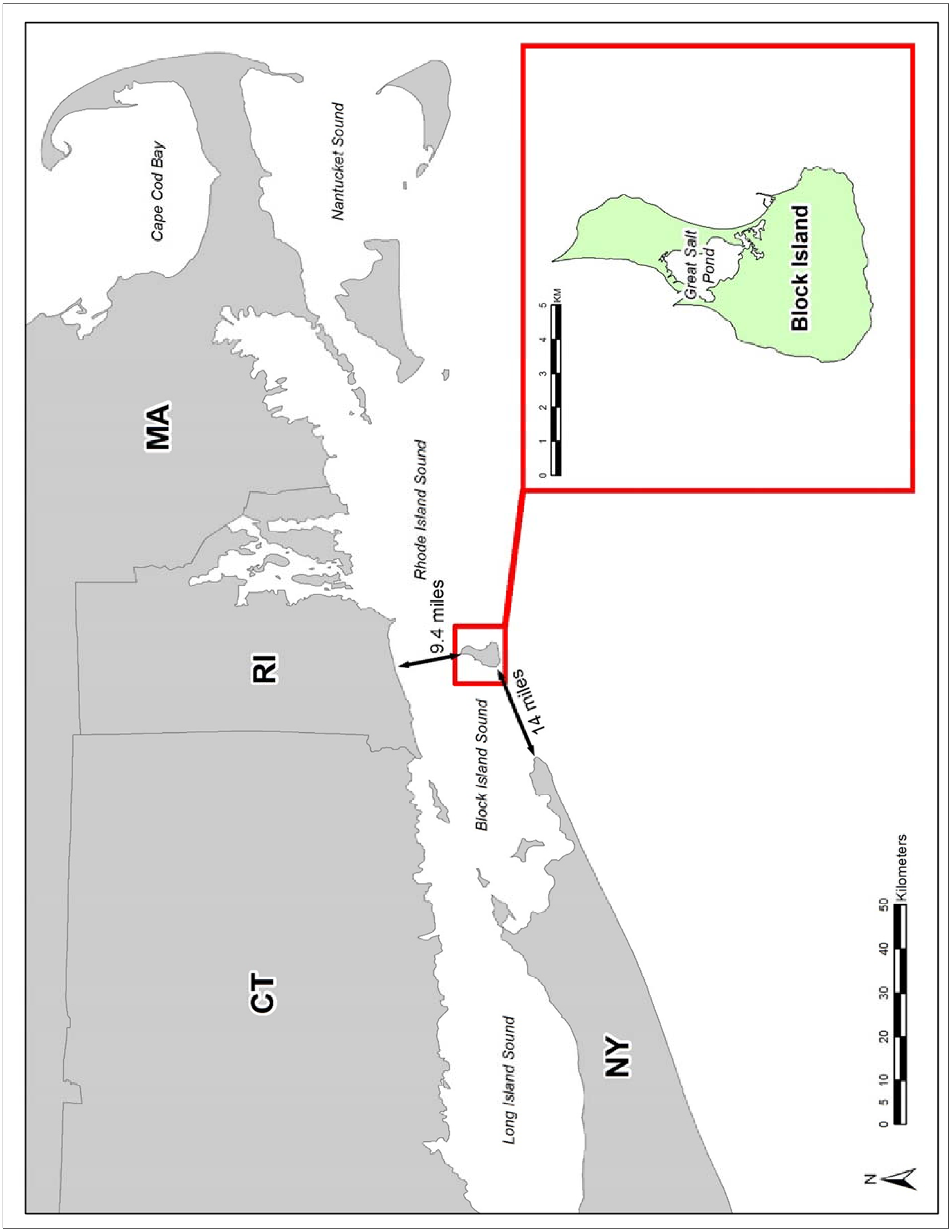

Figure 3-1. Block Island location relative to Long Island and the Rhode Island mainland.

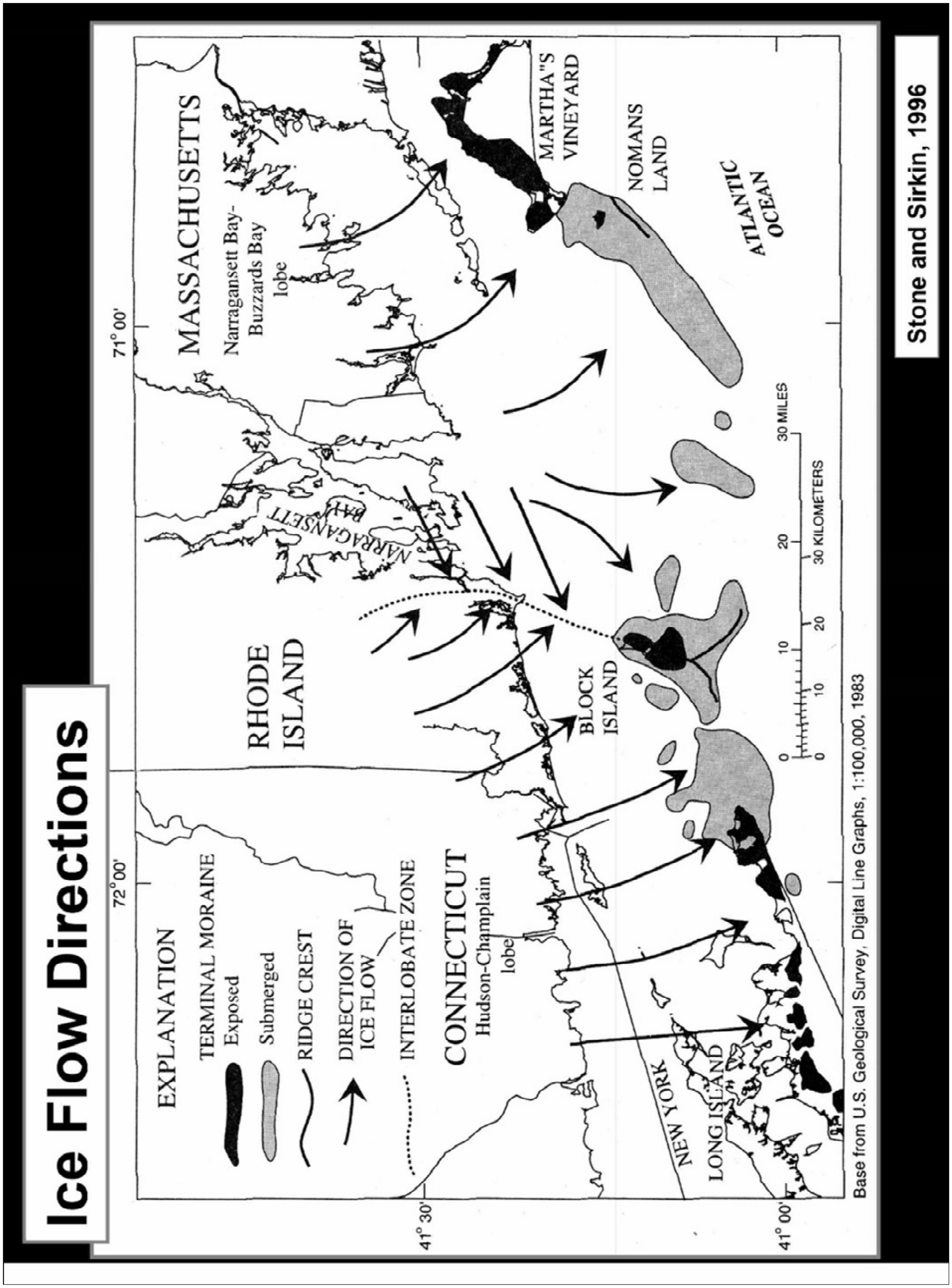

Figure 3-2. Ice flow directions.

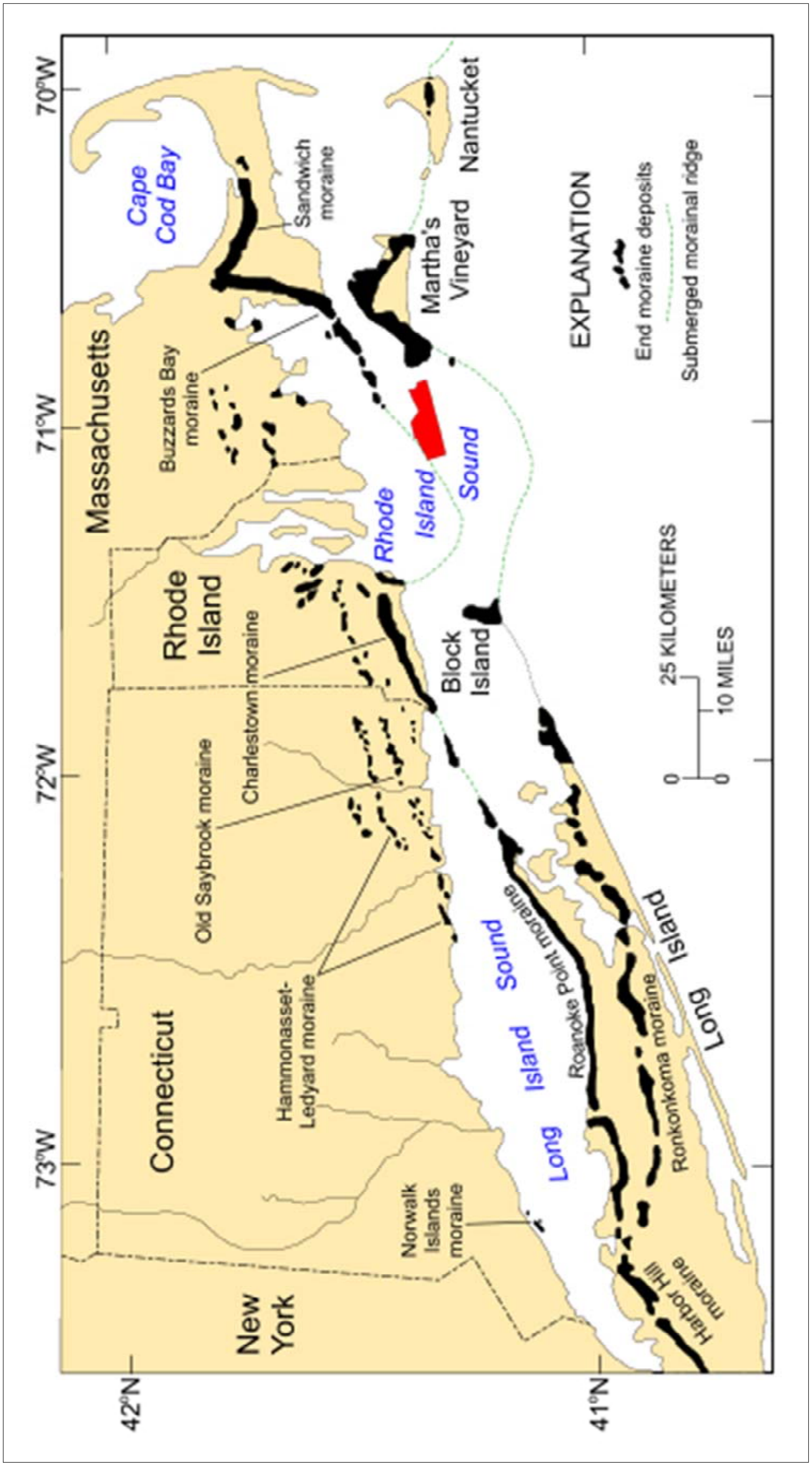

Figure 3-3. End moraines, southern New England.

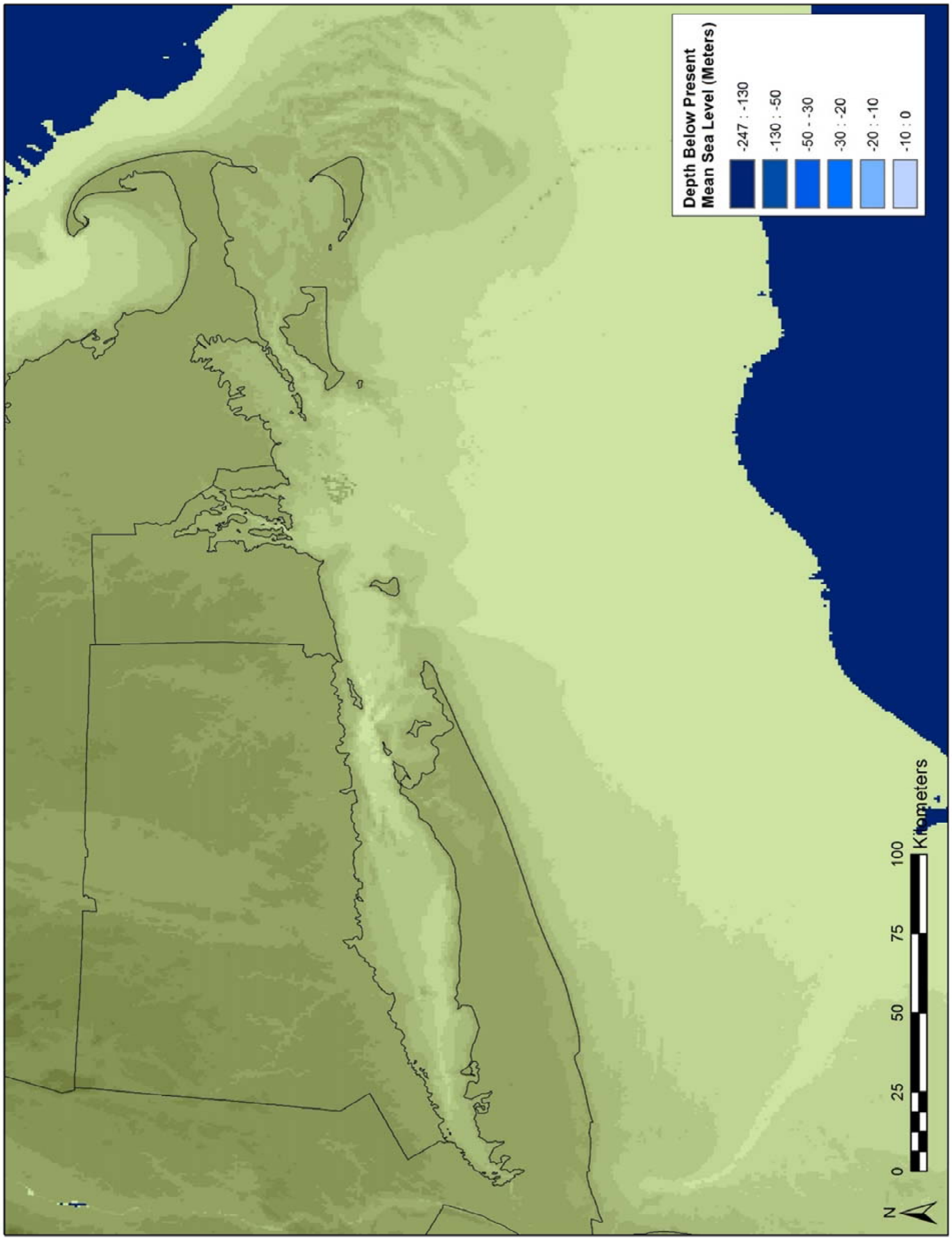

Figure 3-4. Shoreline ca. 21,000 B.P.

As the ice receded northward, glacial meltwaters drained into the ocean, resulting in a rise in sea level and transgression of the sea over the formerly exposed coastal sand and gravel outwash plain. The rate of sea level rise was initially relatively fast, but decreased as the glaciers shrunk in size with the shoreline taking on its generally modern appearance by approximately 6000 B.P. (Figures 3-5 to 3-8).

The large elevated landmass that was to become Block Island extended 30 miles (48 km) south into the continental shelf about 10,000 B.P. (Figure 3-6). As sea levels rose from glacial meltwaters, the Block Island landmass continued to change, achieving its current configuration about 6000 B.P. (Figures 3-5 to 3-8). Between 4000 B.P. and 3000 B.P., rising sea levels breached the narrow barrier that separated the large freshwater pond (future Great Salt Pond) in the center of the island from the sea (Bellantoni 1987; Tveskov 1992). The Great Salt Pond that subsequently formed was originally a freshwater pond occupying much of the lowlands between Beacon Hill and Corn Neck. These two highlands were severed from each other when the seas breached the freshwater pond. Rising sea levels created a saltwater channel between the two islands that was eventually blocked on the east and west ends by sand spits that formed between 4000 B.P. and 3000 B.P. The continental shelf that surrounds the Bock Island landmass, and the Great Salt Pond that occupies 10 percent of the island's interior, contain some of the richest marine communities in the region because of the highly variable bathymetry (underwater topography). The Great Salt Pond is generally deeper, saltier, and clearer than the salt ponds on the Rhode Island mainland and provides a unique and productive ecological niche (Nixon 2004). The bathymetric variability is particularly evident off the southwest corner of the island and makes it a particularly attractive fishing area (Figure 3-9), described in detail in Chapter 4.

Soils

Soils are the product of "physical and chemical processes acting upon geological material" (Rector 1981:57). Glacial ice picked up and ground bedrock, which was then transported and deposited as a mixture of unweathered rock particles of various sizes. These sediments were separated and sorted by glacial meltwater. Strong winds distributed fine eolian (windblown) particles over the landscape. Vegetation became established, chemical processes of weathering increased, and rock sediments developed into soils. Differences in local and regional soils are primarily attributed to the interaction of the five factors of soil formation: the parent material, climate, living organisms, relief, and time. The soils on Block Island have developed since the retreat of the glaciers about 18,000 years ago. In many areas of Block Island the process of deforestation that began about 1000 B.P. with the introduction of maize horticulture was greatly intensified with the arrival of English settlers in 1661 (e.g., Sirkin 1976). Land clearing was so severe that by 1721 the Town of New Shoreham passed an ordinance prohibiting any cutting of trees for fencing (Livermore 1877:26). With no tree roots to hold the soils, the constant winds on Block Island picked up fine-grained terrestrial sediments and beach sands and redeposited them in various areas of the island. Geologists have encountered an eolian mantle exceeding 1 m in thickness in some parts of the island (e.g., Stone and Sirkin 1996).

Block Island Ecology

Block Island is situated in an ecologically unique region; the Rhode Island Sound and Block Island Sound ecosystems are located at the boundary of two intermingling biogeographic provinces: the Acadian to the north (Cape Cod to the Gulf of Maine) and the Virginian to the south (Cape Cod to Cape Hatteras). The presence of Block Island, an 11-square (sq) mile (28-sq km) island on the inner continental shelf, created the potential for a diversity of shallow and deepwater marine environments and communities. Because of this, the waters surrounding Block Island contain a very rich and diverse mix of northern, coldwater species and more southern, warmwater fish and mammal species (Hale 2002).

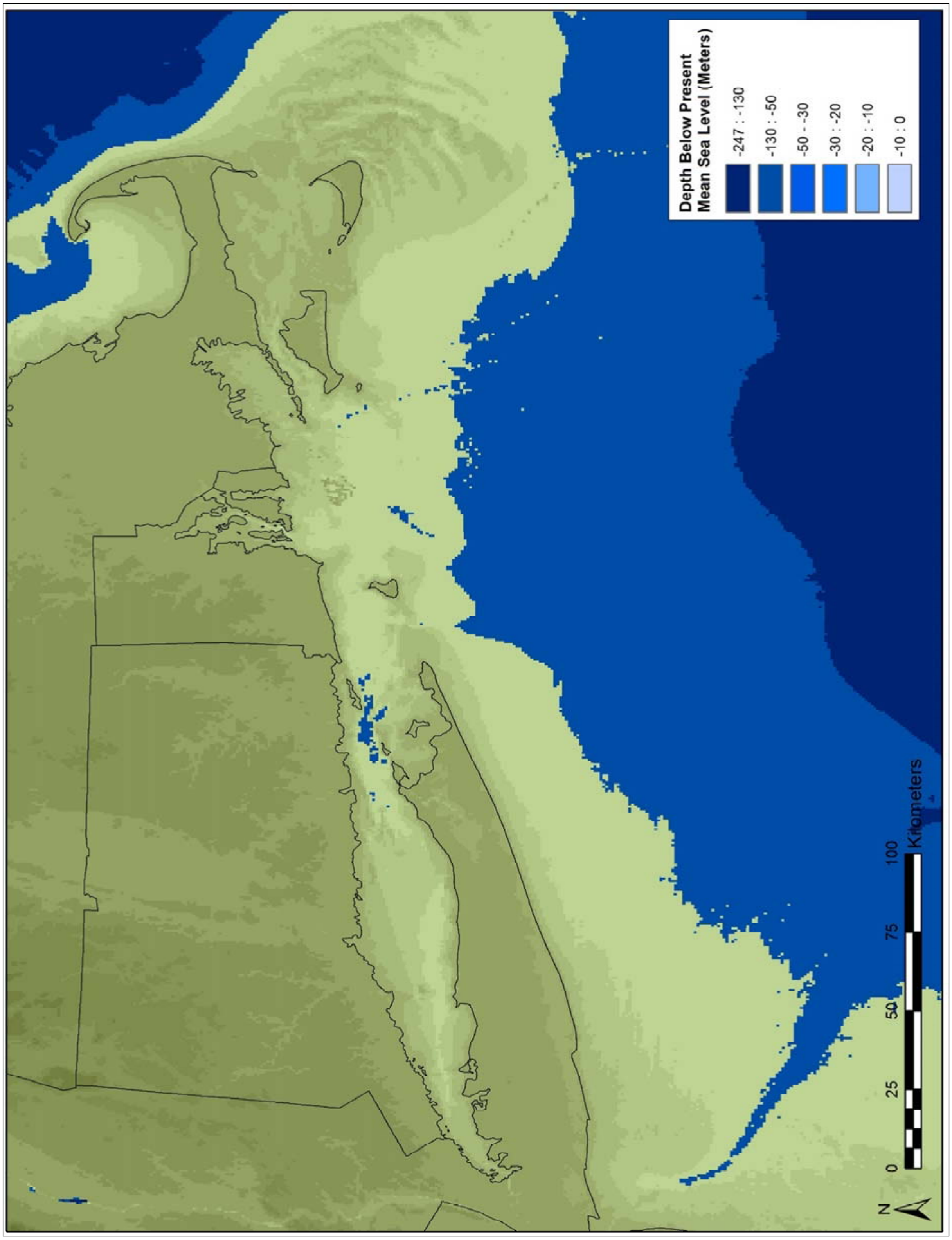

Figure 3-5. Sea level, 11,000 B.P., -50 m below present.

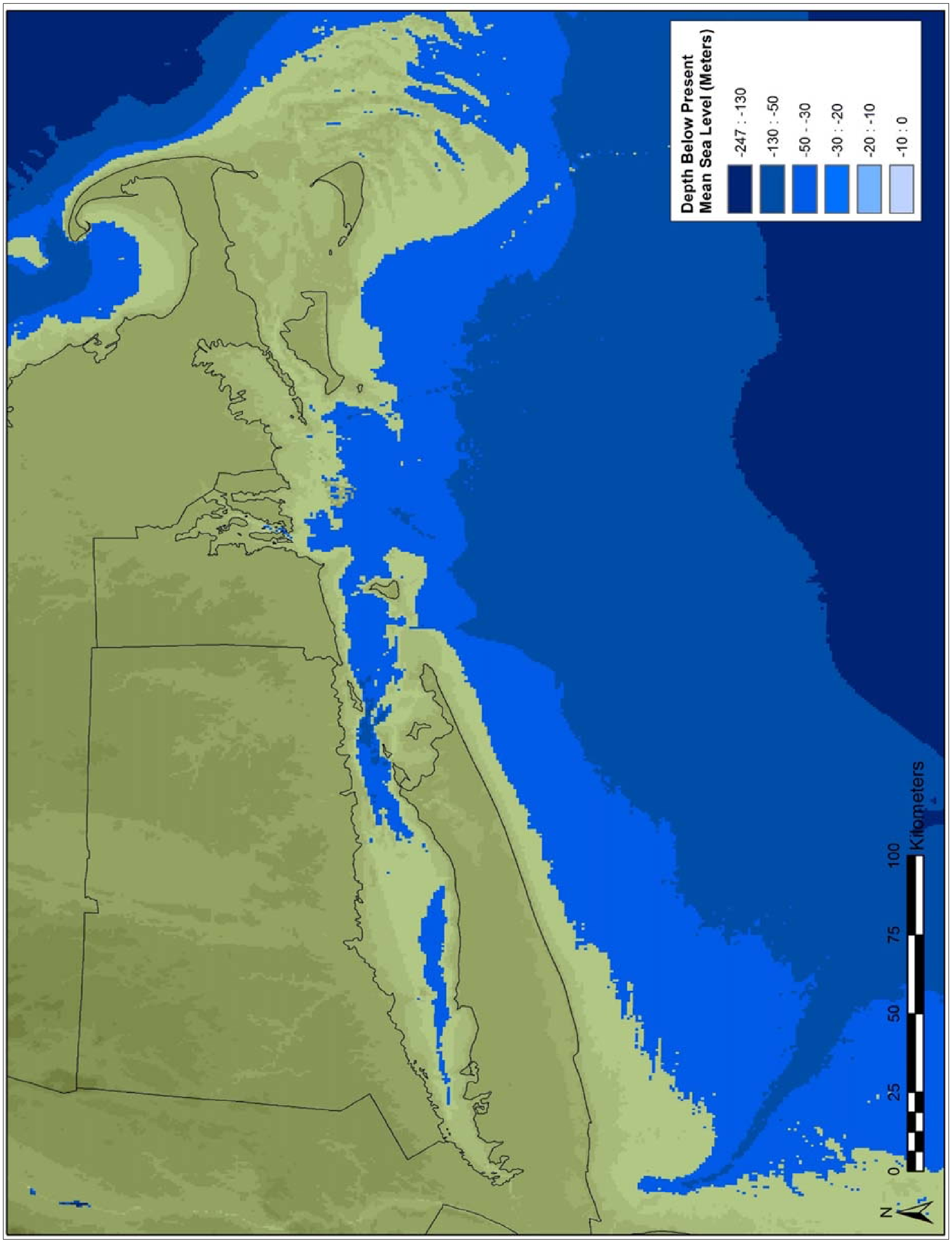

Figure 3-6. Sea level, 9900 B.P., -30 m below present.

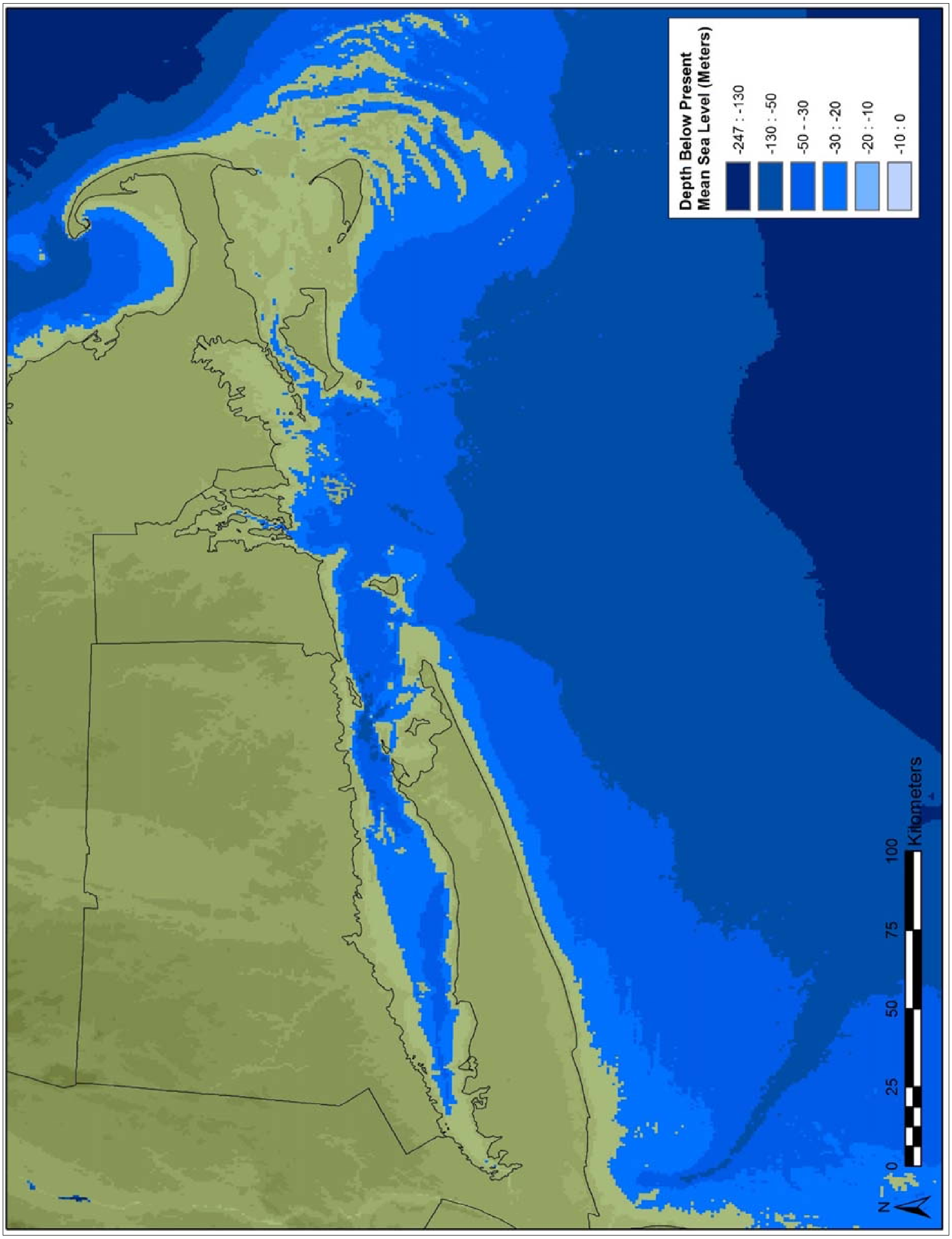

Figure 3-7. Sea level, 7300 B.P., -20 m below present.

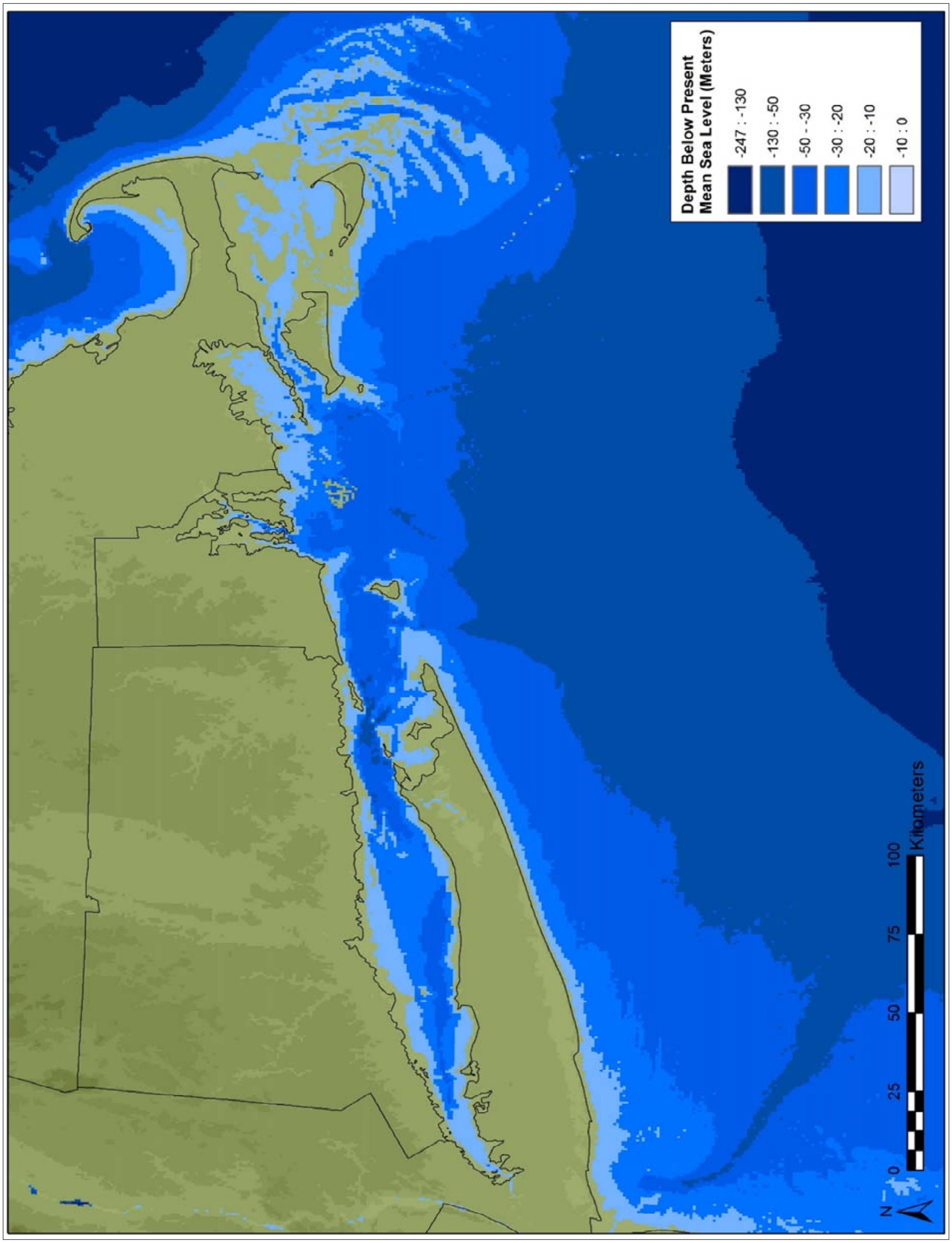

Figure 3-8. Sea level, 6000 B.P., -10 m below present.

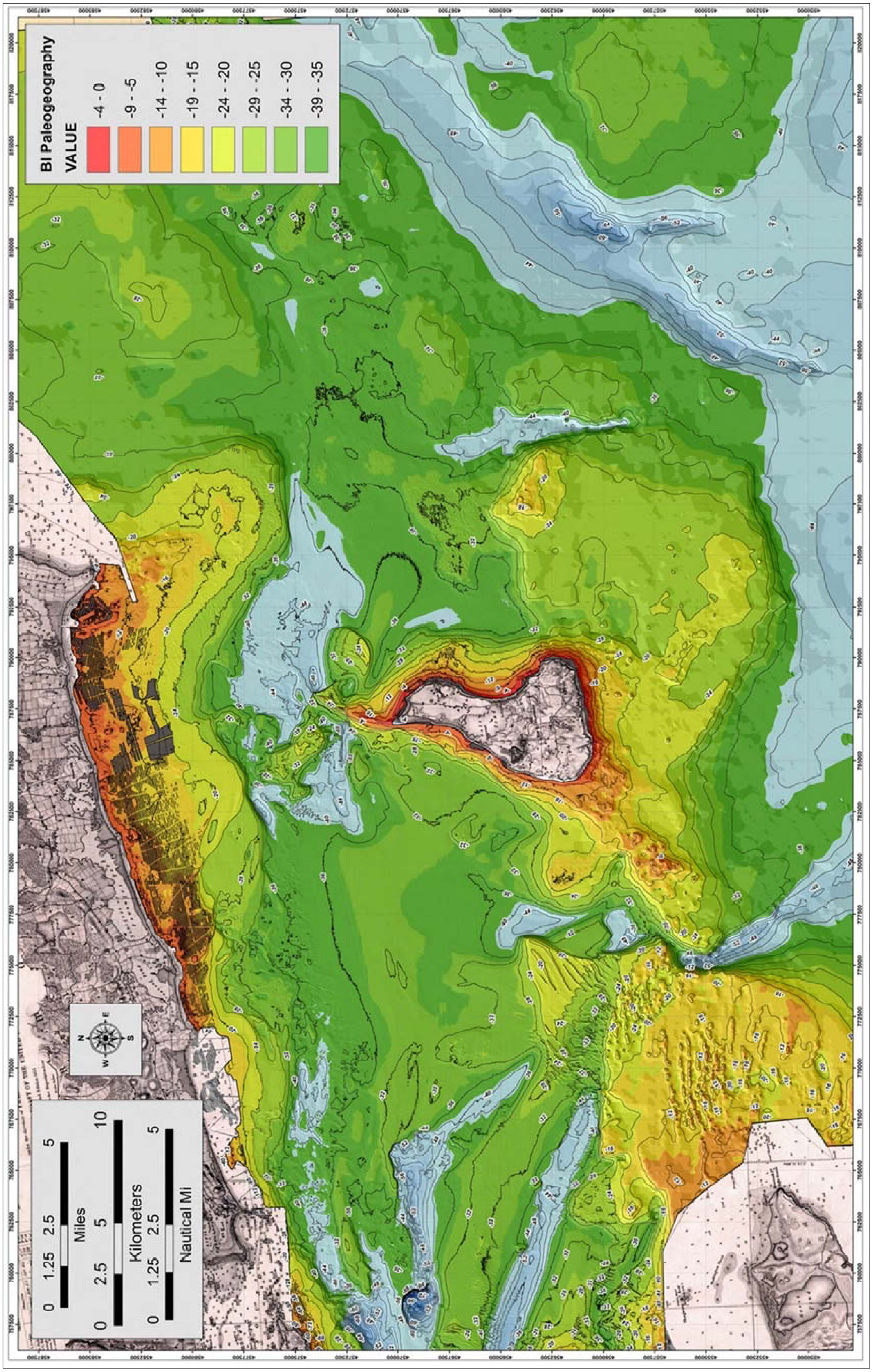

Figure 3-9. Block Island regional bathymetry.

Important fish species often recovered from archaeological sites on Block Island are Atlantic and Shortnose Sturgeon, Cod, Tautog, Bluefish, Winter Flounder, Summer Flounder, King and Atlantic Mackerel, American and Hickory Shad, Pollack, Scup, American Eel, and Sea and Striped Bass. Some of these species, such as Atlantic Sturgeon, are anadromous or seasonally abundant in Block Island waters, making them good seasonal indicators when recovered from archaeological sites (Bellantoni 1987; Nixon 2004; Tveskov 1997; Table 3-1). Grey and Harbor Seals are also common in Block Island waters from November through April. Seal bones are by far the most frequently recovered mammal remains from Woodland Period sites on Block Island (e.g., Bellantoni 1987).

Table 3-1. Common Fish Species and Seasonality.

Species	Season				Comments
	Winter	Spring	Summer	Fall	
American Shad		X	X	X	Anadromous; May and June
Hickory shad				X	Anadromous; September–November
Blueback herring		X	X		Anadromous; May and June
Other herring		X	X	X	Anadromous; April–June spawning runs
Alewife		X	X	X	Anadromous; April and May
Atlantic Tomcod	X	X	X	X	Highest numbers in spring and fall
Scup		X	X	X	Prefers warm water
Striped Bass		X	X		Not cold water tolerant
Sea Bass		X	X		Not cold water tolerant
Tautog	X	X	X	X	Resident fish but spends winter offshore
Atlantic sturgeon		X			Anadromous; April and May
Short-nosed sturgeon	X	X	X	X	Anadromous; April and May and small numbers year round
Winter Flounder	X	X	X	X	Most common in winter
Summer Flounder		X	X		Not cold water tolerant
Eel	X	X	X	X	Catadromous; mid-March–April
Catfish	X	X	X	X	Brackish tolerant
Perch	X	X	X	X	Brackish tolerant

A wide variety of resident and migratory birds have also been recovered from Block Island Native sites, with water birds being the most abundant and economically important (Table 3-2). Water birds are most common on Block Island during the spring and fall, with peaks from early March through mid-April, and again in late September through October. Water depths of less than 60 ft (20 m) are important feeding habitats for diving ducks, making the waters surrounding Block Island ideal habitats for a variety of duck species.

Table 3-2. Common Waterfowl and Seasonality.

Waterfowl Type	Season				Comments
	Winter	Spring	Summer	Fall	
Canada geese	X	X		X	Migratory; overwinters in estuaries before leaving in spring for northern nesting grounds
Brant	X	X		X	Migratory; begin arriving in September, and leave in June for arctic nesting grounds
Residential ducks	X	X	X	X	Includes sea ducks, bay ducks, mallards, black ducks, teals, and wood ducks, Great Auk (extinct)
Winter ducks	X	X			Includes mergansers, canvasbacks, scaup, buffleheads, golden eye, ring-necked, and

Continued on next page

Waterfowl Type	Season				Comments
	Winter	Spring	Summer	Fall	
					ruddy-head ducks, as well as non-resident mallards, black ducks, and teals
Sea Ducks		X		X	Includes eider, scoters, and long-tailed ducks

Great Salt Pond

The Great Salt Pond is one of the most productive interior marine environments in the region and, along with Trims and Harbor salt ponds make up 10 percent of the area of Block Island (Figure 3-10). Coastal salt ponds or lagoons such as the Great Salt Pond are common along the glacial moraines from Long Island to Nantucket, including the south coast of Rhode Island. The Great Salt Pond is unique in comparison to the mainland salt ponds because of its depth and estuarine nature.

The pond is 610 acres (255 hectares), not including Trims and Harbor ponds. A constant supply of fresh water entering the pond from ground water, and runoff from the 2,120-acre watershed surrounding the pond lowers salinity relative to the surrounding ocean. The pond is also relatively deep for a coastal lagoon; approximately 50 percent of its area is greater than 12 ft (4 m) in depth with a maximum depth of 55 ft (17 m). The deeper waters of the Great Salt Pond, as compared to mainland salt ponds, provide a winter refuge for many species that normally move out of the mainland salt ponds during the winter. The Great Salt Pond also has an organic soft bottom habitat that supports a wide diversity of invertebrates (Hale 2002).

As a result of these factors, the Great Salt Pond supports a much more varied and richer ecosystem than other salt ponds in the region**.** Deep lagoons such as the Great Salt Pond support a diversity of marine and estuarine fish species. The populations of fish in the Great Salt Pond and relative abundance of species has varied through time depending on salinity, which can fluctuate depending on whether the breachway is open or closed. Species historically found in this waterbody include White Perch, American Eel, Alewife, Winter Flounder, Atlantic Sturgeon, Blueback Herring, Striped Bass, and Tautog (Hale 2002). Although these fish are present in the salt pond, they are found in much greater numbers in the waters surrounding Block Island. The salt ponds also support a dense and varied shellfish population, the most important being quahog, hard and soft shell clam, and scallop (Table 3-3). For comparison, only mussels are found in significant numbers in Block Island Sound. Until a permanent breachway was constructed in 1895, the salt pond was connected to the sea along its western beach by a narrow channel that would be battered open by periodic storms and eventually close again by longshore drift of sands that subsequently lowered the salinity of the pond from the addition of fresh water from groundwater and runoff.

The abundance and diversity of shellfish and fish species recovered from Block Island middens throughout the Woodland Period (3000–400 B.P.) indicate the Great Salt Pond was always saline enough to support a variety of marine and estuarine fish and shellfish. Of all the species of shellfish found on Block Island, oyster has the greatest tolerance for lowered salinity and not surprisingly is one of the more common shellfish species recovered from Block Island sites (Table 3-3). Temperature also plays an important role and there is a correlation between decreasing salinity and rising temperature in the salt ponds when the flow of cooler ocean water is restricted or cut off.

Historical records refer to the presence or absence of a channel and the resulting effects of fluctuating salinity in the pond, processes that occurred throughout the Pre-Contact Period as well (Figure 3-11). When the island was settled by the English in 1661, the Great Salt Pond was not open to the ocean and seems to have closed and opened periodically through the eighteenth and nineteenth centuries (Livermore 1877:140–147). In 1762, the pond was cut off from the sea and the inhabitants of Block Island requested assistance from the Rhode Island Colony in constructing a harbor, as formerly the pond was connected to the sea by

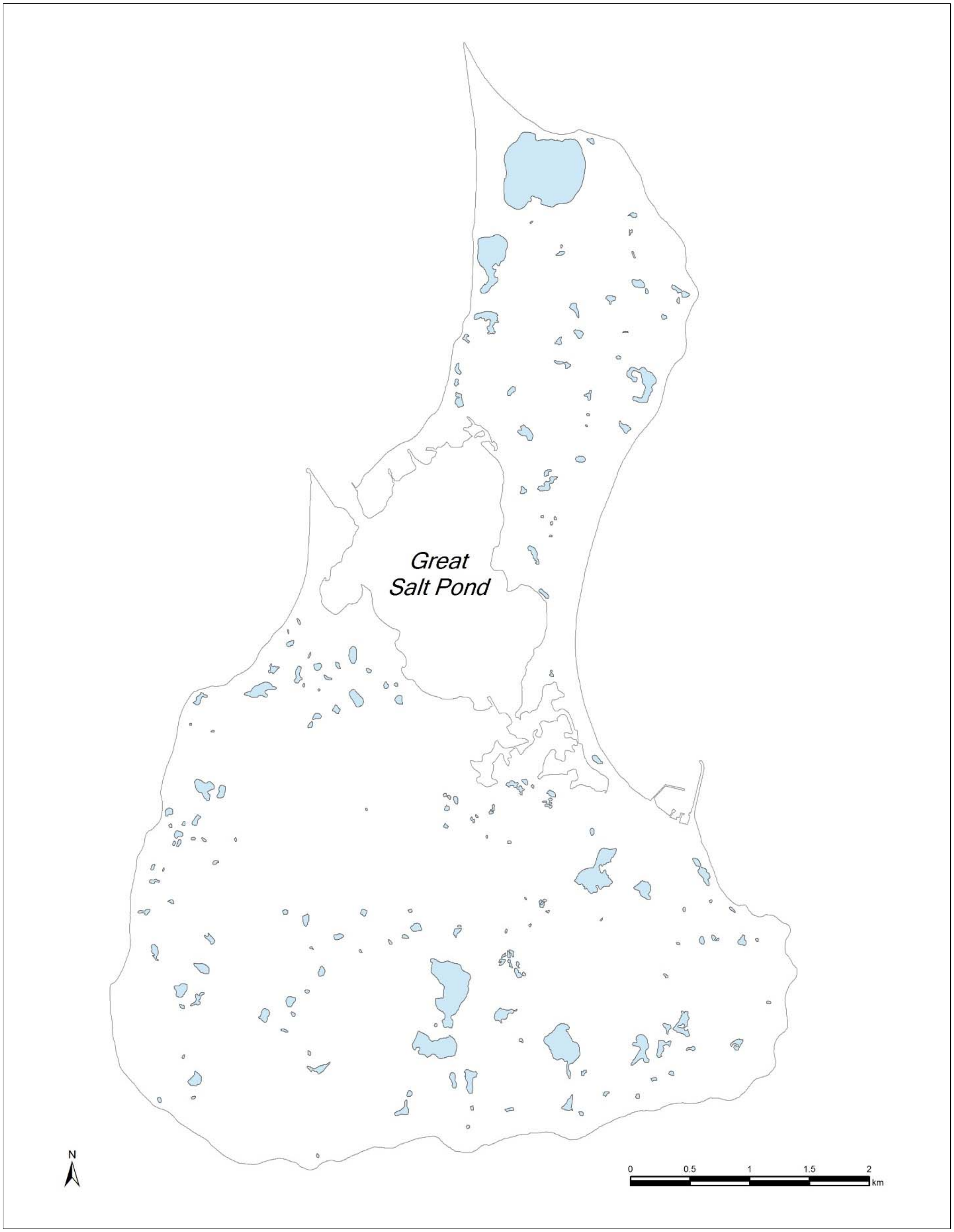

Figure 3-10. Salt and freshwater ponds.

Table 3-3. Shellfish Species in Salt Ponds and Seasonal Availability.

Species	Season				Habitat	Optimal Salinity Range (parts per thousand)
	Winter	Spring	Summer	Fall		
Oyster	X	X	X	X	Subtidal flats	15–28
Hard Shell Clam	X	X	X	X	Subtidal flats	20–30
Soft Shell Clam	X	X	X	X	Intertidal: flats, bays, inlets, sheltered beaches	20–32
Bay Scallop	X			X	Shallow bays with eel grass	20–30
Ocean Water						*30–35*

Figure 3-11. Natural and man-made channels, northwest corner of Great Salt Pond.

a small channel and cod and sea bass had been abundant until the channel had closed. In 1868, the oyster harvest from the salt ponds was recorded at 15,000 bushels, but in 1877, Livermore noted that for several years the pond had been too fresh even for oysters. Maintaining an open channel between the Great Salt Pond and the sea was an ongoing challenge to Block Island residents throughout the late nineteenth century (U.S. Army Chief of Engineers 1905:92).

The glacial geomorphology of the island also enabled the development of a variety of terrestrial habitats, including woods, grasslands, and more than 300 freshwater ponds (glacial kettle holes) and wetlands (Figures 3-12 and 3-13). These habitats support a wide range of migratory waterfowl, woodland mammals (although deer were largely hunted out by 3,000 years ago), freshwater fish, turtles, and a variety of wetland and terrestrial plants and tubers.

Paleoenvironmental Studies

The environment of Block Island has undergone a series of vegetative successions following the retreat of the Laurentide ice sheet about 21,000–15,000 years ago (Dunwiddie 1990). Millennia of natural events (storms, fires, diseases, etc.) and cultural processes (controlled burns, land clearing, the introduction of nonindigenous plant and animal species, animal extinctions, etc.) have also shaped the island's present vegetation. The vegetative history of Block Island is based on regional reconstructions from pollen cores from a number of mainland sites and sediment cores taken on Block Island by Dunwiddie (1990), Jackson and Dunwiddie (1992), and Sirkin (1976). Jackson and Dunwiddie concluded that 25 to 75 percent of the pollen record on Block Island was from mainland forests and therefore the record must be used with caution as it primarily reflects only broad patterns of vegetation communities on the island (Jackson and Dunwiddie 1992).

When Block Island was still connected to the mainland about 12,400 B.P., the pollen record shows domination by sedges with scattered pine, willow, and grasses, suggesting a tundra-like environment. Between 12,400 B.P. and 9600 B.P., the pollen record on Block Island was dominated by spruce and Jack Pine with lesser amounts of birch, alder, and White Pine, suggesting a boreal forest environment. However, the recovery of an Elk vertebrae from a pond/wetland on Block Island dating to about 11,000 B.P. suggests the Block Island environment was more open at that time. Between 9600 B.P. and 7900 B.P., the pollen record on Block Island was dominated by White Pine, oak, and alder, suggesting a developing temperate forest increasingly dominated by oak. After 7900 B.P., the pollen record indicates a decline in White Pine and a continued increase in oak pollen. The pollen record also records the appearance of beech about 6300 B.P. and, more importantly, hickory about 4400 B.P. (Dunwiddie 1990; Jackson and Dunwiddie 1992). As such, the presence of hickory nuts in archaeological sites would indicate an occupation that postdates 4500 B.P. About 1000 B.P., the pollen records indicate an increase in grasses and other non-arboreal pollen, which may indicate clearing associated with maize horticulture (Hammond 2002; Sirkin 1976).

Historic Landscape

The only early historical records that describe the Block Island landscape are a brief mention by Verrazzano in 1524, the Massachusetts Bay Raid punitive expedition in 1636, and late seventeenth-century English deeds for Block island that occasionally reference environments, landscapes, English land use, and potentially Native land use.

In 1524, Giovanni Verrazano, sailing for the King Francis I of France, explored the east coast of North America from North Carolina to Cape Breton, Nova Scotia. In late April, he briefly described Block Island as he sailed by on his way into Narragansett Bay where he stayed for two weeks:

Figure 3-12. Kettle hole pond.

Figure 3-13. Freshwater swamp/marsh.

> We discovered a triangular-shaped island, ten leagues from the mainland, similar in size to the island of Rhodes; it was full of hills, covered in trees, and highly populated to judge by the fires we saw burning continually along the shore…but did not anchor there because the weather was unfavorable (Wroth 1970:137).

There are no other recorded European encounters with Native peoples in Southern New England until the voyages of Bartholomew Gosnold in 1604 and Samuel Champlain in 1608. However, in the intervening 70–80 years, European cartographers continued to incorporate more detailed depictions of southern New England's coastlines into their maps, suggesting an ongoing, although poorly documented, European presence in the region. In 1932, Elizabeth Dickens, an ornithologist who spent her 85 years on Block Island, recovered a ceramic pot eroding from a shell midden along the bluffs in the southwestern section of the island (Robby Lewis 1987, personal communication). The pot was identified by Ivor Noël Hume (personal communication 1987) as a sixteenth-century Iberian (Spanish or Portuguese) vessel (Figure 3-14). It is unclear from the context whether the site was Native or European, but the presence of the vessel indicates at least limited encounters with Europeans during this period.

Figure 3-14. Sixteenth-century Iberian vessel.

In late August 1636, a military expedition of 90 Massachusetts Bay soldiers under the command of Colonel Endicott was sent to Block Island with orders "to put to death the men of Block Island, but to spare the women and children, and to bring them away, and to take possession of the island" (Winthrop in Hosmer 1908:187). The raid was in retaliation for the murder of an English trader six weeks before. After the English established a base camp in an abandoned Native village near Crescent Beach, they divided into two groups and spent two fruitless days searching the island for the Manisses who hid themselves in the swamps. One group under the command of Endicott described the island as

> …about ten miles long, and four broad, full of small hills, and all overgrown with brush-wood of oak,—no good timber in it,—so as they could not march but in one file and in the

> narrow paths. There were two plantations, three miles in sunder, and about sixty wigwams,—some very large and fair, and above two hundred acres of corn, some gathered and laid on heaps, and the rest standing (Winthrop in Hosmer 1908:187).

A second group under the command of Captain Underhill described other areas of the island as follows:

> The next day wee set upon our march, the Indians being retired into Swamps, so as wee could not find them, wee burnt and spoyled both houses and corne in great abundance… Having spent that day in burning and spoyling the Iand, wee tooke up the quarter for that night, about midnight my selfe went out with ten men about two miles from our quarter, and discovered the most eminent Plantation, they had in the Iand where was much corn, many Wigwams, and great heaps of mats; but fearing lest wee should make an alarum by setting fire on them; wee left them as wee found them, and peaceably departed to our quarter: and the next morning with 40 men marched up to the same Plantation, burnt their houses, cut downe their corne, destroyed some of their dog instead of men, which they left in their Wigwams. Passing on toward the water side to imbarque our soldiers, wee met with several famous Wigwams with great heaps of pleasant corn ready shelled, but not able to bring it away, wee did throw their mattes upon it, and set fire and burnt it: many well wrought mattes our soldiers brought from thence, and several delightful baskets: wee being divided into two parts, the rest of the body met with no less, I suppose, then ourselves did [i.e., Endicott] (Underhill 1638:6–7).

Although these descriptions are seemingly contradictory, they likely refer to different parts of the island observed by the two groups. Endicott's description of two villages three miles in sunder (apart) indicates that both villages could not be situated on the Great Salt Pond. Underhill's reference to a village two miles from their base camp could have been a location as far south as Fresh Pond. Based on these descriptions, it appears that there were between three and six villages widely dispersed on the island, a few of them quite large. A 1663 reference to six sachems on Block Island further supports the presence of six Manissean communities on the island in the late Contact Period (New Shoreham Town Book No. 1:30–31, 1663).

The Corn Neck area of Block Island had been repeatedly cleared for maize horticulture over the centuries using slash-and-burn or shifting field swidden horticulture cultivation methods. Swidden horticulture involves clearing land by cutting and burning forests or woodlands and after one or two planting seasons new plots would be cleared, as maize horticulture quickly strips the soils of nitrogen and other nutrients in the absence of fertilizers. The old plots would be left fallow for a number of years to regenerate and in the process create a landscape characterized by a patchwork of second-growth fields in various stages of regrowth. The practice is indicated by the reference to "all overgrown with brush-wood of oak, no good timber in it, so as they could not march but in one file in narrow paths" (Winthrop in Hosmer 1908:187). The English were essentially describing a landscape that had been repeatedly cleared for maize horticulture over decades, if not centuries. Verrazano's observation that the island was "covered in trees" was probably a reference to native managed mast (nut trees) woodlands in the southern portions of the island, which were still extant at least two decades after the English settled the island in 1661. The only trees identified in deeds as boundary markers are nut trees such as oak and walnut.

Massachusetts Bay claimed Block Island by "Right of Conquest" following the Endicott Raid. In 1658, the island had been transferred to several private individuals, including John Endicott, leader of the military expedition 20 years earlier. These men then sold the island to the 16 original proprietors, some of whom settled on the island in 1661, while the remainder leased their allotments to other settlers. Each proprietor received a 16th share of each of the four major divisions of the island, which appears to have been based on cleared land, marsh and salt hay lots, meadows, and partially cleared and forested land. Figure 3-15 is the

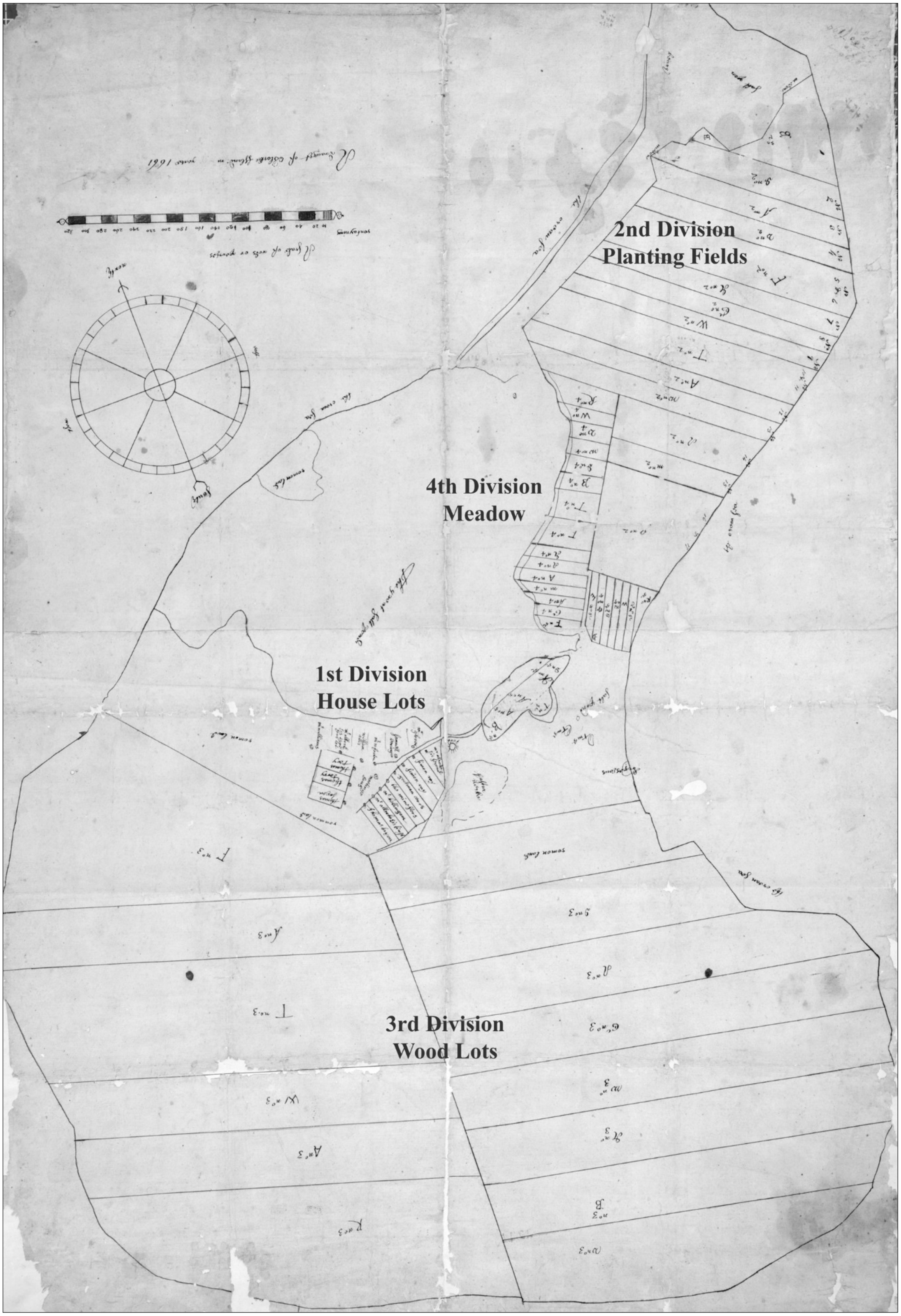

Figure 3-15. 1661 plat map of Block Island.

1661 plat map of the island, which depicts the four major allotments or divisions, which included agricultural land (Corn Neck), wooded and forested areas (southwest and southeast sections of the island), meadow (small lots east of the Great Salt Pond), and house lots south of the Great Salt Pond, each divided into 16th-shares.

The original proprietors began to divide and sell their allotments among themselves and to dozens of new settlers who came to the island in the next few decades (Burgess 1924:2–3, 74). By 1675, the number of proprietors had increased from 16 to 30 and, by 1685, had reached 36. More than 150 land transactions are recorded in the Block Island town records between 1663 and 1700, providing a rich source of information about English, and potentially Native, land use practices. The deeds make frequent reference to wood lots, timber, and nut trees on the south end of the island while references to meadow, meadow lots, and fields are most common in the Corn Neck area. These transactions also reference a number of Native place names that can be identified to a specific location, such as a pond, or a general area such as a plain or cleared ground (Figure 3-16).

The area of Block Island referred to as Corn Neck comprises one third of the island, and many of the early Block Island deeds make reference to plots of land as "meadow," "pasture," and "fields"—essentially cleared land (Burgess 1924). One area of Corn Neck was referred to as "NoPaquonomuss" (a derivative of Poquonnock, which means cleared or broken ground), indicating former Native planting fields. Corn Neck was likely not the only place on the island used by the Manisses for planting. The southeastern section of Block Island also contains a significant amount of prime farmland (e.g., loess over ablation till, loess over fluvial, ablation till, and fluvial deposits). One area east of Fresh Pond was referred to as "Wagoshik Plaine" and contains more than 50 acres of prime farmland. Both place names indicate areas that were or had been cleared and cultivated (Figure 3-16).

Other surviving Native place names also provide some information on potential Manissean land use practices and the importance of specific habitats. The northern tip of Block Island was referred to as "Saconk" or "Sackonck," which very roughly translates as "place of birds," or "place of rocky beach and sand." Saconk is a fairly large area stretching from the east to west coast of the island and must have been an important area to the Manisses given the apparent size and diversity of habitats and resources mentioned in English deeds including freshwater ponds, beaches, marshes, and meadows. The beach areas were prime nesting areas for a number of bird species and today constitute a large part of the National Wildlife Refuge on the island. Land deeds also reference Saconk Pond (Middle Pond) within the broader Saconk land area. Tonnotounknug/Townotonkemig and Nabbequannemus refer to the Fresh and Long Ponds, respectively, two of the largest open bodies of fresh water on the island.

One of the more interesting and significant aspects of the initial English allotments and later land transactions is the degree to which they reflect Native land use practices. Until 1661, there was no English presence on the island that might have influenced or otherwise impacted Native land use practices such as those that occurred on the mainland. When the English arrived in 1661, they encountered an active Native cultural landscape that reflected centuries of Native land use practices with respect to horticulture and forest management. These practices are reflected in how the island was initially divided between the original 16 proprietors and in subsequent land transfers.

The USDA-Natural Resources Conservation Service (NRCS) and the Rhode Island Department of Administration's Division of Planning have identified those lands in Rhode Island that have a combination of physical and chemical features that make them best suited for farming. These "Important Farmlands" are subdivided into "Prime Farmlands," which are the best soils for agricultural use, and "Additional Farmlands of Statewide Importance," which are other "soils that are less well suited for intensive farming but are still valuable for many farm enterprises" (USDA-NRCS 2015). Prime farmland is defined as "land that has the

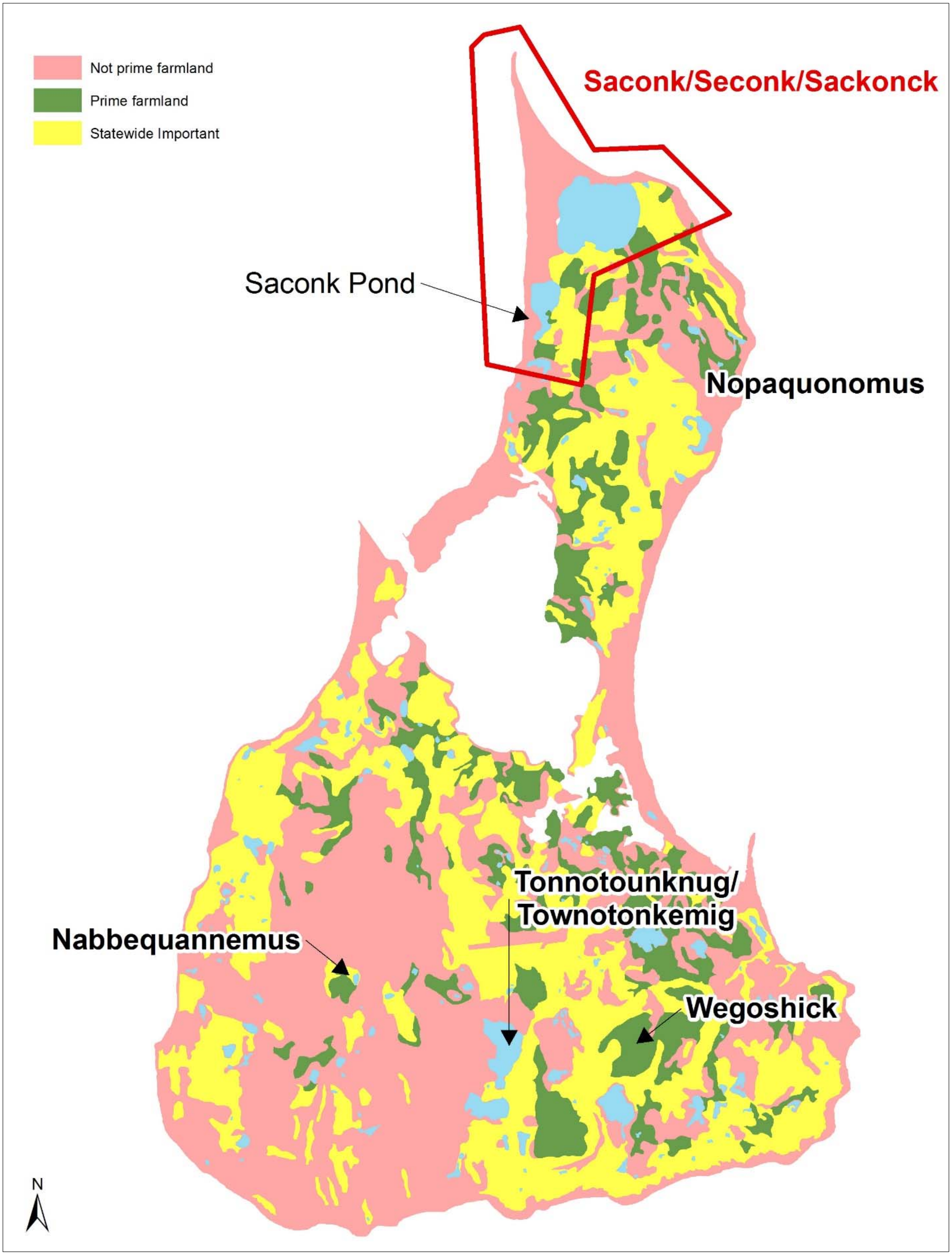

Figure 3-16. Native place names and agricultural soils.

best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses (the land could be cropland, pastureland, range-land, forest land, or other land, but not urban built-up land or water). It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods" (USDA-NRCS 2015). Additional farmlands of Statewide Importance are defined as "farmland of statewide importance for the production of food, feed, fiber, forage, and oil seed crops. Criteria for defining and delineating this land are to be determined by the appropriate state agency or agencies. Generally, additional farmlands of statewide importance include those that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods."

The distribution of soils suitable for agriculture was an important consideration in the location of post-contact settlements and the subdivision of Block Island lands into parcels. The areal extent of good agricultural soils is also likely to have influenced Native American settlement and land use patterns after the adoption of intensive maize horticulture. Table 3-4 summarizes the distribution of agricultural soils by major geographic subdivisions. Tables 3-5 and 3-6 provide further detail on the concentration of these soils in Corn Neck and the southern section of the island. The open ponds on Block Island were not only important as sources of fresh water but they also supported a wide range of plant, bird, fish, and mammal species. While there are over 300 freshwater ponds on the island, many had evolved into closed peat bogs by the seventeenth century and became an important source of fuel for the colonists. It was likely that the larger and more open ponds, such as Fresh and Long ponds, and large freshwater wetlands were of greater value to the Manisses. English deeds refer to several large and open ponds on the island in the late seventeenth century that were used by the Manisses based on the frequency of archaeological sites in the immediate vicinity of the ponds.

Table 3-4. Distribution of Agricultural Soils.

	Corn Neck	South	Total
Total Acres (% Total Acreage)	1,385 (23%)	4,583 (77%)	5,968
Total Prime Farmland Acreage (% Total Prime Farmland)	284 (4.7%)	561 (9.4%)	846
Total Important Farmland Acreage (% Total Important Farmland)	516 (8.6%)	1,576 (26.4%)	2,092
Not Prime Farmland Acreage (% Total Not Prime Farmland)	584 (9.8%)	2,446 (41.0%)	3,030

Table 3-5. Corn Neck Agricultural Soils.

Total Acreage	1,385
Prime Farmland Acreage (% Prime Farmland Acreage)	284 (20.5%)
(Important Farmland Acreage (% Important Farmland Acreage)	516 (37.2%)
Total Prime and Important Acreage (% Total Prime and Important Acreage)	800 (57.7%)
Not Prime Farmland Acreage (% Not Prime Farmland)	584 (42.3%)

Table 3-6. South Block Island Agricultural Soils.

Total Acreage	**4,583**
Prime Farmland Acreage (% Prime Farmland Acreage)	561 (12.2%)
(Important Farmland Acreage (% Important Farmland Acreage)	1,576 (34.3%)
Total Prime and Important Acreage (% Total Prime and Important Acreage)	2,137 (46.5%)
Not Prime Farmland Acreage (% Not Prime Farmland)	2,446 (46.5%)

There are frequent references in the deeds to wooded areas on the island and, without exception, these areas are all on the southeastern and southwestern sections of the island (e.g., Burgess 1924). Many of the property boundaries in these areas refer to nut or mast trees such as walnut and oak. There is not a single reference to a non-mast tree such as maple or beech. There are also many references to young walnut trees suggesting these and other nut-producing species were economically important, encouraged, cultivated, and likely managed by the Manisses (and later the English) in stands on the south end of the island.

Sea Level Rise and Coastal Dynamics Affecting the Block Island Coastline

There are a number of short-term and long-term factors that influence the severity of the impacts of coastal storms on shorelines and, therefore, impacts to archaeological sites situated along the coast: Relative Sea Level Rise (RSLR; defined as sea level rise related to the level of the continental crust), landform elevation relative to Mean Lower Low Water (MLLW; defined as the average of the lower low water height of each tidal day), Bathymetry (the depth of ocean floors expressed as contour lines or isobaths, the terrestrial equivalent of topography), the duration and wind speed of the storm, height of waves, the severity of the storm surge, and the frequency of coastal storms.

There are two principal factors that increase the RSLR and MLLW: the thermal expansion of the world's oceans from rising ocean temperatures and glacial melting (eustatic sea level rise), also from rising global temperatures (Figures 3-17 and 3-18). The rate of eustatic sea level rise is likely to increase in the future because of further CO_2-induced warming, which will cause continued expansion of the volume of water in the world's oceans as a result of increasing ocean temperature and glacial melting.

Global average sea level rise between 1880 and 2004 is estimated at 1.7 millimeters (mm) (0.067 inches [in]) ± 0.3 mm (0.012 in) per year, or a total of 195 mm (7.7 in) over 124 years. In the last few decades, there has been a significant acceleration in the rate of sea level rise of 0.013 mm (0.00051 in) ± 0.006 mm (0.00024 in) per year.

From 1950 to 2009, the average rise in sea level was 1.7 mm (0.067 in) ± 0.3 mm (0.012 in) per year with an increase to 3.3 mm (0.13 in) ± 0.4 mm (0.016 in) per year from 1993 to 2009 (Nicholls and Cazenave 2010; Watson et al. 2015). The rate of sea level rise will continue to increase, and it is estimated that by 2030, global sea levels will be 20 cm (7.9 in) higher than today's and by 2095, 71 cm (28 in) higher than today's. Digital elevation models developed to calculate the impacts of storms correlated with sea level rise indicate that by 2095, with sea levels 70 cm higher than today's, storms will have a magnitude four times greater (Watson et al. 2015). These changes translate into significant impacts to coastal zones, and these

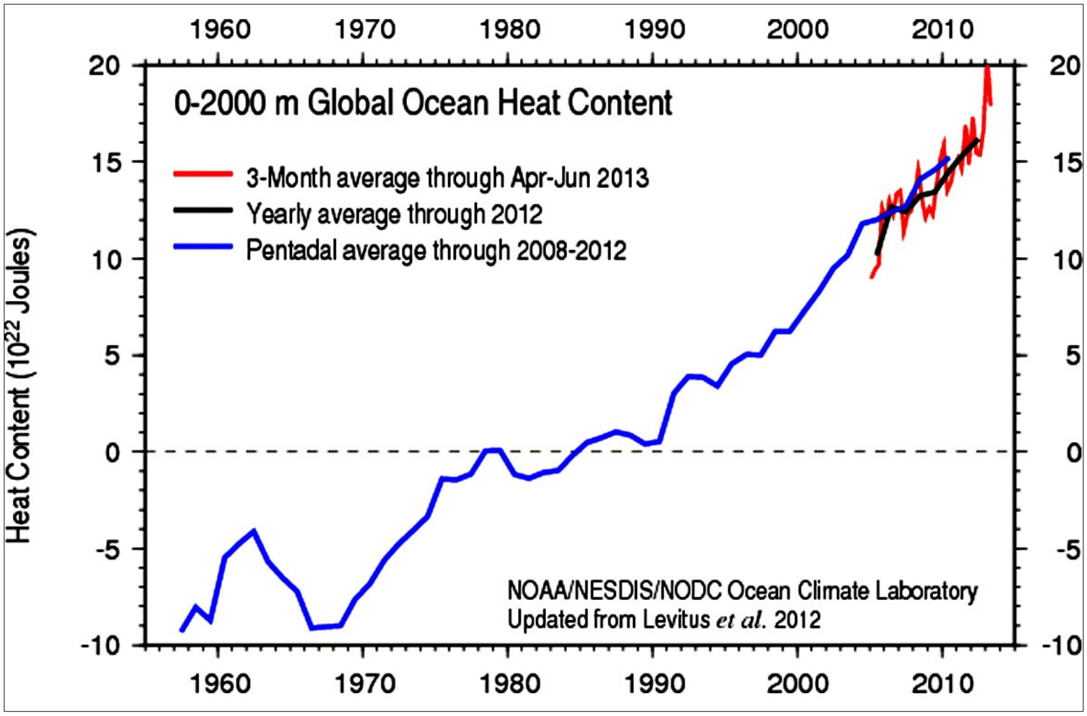

Figure 3-17. Global ocean temperature change.

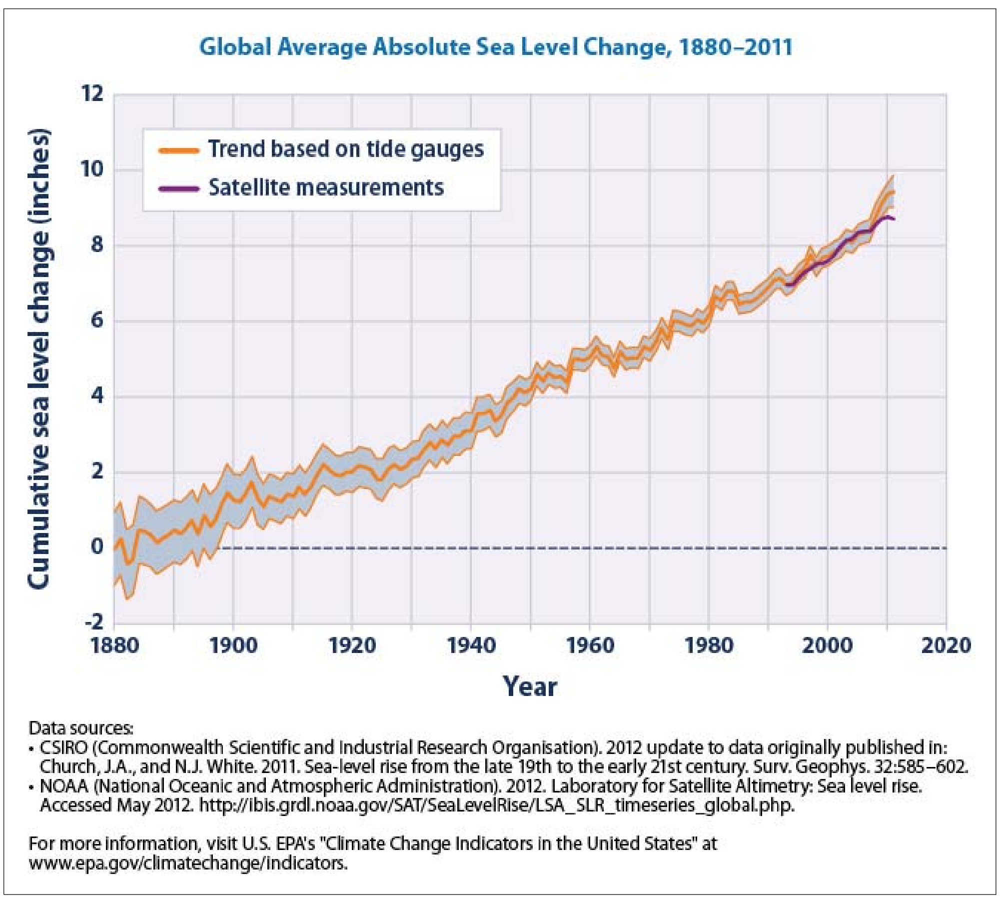

Figure 3-18. Global sea level change.

calculations suggest that coastal flooding due to storms will be much more severe by the end of the twenty-first century than they are today. Sea level rise will also result in higher storm surges, causing 100-year floods to occur 3–4 times more frequently by the end of the twenty-first century.

Research on long-term trends in the rates and amount of coastal erosion between 1952 (pre-Hurricane Carol) and 2013 (post-Hurricane Sandy) was conducted by Bryan Oakley of the Department of Environmental Earth Science Department at Eastern Connecticut State University for SAMP. Aerial photographs from 1952 were the earliest that had sufficient quality and detail that could be georeferenced with any degree of confidence. Oakley collected data from 325 locations at intervals of approximately 100 m (325 ft) in nine arbitrarily defined sections of the seaward-facing coastline (Shoreline Change Areas). Oakley measured the linear distance of shoreline advance (positive numbers) or retreat (negative numbers), termed “Shoreline Change Distance,” and the average annual distance of shoreline migration over a 60-year period, termed “Shoreline Change Rate” (Figures 3-19 to 3-25; Table 3-7). Like the Shoreline Change Distance metric, positive numbers in the Shoreline Change Rate represent a seaward migration of shorelines (sedimentation) and negative numbers represent a landward retreat of shorelines (erosion).

Oakley created cross-sectional profiles extracted from sequential LiDAR elevation models from a comparison of the 2011 USGS (pre-Hurricane Sandy) and 2012 U.S. Army Corps of Engineers LiDAR data collected two weeks after Hurricane Sandy to examine the response of the bluff faces along the shorelines. Transects were placed perpendicular to the shoreline and spaced at 100-m intervals. Topographic profiles were constructed using the Interpolate Line tool in ESRI ArcMap v. 10.1 Spatial Analyst extension. Pre- and post-Hurricane Sandy profiles were constructed for 166 transects that featured a bluff backed shoreline.

Block Island bluffs ranged in height from < 5 m (16 ft) to > 50 m (165 ft) above MLLW and varied in composition from Cretaceous-Tertiary Coastal Plain strata to Late Wisconsin glacial till and stratified deposits. The vertical limit of bluff erosion averaged 7.5 m above MLLW for the 166 transects, although the elevation ranged from < 1 m (3 ft) to > 20 m (62 ft). Where the elevation of the bluff crest was less than 10 m, the entire bluff face retreated (McDonald and Oakley 2015). Variation in the degree of bluff erosion appeared to be largely due to the heterogeneity of the bluff composition, nearshore bathymetry and shoreline orientation, but bluff height was the most important factor in the degree of erosion (McDonald and Oakley 2015). Figure 3-26 is an example of a cross-sectional profile at the Spring House Pond south of Old Harbor. The amount of shoreline retreat at this location over the last 60 years was 9.7 m (31.8 ft) at a rate of 0.16 m/yr (0.52 ft/yr). Figure 3-26 indicates that approximately 2 m of the bluff face was lost in one year as a result of Hurricane Sandy, accounting for 20 percent of bluff erosion in that area over the last 60 years, underscoring the severity of Hurricane Sandy’s effects to some shoreline sections.

MPMRC subdivided Oakley’s Shoreline Change Areas 1 and 2 to better reflect the variation in coastal dynamics and potential erosion hazard to archaeological resources. Assuming that impacts on the Northeast and Northwest Shoreline Change Areas in any given storm would differ depending on wind, wave direction, and intensity of any given storm, Shoreline Change Area 2 was subdivided into a Northeast Shoreline Change Area (Area 2) and a Northwest Shoreline Change Area (Areas 2a and 2b; Figures 3-20 and 3-21). MPMRC then further subdivided the Northwestern Shoreline Area was into Shoreline Change Areas 2a and 2b due to the large differences in Shoreline Change Distance and Rate over the last 60 years. Shoreline Change Area 2a is characterized by sand dunes with a mean Shoreline Change Distance of +12.6 m (+41.24 ft) and a mean Shoreline Change Rate of +0.2 m/yr (0.66 ft/yr) (Table 3-7). Shoreline Change Area 2b is characterized by bluffs and, in contrast to Shoreline Change Areas 2a, it has a mean Shoreline Change Distance of -2.62 m (-8.61 ft) and a mean Shoreline Change Rate of -0.05 m/yr (-0.18 ft/yr) (Table 3-7; Figure 3-23). (Note that the red lines in Figures 3-22 to 3-25 indicate the 1952 shoreline, and the blue line indicates the 2013 shoreline.)

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Figure 3-19. Shoreline Change Transects, Area 5 (adapted from Oakley et al. 2015).

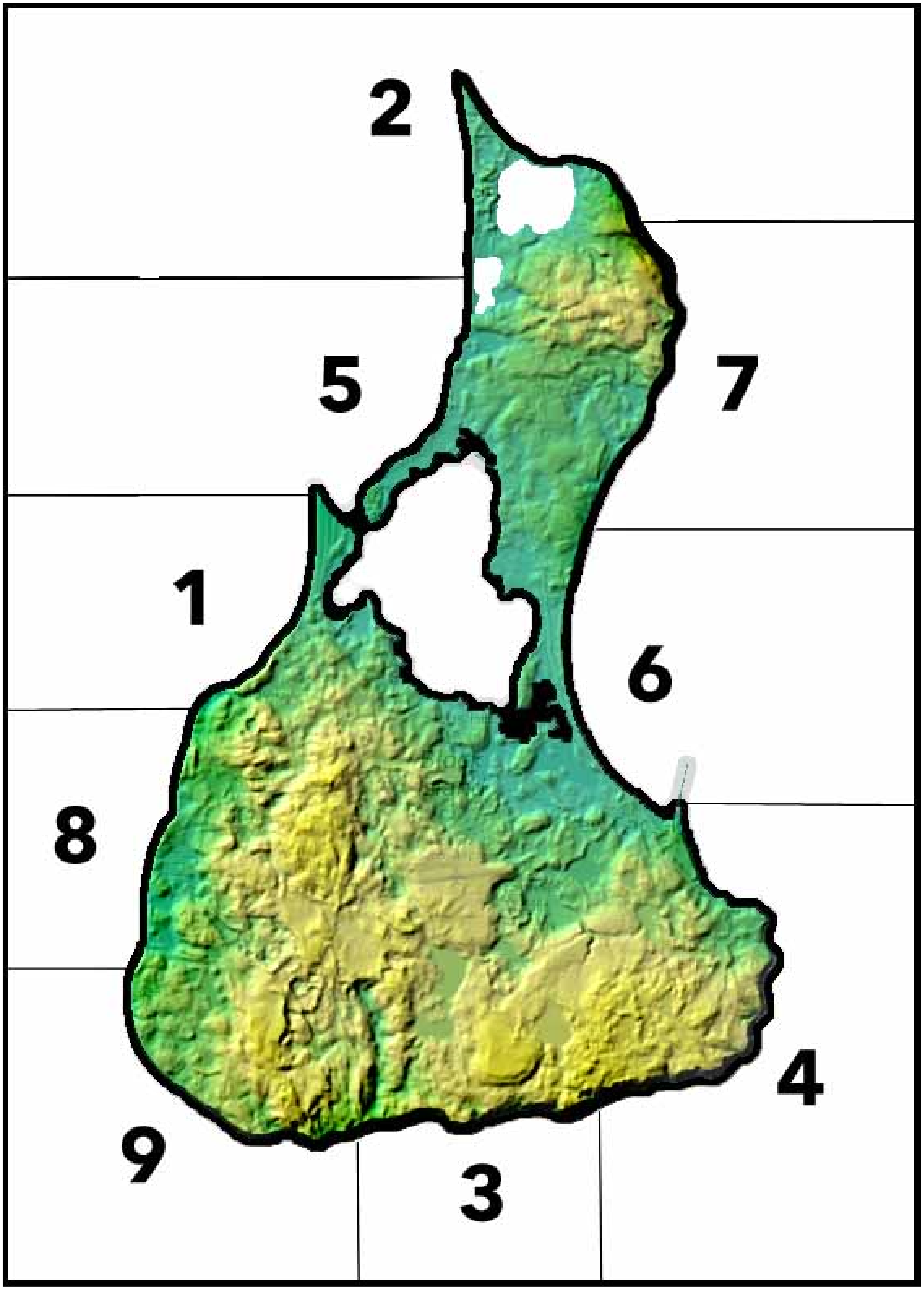

Figure 3-20. Shoreline Change Areas.

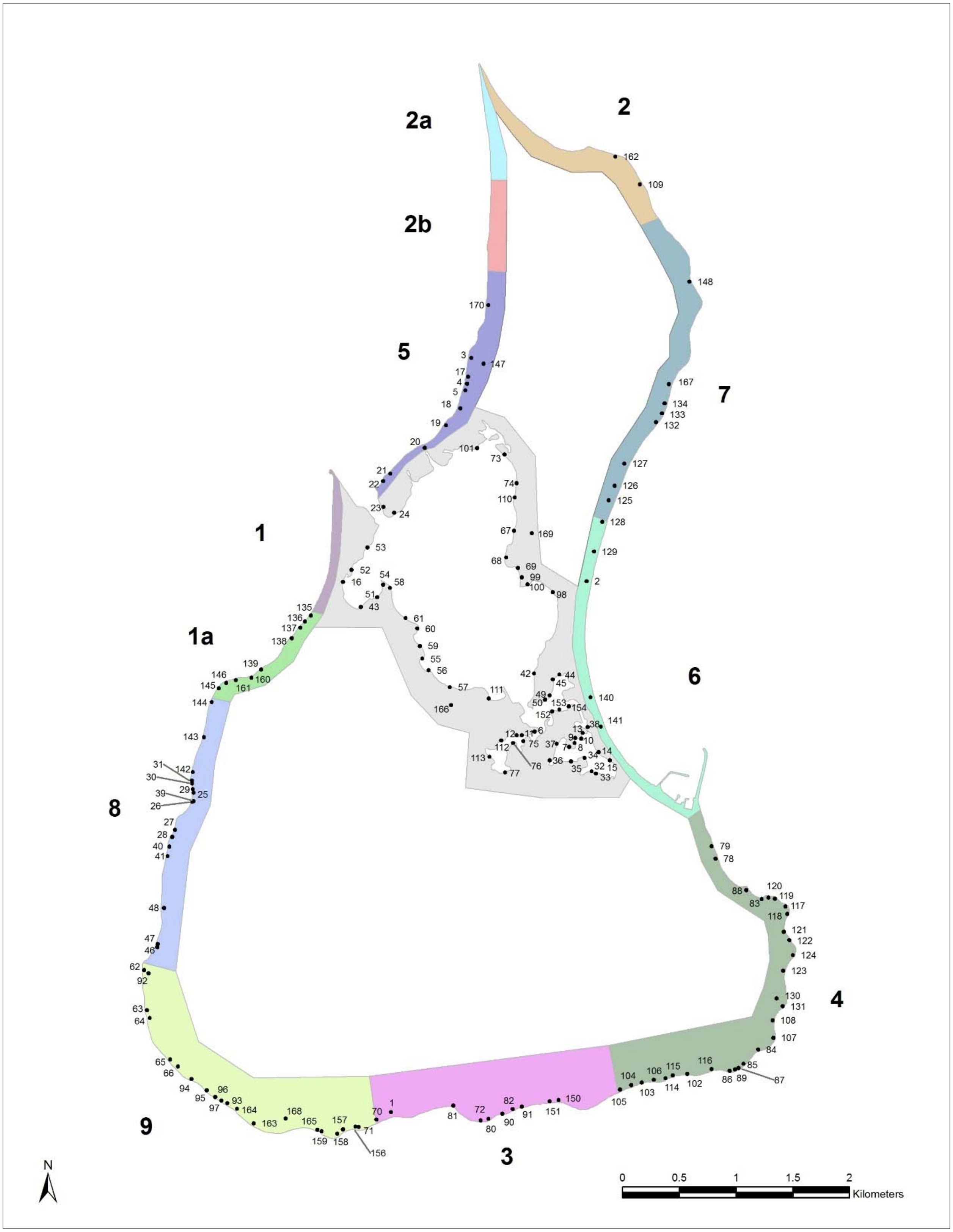

Figure 3-21. Revised Shoreline Change Areas.

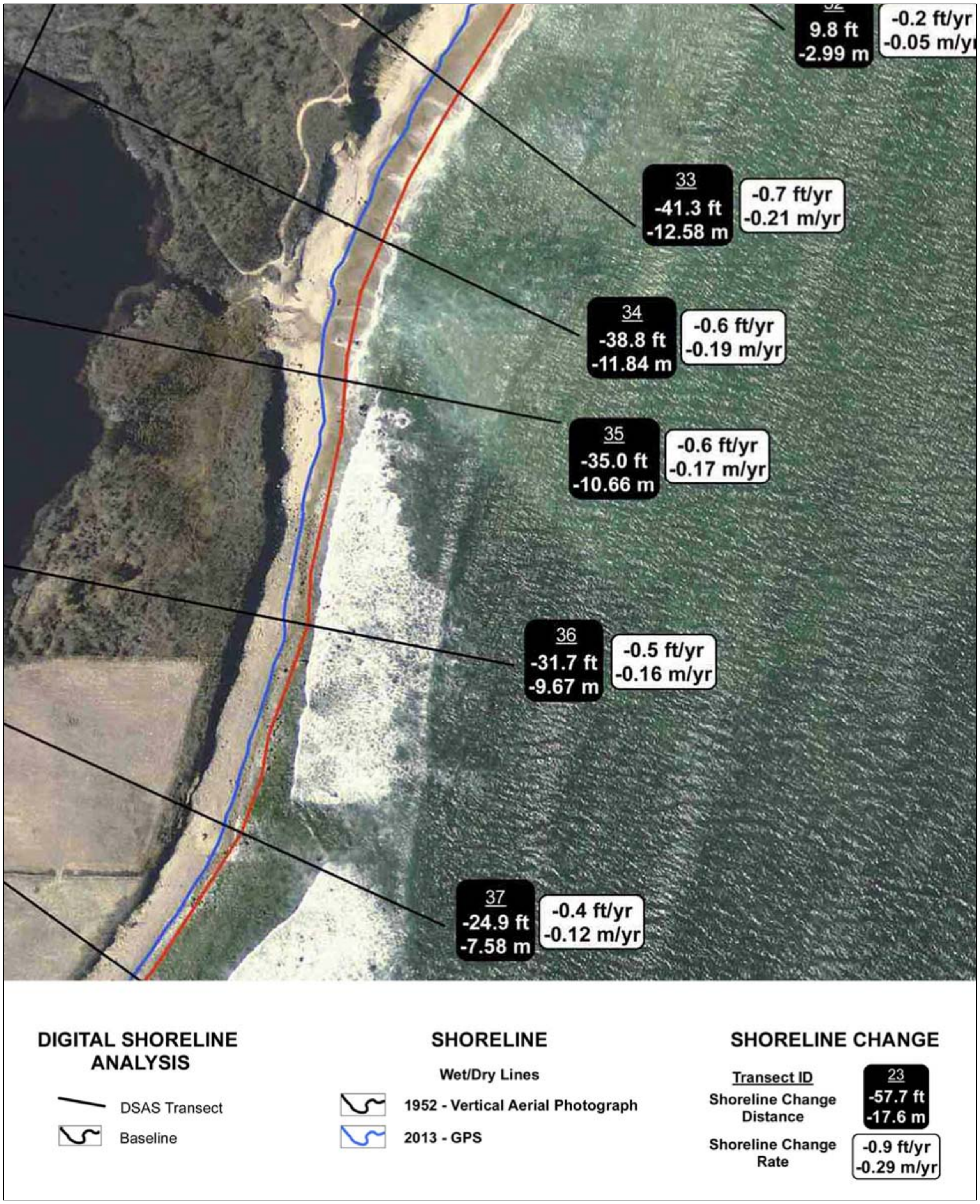

Figure 3-22. Example of Shoreline Change Transects, Mansion Beach, Area 7 (adapted from Oakley et al. 2015).

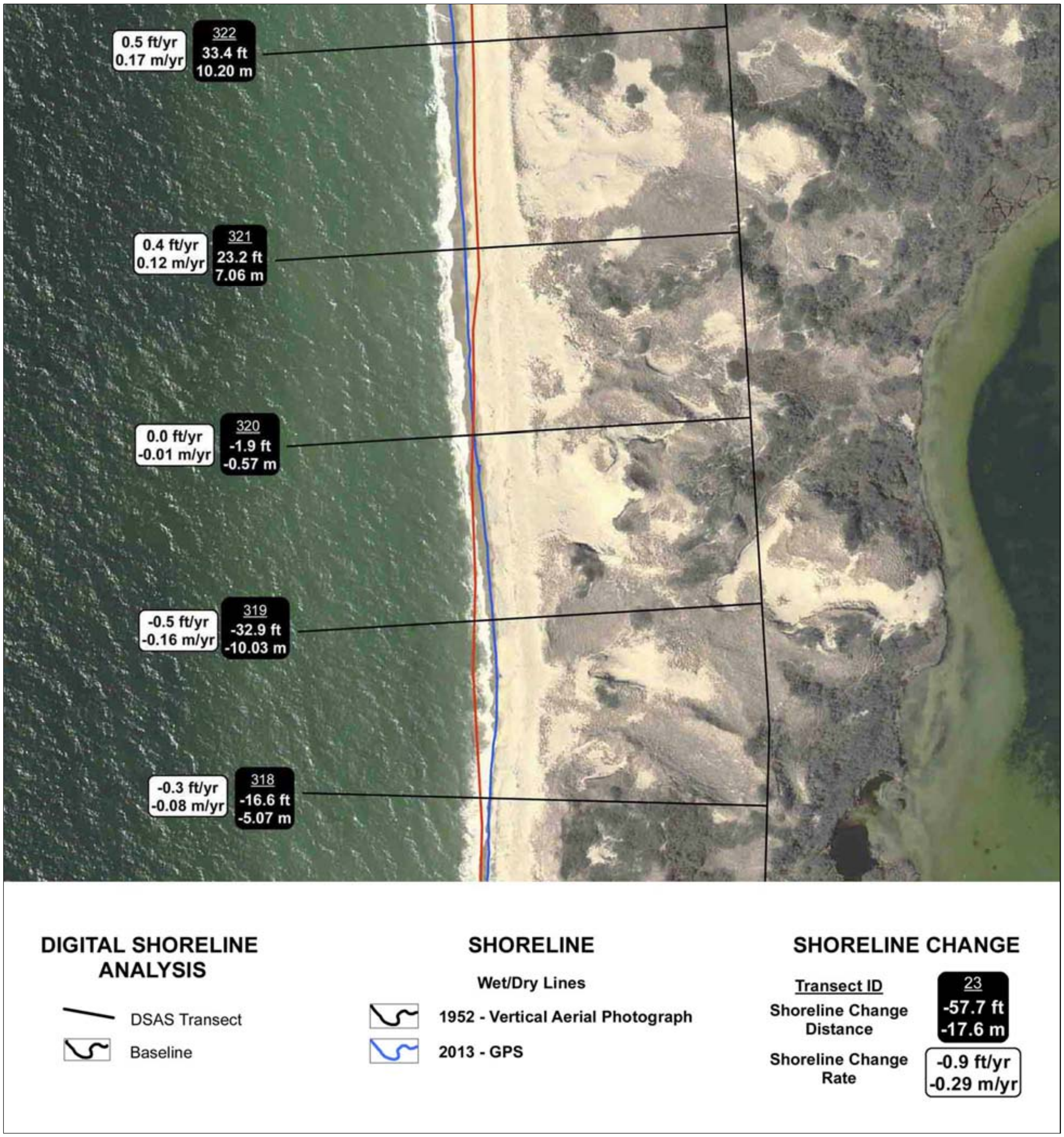

Figure 3-23. Shoreline Change transition zone, Areas 2a and 2b (adapted from Oakley et al. 2015).

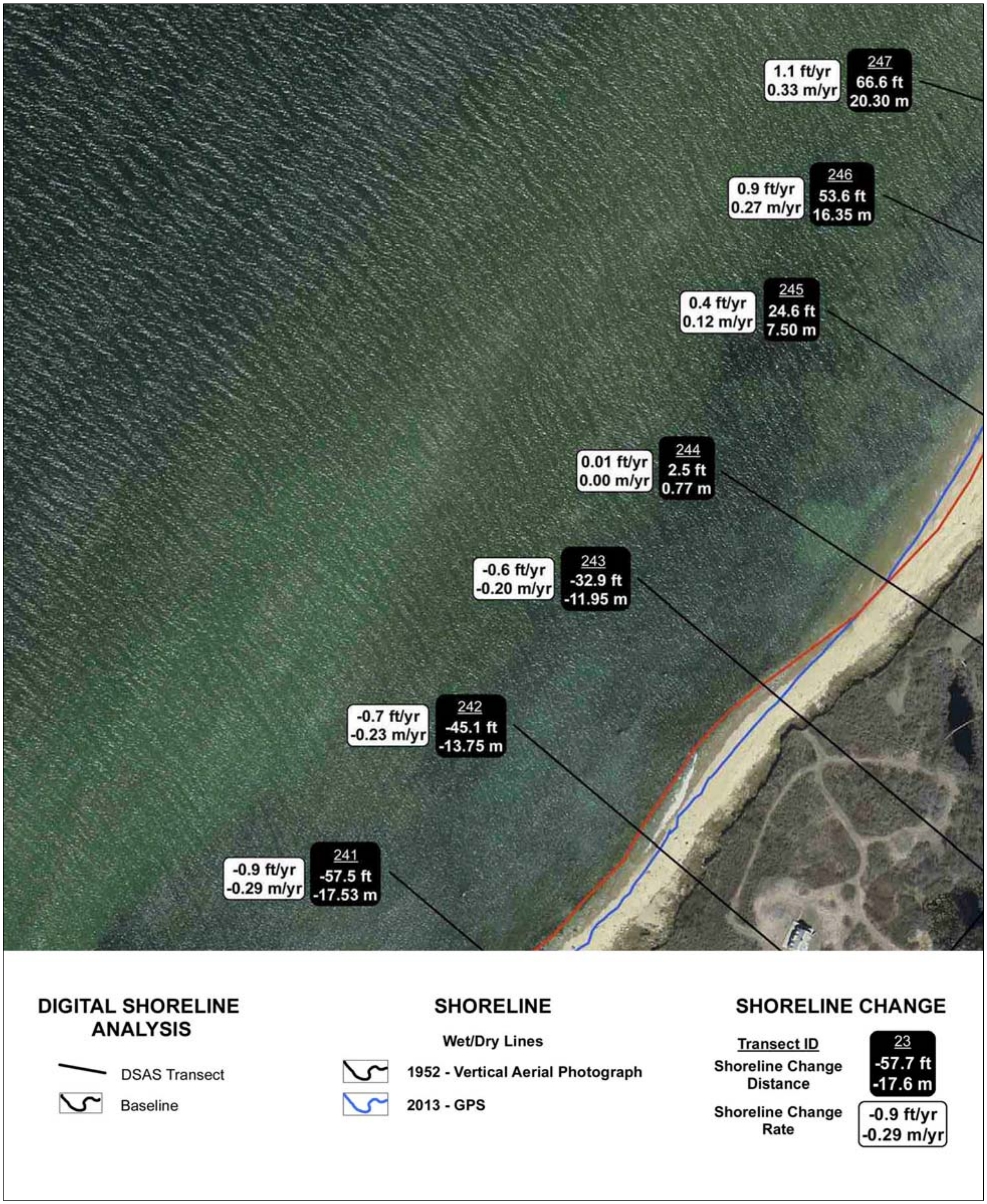

Figure 3-24. Shoreline Change transition zone, Areas 1 and 1a (adapted from Oakley et al. 2015).

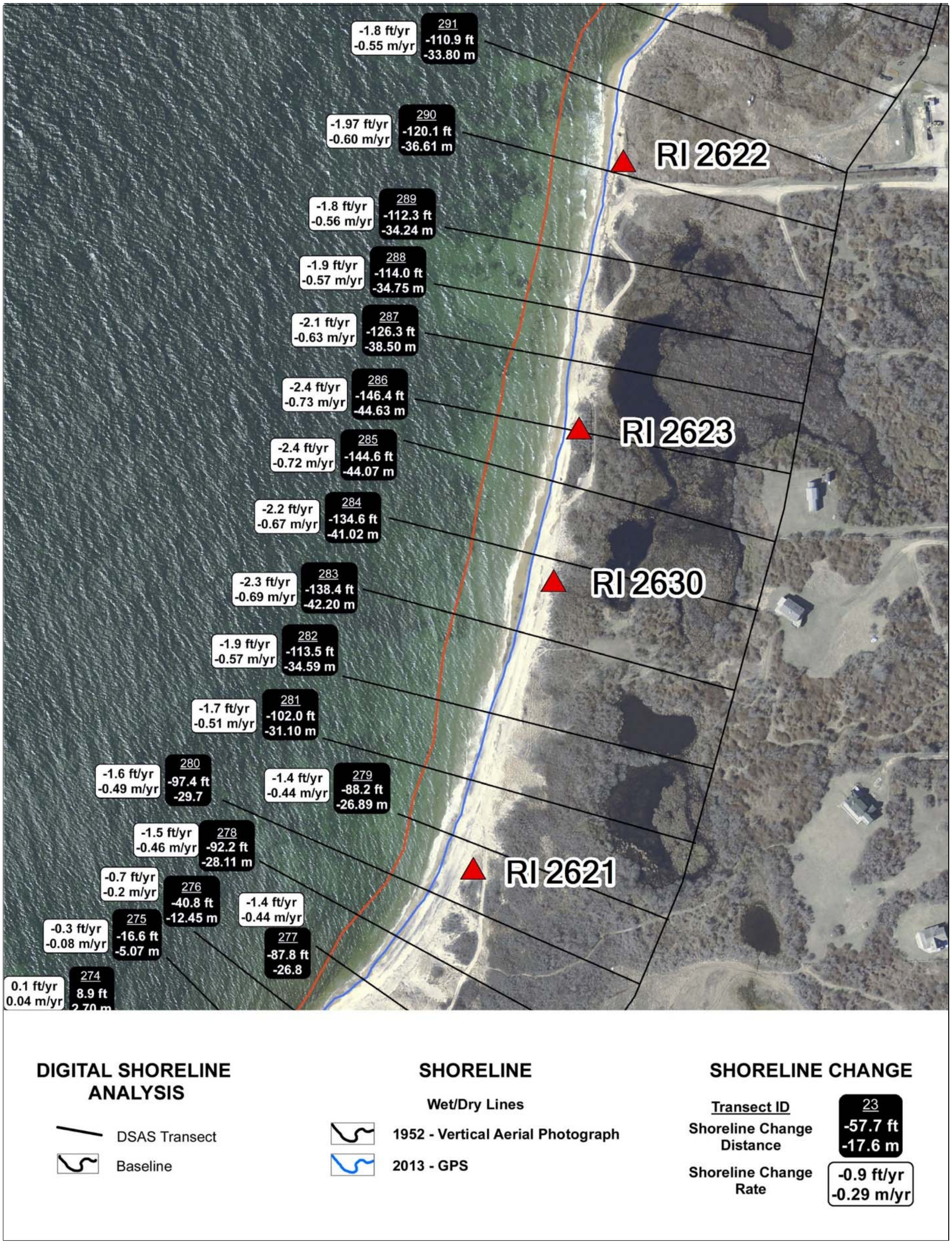

Figure 3-25. Section of Area 5 with highest rate of shoreline change (adapted from Oakley et al. 2015).

Table 3-7. Block Island Shoreline Gain/Loss Totals by Area.

Area	1	1a	2	2a	2b	3	4	5	6	7	8	9
	Grace Point, New Harbor Inlet	Grace Point	Sandy Point East, Clayhead	Sandy Point West	Logwood	Mohegan, Great Point, Lewis Point	Mohegan, SE Light, Old Harbor	New Harbor Inlet, Logwood Cove	Old Harbor, Scotch Beach	Scotch Beach, Clayhead	SW Point, Grace Point	SW Point, Lewis Point
Transects	244–257	234–243	1–23	321–325	310–320	162–190	116–161	258–309	62–115	24–61	211–233	191–210
Shoreline Change Distance (ft)												
Mean	+94.97	-45.09	-14.20	+41.24	-8.61	-44.90	-19.08	-75.43	+19.69	-16.99	-23.64	-14.07
Range	+2.5/+143	-75.2/ -22.5	-114.0/ +57.8	+23.2/ +53.1	-32.9/ +5.7	-136.4/ +7.3	-95.5/ +90.1	-201.0/ +73.78	-224.3/ +136.3	-64.4/ +19.1	-51.6/ +14.98	-51.3/ +22.6
Std. Dev.	+41.10	-16.30	+37.14	+11.35	+9.87	+32.28	+31.37	+73.78	+57.32	+19.78	+14.98	+22.66
Shoreline Change Rate (ft/yr)												
Mean	+1.56	-0.74	-0.25	+0.66	-0.18	-0.73	-0.31	-1.24	-0.33	-0.29	-0.39	-0.23
Range	+0.01/+2.30	-1.20/ -0.40	-1.90/ +0.90	+0.40/ +0.90	-0.50/ +0.10	-2.20/ +0.10	-1.60/ +1.50	-3.30/ +0.80	-3.70/ +2.20	-1.10 / +0.30	-0.80/ 0.00	-0.80/ +0.50
Std. Dev.	+0.67	-0.24	+0.61	+0.19	+0.17	+0.53	+0.51	+1.21	+0.94	+0.32	+0.24	+0.36

The differences in Shoreline Change Distance and Rate between Shoreline Change Areas 2a and 2b are the result of differences in sediment transport load dynamics between the two Areas. Partly because of the shape and contour of the shoreline in the northwestern Shoreline Change Area and the westerly “hook” of the northern tip of the island that slows the current, there is a reduction in transport energy that results in a high rate of deposition along the extreme northwestern portion of the island. The same situation applies to Shoreline Change Areas 1 and 1a. The mean Shoreline Change Distance in Area 1 is +28.95 m (+94.97 ft) and a rate of +0.48 m (+1.56 ft/yr). In contrast, the mean Shoreline Change Distance for Shoreline Change Area 1a is -13.74 m/yr (-45.09 ft/yr), and the mean Shoreline Change Rate is -0.23 m/yr (-0.74 ft/yr) (Table 3-7; Figure 3-24).

When the permanent breachway was constructed into the Great Salt Pond in 1895, a jetty was created at the end of the breach that served to significantly slow the sediment transport rate to the north, resulting in a high rate of deposition in MPMRC’s redefined Shoreline Change Area 1 (Figure 3-19). The presence of the jetty also altered the south to north currents, resulting in greater than normal erosion in Shoreline Change Area 5 as the currents cut back into the shoreline after rounding the jetty. As the sediment transport load was already significantly reduced by the presence of the jetty, it resulted in a greater net erosion of the coastline in that stretch of the coast. In Shoreline Change Area 5, the mean Shoreline Change Distance is -23 m (-75.43 ft) and the mean Shoreline Change Rate is -0.38 m/yr (-1.24 ft/yr), the highest on the island (Table 3-7). In one 500-m section of Shoreline Change Area 5, the mean Shoreline Change Rate is -0.73 m/yr (-2.4 ft/yr) (Figure 3-25). If these calculations are representative of the rate of shoreline loss in the 113 years since the jetty was constructed, the amount of shoreline retreat over that period is 43 m (140 ft). Unfortunately, this area also contains the highest density of multicomponent Woodland and Contact Period sites identified as seasonal spring fishing camps (Figure 3-26).

Oakley’s analysis of the cross-sectional profiles indicates that Block Island bluffs lower than 10 m below MLLW suffered the greatest impact from Hurricane Sandy, retreating as much as 1–3 m (36 ft) (Figures 3-27 to 3-31). Bluffs between 10 and 15 m (30–50 ft) above MLLW had a more varied response to erosion. (In some instances there was relatively little impact and in other instances the entire bluff face retreated). The erosion of bluffs 15–50 m (50–165 ft) was limited to the toe of the bluff and lower bluff face, although there is significant variation in the vertical limit of erosion. The factors that resulted in this variability are complex but include the degree of soil consolidation, the nature of vegetation and root mass, and the presence or absence of groundwater. These data have significant implications for calculating future impacts to National Register and National Register-eligible archaeological sites situated along various sections of the Block Island coastline.

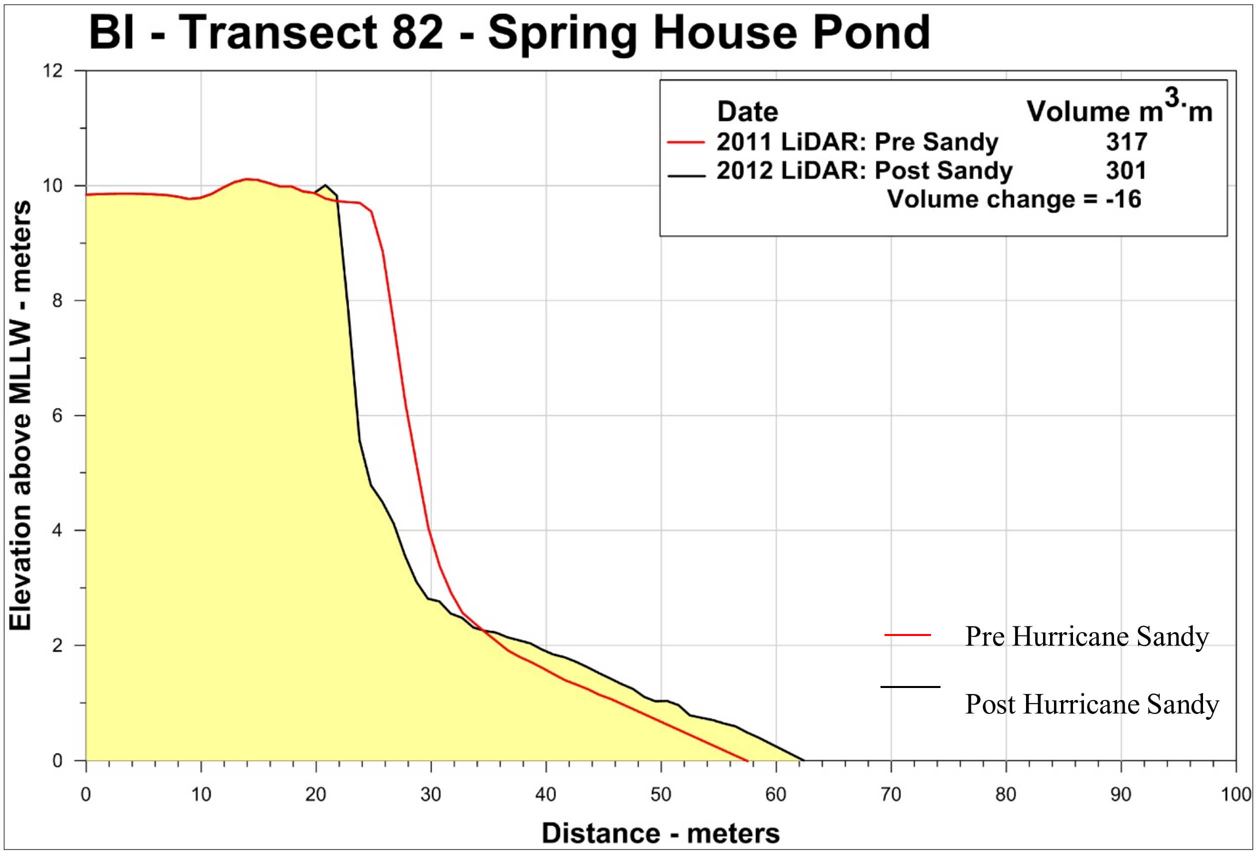

Figure 3-26. Example of a cross-sectional profile, Transect 82 (adapted from Oakley 2015).

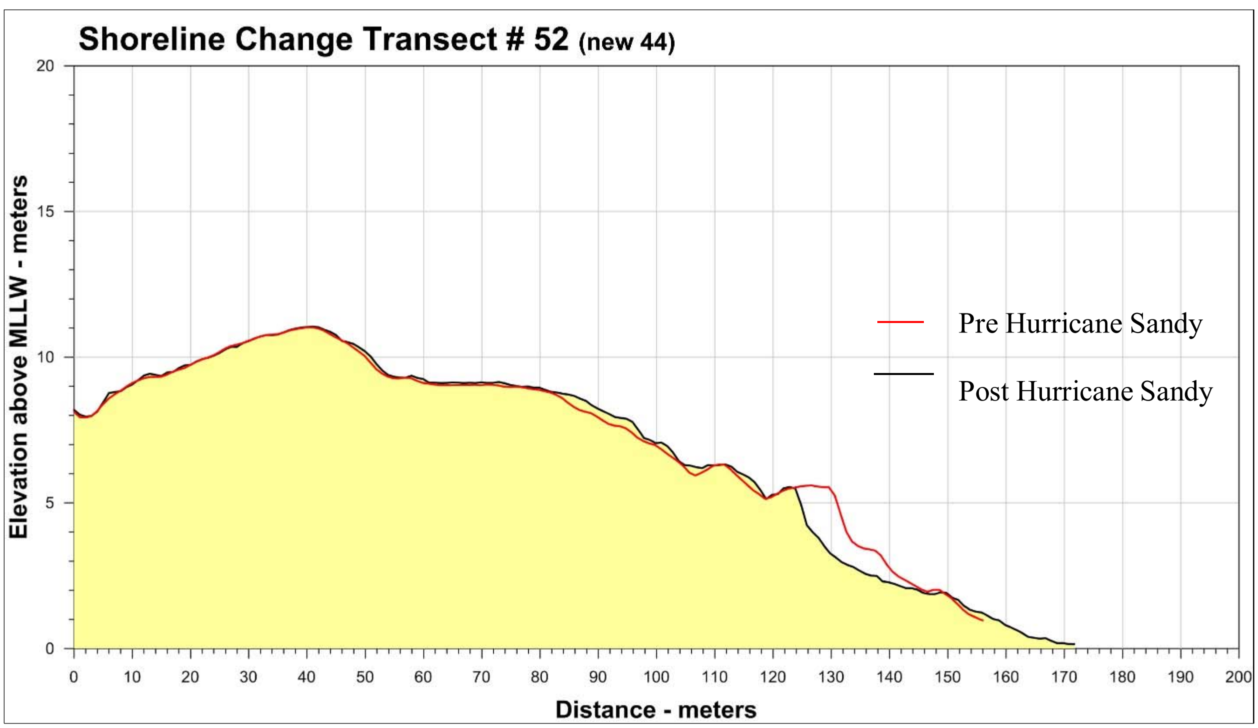

Figure 3-27. Storm Sandy Bluff Erosion Transect 52, HDADs 127 and 126 (adapted from Oakley 2015).

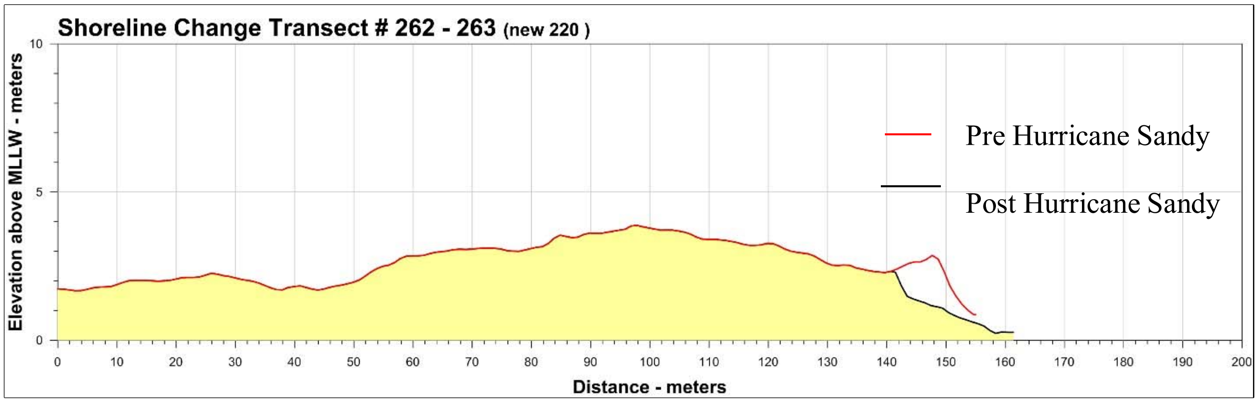

Figure 3-28. Storm Sandy Bluff Erosion Transects 262 and 263, HDAD 22 (adapted from Oakley 2015).

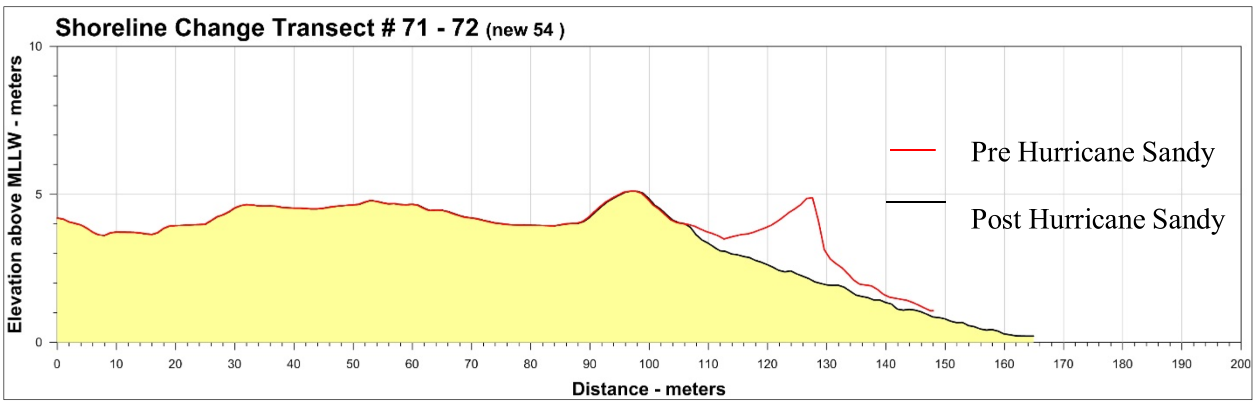

Figure 3-29. Storm Sandy Bluff Erosion Transects 71 and 72, HDAD 2 (adapted from Oakley 2015).

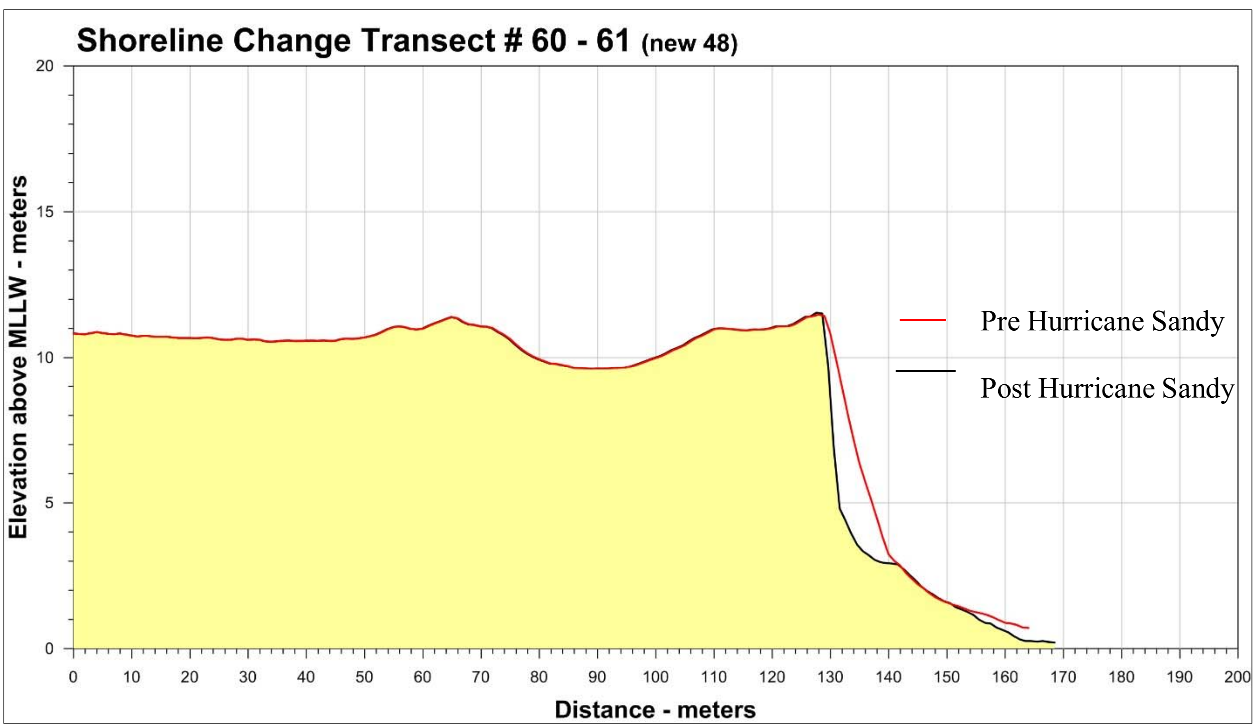

Figure 3-30. Storm Sandy Bluff Erosion Transects 60 and 61, HDADs 128 and 129 (adapted from Oakley 2015).

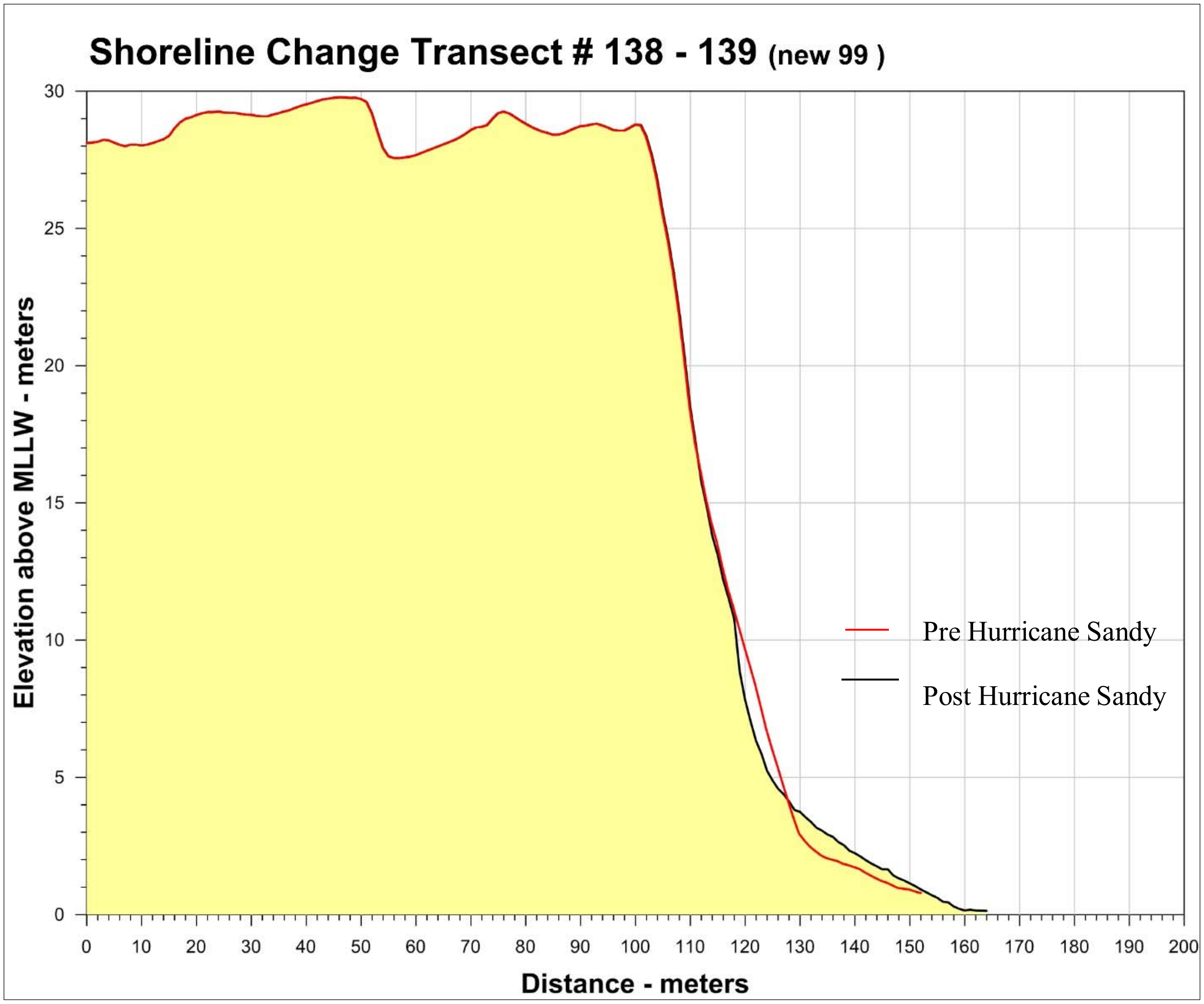

Figure 3-31. Storm Sandy Bluff Erosion Transects 138 and 139, HDADs 123 and 124 (adapted from Oakley 2015).

CHAPTER FOUR

NATIVE AMERICAN CULTURAL HISTORY AND LAND USE PATTERNS ON BLOCK ISLAND

Introduction

This chapter provides an overview of Native American settlement and land use patterns on Block Island from approximately 11,000 B.P. through the seventeenth century and provides a framework for interpreting the archaeological materials recovered from the Phase I and Phase II Hurricane Sandy surveys. The temporal frameworks for the cultural/temporal periods discussed below are based on radiocarbon dates and diagnostic projectile points and ceramics from archaeological sites throughout southern New England, including Block Island. The cultural/temporal periods are identifiable by diagnostic artifact types such as projectile points and ceramics, patterns of land use and resource exploitation, and occasionally by other social indicators such as burial practices. These periods are summarized in Table 4-1. Table 4-2 summarizes the reported radiocarbon age estimates from archaeological sites on Block Island.

Prior to the Phase I and Phase II surveys conducted for the Hurricane Sandy Project, 60 Pre-Contact and Contact Period archaeological sites had been documented on Block Island (see Figure 2-1). Some of these sites were investigated in the context of CRM projects and systematic surveys funded by Survey and Planning Grants by the RIHPHC in the 1980s and early 1990s and by University of Connecticut archaeological field schools. One of the striking patterns in the site location data is the very low density of pre-contact sites at the northern and southern ends of the island and the high density of sites around the salt ponds. The only island-wide surveys were conducted in 1986 and 1987 by the Public Archaeology Survey Team (PAST) from the University of Connecticut; these surveys attempted to obtain a representative sample of archaeological sites on Block Island. PAST surveyed areas away from the salt ponds through a series of randomly placed test pit transects and used more intensive sampling “blocks” around the salt ponds (Figure 4-1).

One of the positive results of the 1980s surveys was the listing of the Great Salt Pond Archaeological District in the National Register (McBride 1989a). One of the negative results of the early surveys was the conclusion that prior to 2700 B.P., the Native presence on Block Island was limited to small temporary camps indicative of brief forays to the island, with no permanent Native presence on the island until 2700 B.P., coincident with the creation of the Great Salt Pond from rising sea levels. Further, the survey concluded that large Woodland and Contact Period (ca. 2700–400 B.P.) semi-permanent or permanent villages were all in close proximity to the salt ponds and that only smaller temporary and task-specific sites were present in other areas of the island. This bias was largely the result of an insufficient number of transects surveyed in the interior of the island along the coastal bluffs. The CRM surveys conducted on the island only served to reinforce this bias, as the only archaeological surveys required under a CRMC Permit were for undertakings within 200 ft (61 m) of the seaward or salt pond coastlines.

Pre-Clovis Period (24,000–12,500 B.P.)

During the Wisconsin glaciation in the late Pleistocene Epoch about 21,000 years B.P., the Laurentide ice sheet reached its southern terminus (see Figure 3-4). South of what is now New England, the ice margin stretched from east to west across Long Island, Block Island, Martha’s Vineyard, and Nantucket (Uchupi et al. 2001). These islands represent part of the terminal moraine, an enormous deposit of glacial

Table 4-1. Native American Chronology on Block Island.

Period	Years	Identified Temporal Subdivisions	Cultural Aspects
PaleoIndian	12,500–10,000 B.P. (10,500–8000 B.C.)	• Eastern Clovis • Plano	Exploitation of migratory game animals by highly mobile bands of hunter-gathers with specialized lithic technology.
Early Archaic	10,000–8000 B.P. (8000–6000 B.C.)	• Bifurcate-Base Point Assemblages	Few sites are known, possibly because of problem with archaeological recognition. This period represents a transition from specialized hunting strategies to the beginnings of more generalized hunting and gathering.
Middle Archaic	8000–6000 B.P. (6000–4000 B.C.)	• Neville • Stark • Merrimack	Regular harvesting of anadromous fish and various plant resources is combined with generalized hunting on the mainland. The number of Middle Archaic points in Block Island collections indicates increase settlement and land use. As no intact sites from the period are known, it is difficult to know the nature of settlement and land use.
Late Archaic	6000–3800 B.P. (4000–1800 B.C.)	• Otter Creek • Vosburg • Brewerton • Squibnocket • Small Stemmed Point Assemblages	Intensive hunting and gathering within increasingly diverse environments on the mainland and presumably Block island. Evidence of shellfish exploitation is first evident in this period. Increase in the number of Late Archaic points indicates increasing use of the island. The earliest year-round population on Block Island may have occurred about 5000 B.P.
Terminal Archaic	3800–2700 B.P. (1800–700 B.C.)	• Atlantic • Watertown • Orient • Coburn	Same economy as the earlier periods, but there may have been groups migrating into New England or local groups developing technologies strikingly different from those previously used. Trade in soapstone became important. Evidence for complex mortuary rituals is frequently encountered.
Early Woodland	2700–2000 B.P. (700–300 B.C.)	• Meadowood • Lagoon	A scarcity of sites suggests population decline. Pottery was first made during this period. Little is known of social organization or economy, although evidence for complex mortuary rituals is present. Influences from Midwestern Adena culture is seen in some areas.
Middle Woodland	2000–1600 B.P. (A.D. 300–1000)	• Fox Creek • Jack’s Reef	Economy focused increasingly on coastal resources. Populations may have increased from the Early Woodland Period.
Late Woodland	1000–450 B.P. (A.D. 950–1500)	• Levanna	Horticulture was established by 1000 A.D. with a resulting increase in population. Given the increasing need for arable land, villages were not all clustered around the Great Salt Pond.
Proto-Historic and Contact	450–300 B.P. (A.D. 1500–1650)	• European Trade Goods	Groups such as the Wampanoag, Narragansett, Pequot, and Manisses can be identified within specific territories. Political, social, and economic organizations were relatively complex and underwent rapid change following European contact and colonization.

Table 4-2. Radiocarbon Age Estimates from Archaeological Sites on Block Island.

Site Number	C-14 Date (Years B.P.)	Associations
RI 118	720 ± 90	Feature 5
RI 1395	2230 ± 60	
RI 1428	960 ± 70	N33E1 Level B; interior/exterior cord-marked, large grit
RI 1428	1110 ± 70	Feature 19C; shell-tempered ceramics, 8.3 mm
RI 1428	1880 ± 60	Feature 12
RI 1428	2110 ± 210	Feature 40 Strata 3
RI 1428	2380 ± 120	Feature 40 Strata 2; Vinette I ceramics
RI 1428	2420 ± 110	Feature 40 Strata 1; Vinette I ceramics, 10.2 mm
RI 1428	2570 ± 100	Feature 34
RI 1428	3140 ± 90	N37E1 Level F

sediment pushed in place by the advancing ice sheet and built upon by outwash sediment (Sirkin 1996; see Figure 3-3). At this time, sea level was more than 100 m (330 ft) below the current level and the shoreline was 128–160 km (80–100 miles) south of present-day Long Island near the edge of the continental shelf. Remains of mammoth, mastodon, and walrus have been recovered by scallop fisherman from several locations on the continental shelf, testifying to the presence of plants and animals on the shelf, and potentially humans (Coleman and McBride 2008).

The timing of the initial population of the Eastern Seaboard is currently debated by archaeologists in light of the discovery of cultural strata and artifacts in South Carolina, Virginia, Wisconsin, and Pennsylvania that apparently predate the PaleoIndian “Clovis Culture” or the fluted point tradition. The advance and subsequent retreat of glacial ice across southern New England is assumed to have erased any evidence for “Pre-Clovis” occupation of the region, and no such “Pre-Clovis” finds are known from New England.

The origin, timing, adaptation, and method of arrival of the first humans to enter the western hemisphere remain highly controversial (Dillehay and Meltzer 1991; Jablonski 2002; Powell 2005). Clovis First theorists postulate that the first people to arrive in North America originated in northeast Asia and entered northwestern North America across “Beringia,” the land bridge that connected Siberia and Alaska in the Bering Straits ca. 13,000 B.P. PaleoIndian dispersal though the rest of North America (including eastern North America), and eventually into South America, would have been through an ice-free corridor between the Laurentide and Rocky Mountain glaciers (Stanford and Bradley 2013). An alternative theory to explain human entry into the Western Hemisphere, which does not preclude elements of the Clovis First theory, argues that the initial colonization of the Western Hemisphere occurred along the Pacific Rim in many migrations in which peoples utilized boats and followed the coastlines (Erlandson 2002).

Recently, Stanford and Bradley (2013) have postulated a North Atlantic migration by Solutrean people from the Iberian Peninsula in Europe to the east coast of North America about 20,000 B.P. The recent recovery of mastodon remains dated to about 24,000 B.P. in seemingly good association with a Solutrean point 40 miles off the Delmarva Peninsula would appear to support Stanford and Bradley’s theory. The landmass that was to become Block Island was the dominant landform in the region about 15,000–16,000 years ago, rising some 75 m (250 ft) above the surrounding landscape and providing an excellent vantage point for any hunters who may have been in the region, assuming the previously inundated continental shelf south of Block island could support vegetation and animals (Coleman and McBride 2008; Figure 4-2).

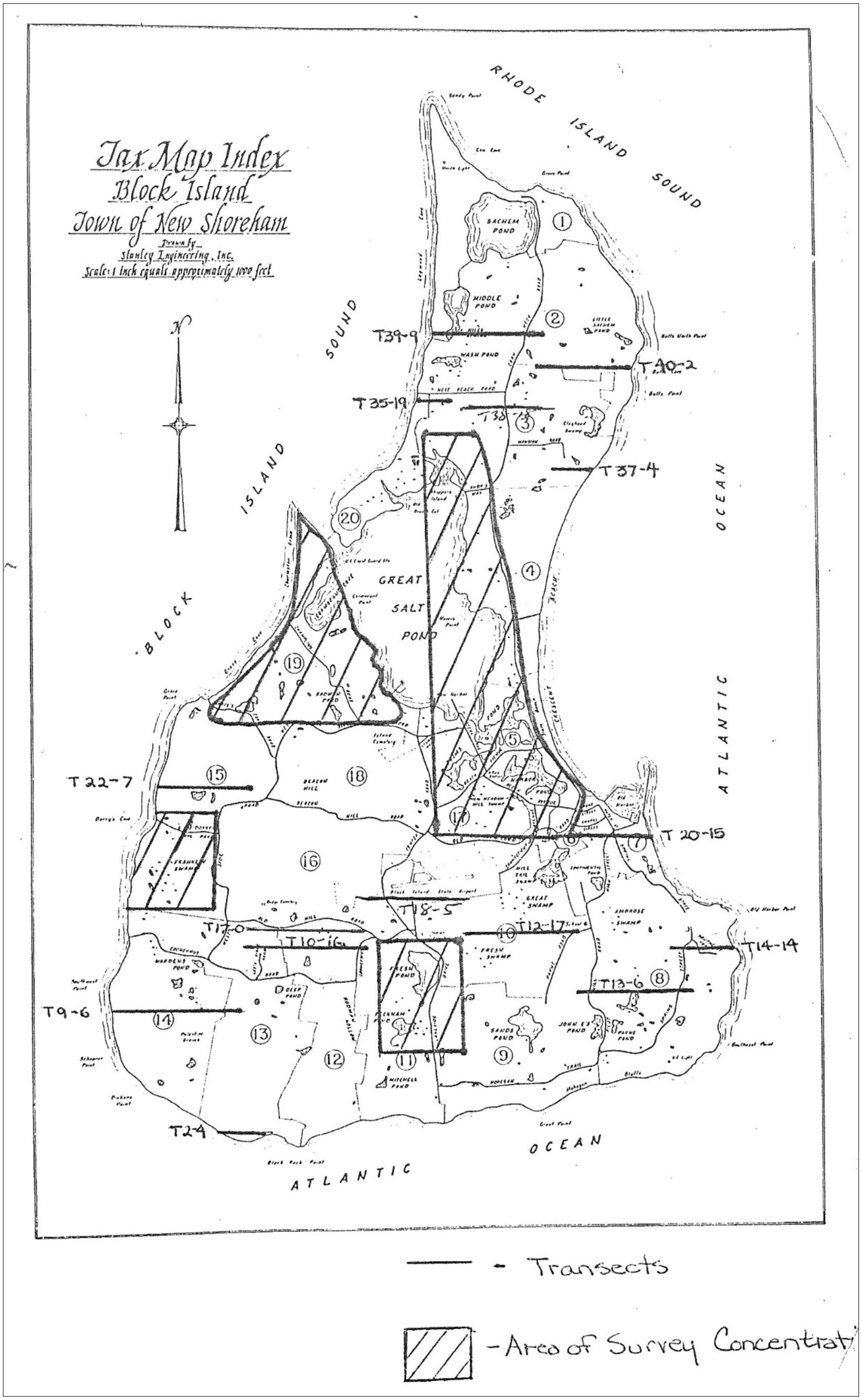

Figure 4-1. PAST Archaeological Survey of Block Island (McBride 1986).

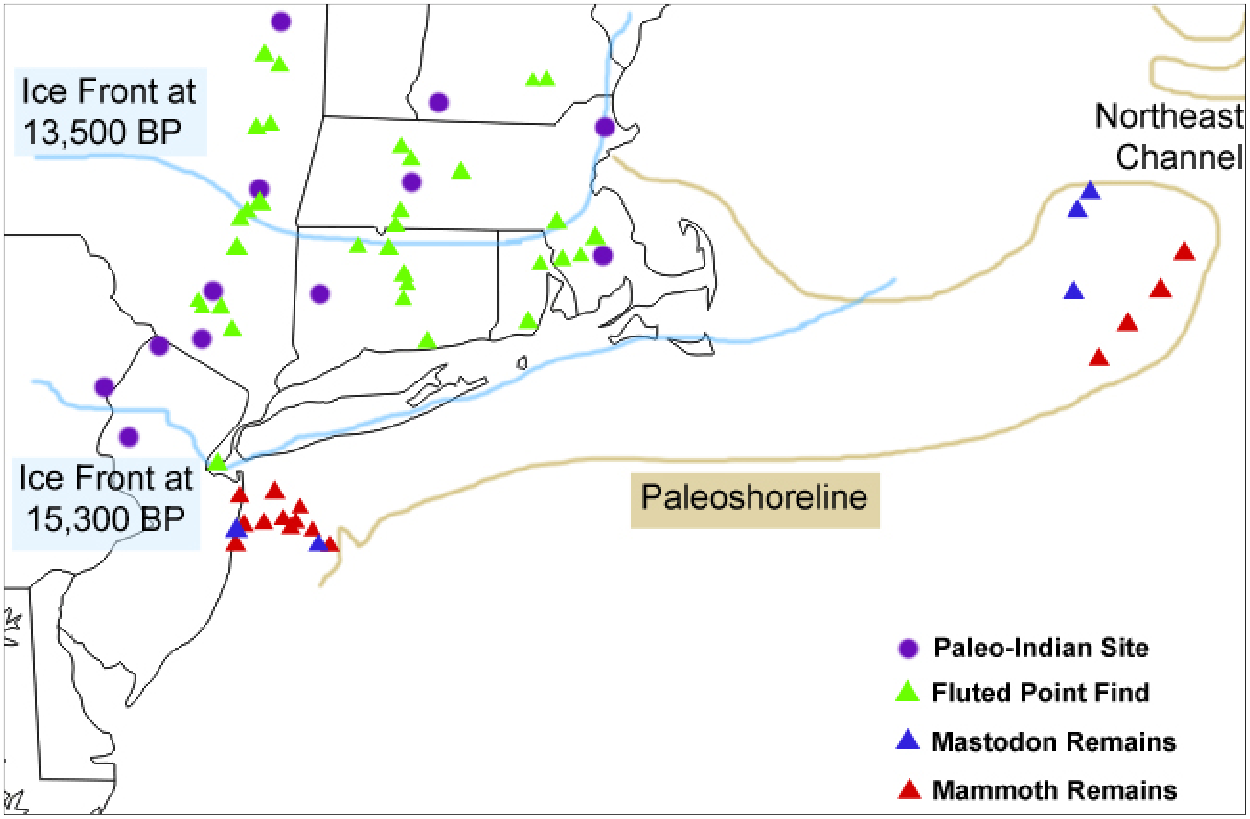

Figure 4-2. Ice margins and artifacts/faunal remains.

PaleoIndian Period (12,500–10,000 B.P.)

The earliest unequivocal evidence for human occupation in New England is associated with the PaleoIndian Tradition, which dates between 12,500–10,000 B.P.[3] in southern New England (e.g., Bradley et al. 2008). PaleoIndian settlement and subsistence patterns in the Northeast are indicative of highly mobile hunters. Many archaeologists believe PaleoIndian subsistence was based on large migratory game, including caribou, bison, mastodon and elk (Dragoo 1976; Kelly and Todd 1988; Meltzer and Smith 1986; Snow 1980; Spiess et al. 1998; Stothers 1996; Waguespack and Surovell 2003). With the exception of caribou, no remains of large game animals have been associated with PaleoIndian sites in the Northeast and some archaeologists have questioned the extent to which PaleoIndians relied on large mammals, particularly in New England (Dincauze 1993; Ogden 1977). Dincauze (1990) has argued that PaleoIndians in southern New England were more opportunistic and generalized in their subsistence strategies, hunting and gathering a wide range of available animal and plant species including small game such as rabbit. Jones and Forrest (2003) concur, arguing that the comparatively larger number of small PaleoIndian encampments in the region relative to large base camps reflects a PaleoIndian settlement and subsistence system wherein hunters and foragers compensated and adjusted to resource unpredictability. However, recent research on the Mashantucket Pequot Reservation has identified several PaleoIndian sites with estimated ages of approximately 11,000 B.P., including some relatively large multiple loci camps that are hypothesized to be warm weather encampments.

[3] Unless otherwise specified, all radiocarbon estimates for cultural periods and archaeological sites refer to uncalibrated radiocarbon years before present (1950).

Resource-rich freshwater glacial ponds and wetlands were widely distributed across the de-glaciated New England landscape, particularly the areas around Block Island until they were inundated by rising sea levels. As Jones and Forrest (2003) have suggested, smaller and more mobile groups may have been better equipped than larger groups to exploit low density and widely distributed resources in a recently de-glaciated landscape. An elk vertebra, dating to approximately 11,000 B.P., was recovered from a kettle hole pond on Block Island, indicating that by that time there was an open landscape with vegetation sufficient to support large game animals (Chris Littlefield, Block Island Conservancy 2014, personal communication).

Diagnostic PaleoIndian artifacts include fluted Bull Brook and Neponset projectile points. PaleoIndian sites post-dating 10,200 B.P. often include unfluted lanceolate points and bifaces (e.g., Jones and Forrest 2003; Bradley et al. 2008). Other diagnostic stone tools associated with this period include scrapers, gravers, and drills. Southern New England PaleoIndian tool assemblages typically include a high percentage of non-local high-quality lithics such as chert and jasper that were often obtained from lithic sources hundreds of miles away. No PaleoIndian artifacts have been identified on Block Island, but the presence of elk during that period suggests it is likely there was a PaleoIndian presence on the island.

Archaic Period (10,000–3000 B.P.)

The Archaic Period was a time of increasing population and settlement complexity as people in the region adapted to ameliorating climates and the resulting increase in the variability and density of seasonally abundant resources. The Archaic Period is divided into the Early, Middle, and Late periods based on differences in environment, technology, and settlement and subsistence patterns. Paleoenvironmental reconstructions and archaeological evidence indicate increasing diversification of terrestrial and coastal resources within well-defined territories. The density and predictability of seasonal resources provided people with the opportunity to gather and settle in large numbers at certain times of the year in large base camps which became common throughout southern New England by 4500 B.P. (Dincauze 1976, 1990).

Early Archaic Period (10,000–8000 B.P.)

The Early Archaic Period coincided with the beginning of the Holocene Epoch beginning about 10,000 years ago. The early Holocene was marked by warmer and drier conditions than the preceding Pleistocene. Subsistence patterns associated with Early Archaic peoples indicate small highly mobile groups hunting large game such as deer and elk and harvesting a wide range of woodland nuts, particularly hazelnut, which tends to grow near wetlands. Wetland tubers such as cattail, bulrush, water lily, and arrowroot were also important resources in Early Archaic subsistence economies (Dumont 1981; Forrest 1999, Kuehn 1998; Meltzer and Smith 1986; Nicholas 1987). Early Archaic occupations in southern New England are typically associated with diagnostic bifurcate-base projectile points. Concentrations of bifurcate-base projectiles are often associated with large glacial lake basins that evolved into very productive wetlands by the Early Archaic Period and at the headwaters of major rivers in southeastern Massachusetts (Taylor 1976), Connecticut (Pfeiffer 1986), and Rhode Island (Turnbaugh 1980). The association of Early Archaic sites with large wetlands indicates that the resources these habitats provided were one of the most important aspects of Early Archaic subsistence economies (Jones and Forrest 2003; Nicholas 1987).

Archaeological data from Connecticut (Forrest 1999) and the Gulf of Maine region of northern New England (Robinson 1992) suggest that some southern New England early Holocene populations utilized a distinct quartz lithic technology producing quartz “microliths” for use in composite tools (Forrest 1999). The ubiquitous nature of quartz in regional artifact assemblages raises the possibility that some Early Archaic sites and assemblages are often misidentified as Late Archaic Narrow Stemmed occupations. The settlement pattern associated with the Gulf of Maine Archaic Period is markedly different from that associated with the makers of bifurcate-base projectile points. The Sandy Hill Site, a Gulf of Maine Archaic site on the Mashantucket Pequot Reservation in southeastern Connecticut, is a large residential base camp with subterranean pit houses that was occupied almost continually between 8800 and 8200 B.P., in sharp contrast to the few small seemingly temporary sites associated with peoples using bifurcate-base projectile points (Forrest 1999; Jones and Forrest 2003).

Small, short-duration sites resulting from logistical forays undoubtedly supplemented the large semi-permanent site associated with the Gulf of Maine Archaic Period at Mashantucket. Jones and Forrest (2003) interpret the Gulf of Maine Archaic semi-permanent residential settlement pattern in southeastern Connecticut as an adaptive response to predictable, readily abundant resources associated with large glacial lake basins. The identification of a semi-subterranean pit house associated with a LeCroy Bifurcate complex at the Weilnau Site in Ohio (Stothers 1996) and more recently two pit houses dated to 7830 ± 130 B.P. and 8110 ± 90 B.P. at the Whortleberry Hill Site in Dracut, Massachusetts (Dudek 2005) may indicate a previously unsuspected degree of sedentism associated with both the Gulf of Maine Archaic and Early Archaic bifurcate producers in portions of the Northeast and Great Lakes regions. Botanical remains recovered from the Whortleberry Hill Site include acorns, hazelnuts, blackberry/raspberry, and goosefoot and suggest a late summer occupation that possibly extended into the winter. Apparent differences in identifiable artifact assemblages (quartz microlith composite tools vs. bifurcate-base projectile points) and settlement patterns suggest the possibility that two distinct Early Archaic populations occupied the southern New England landscape during the early Holocene (Forrest 1999).

By the Early Archaic Period, Block Island was separated from the mainland and Long Island, although the distance was relatively short and could be easily traversed by dugout canoe (see Figure 3-6). The collections of the Block Island Historical Society contain a number of Early Archaic projectile points although very few have any provenience. However, unlike the Early Archaic projectile points on the mainland, which are almost exclusively manufactured from lithic materials that originated outside of southern New England, the Early Archaic points on Block Island are all made out of quartz and quartzite, presumably made from local beach cobbles. This contrast is significant; it indicates that by the Early Archaic Period there may have been a resident population of people on Block Island who were less mobile than people on the mainland or who did not participate in extra-regional exchange networks.

Middle Archaic Period (8000–6000 B.P.)

The increased frequency of Middle Archaic sites in southern New England indicates that resident populations were firmly established in the region by 8000 B.P., and on the basis of a dramatic increase in the number of archaeological sites, populations were increasing as well. Middle Archaic sites on the mainland are commonly associated with waterfalls in major river drainages, wetlands, and sometimes coastal settings (Bunker 1992; Dincauze 1976; Doucette 2005; Doucette and Cross 1997; Maymon and Bolian 1992) with large base camps established along large wetland systems (Doucette and Cross 1997; Jones 1999). Subsistence activities associated with Middle Archaic base and logistical/temporary camps indicate a seasonal focus on anadromous fish such as salmon, alewife and shad; hunting of large and small game; and collecting of nuts, seeds, and wetland and terrestrial tubers and shellfish. An increase in the complexity of seasonal rounds is hypothesized based on the broad range of resources available throughout the period reflected in paleoenvironmental reconstructions (McBride 1984).

Middle Archaic occupations in southern New England are typically identified by the presence of diagnostic Neville, Neville-variant, Stark, and Merrimack projectile points (Dincauze 1976; Dincauze and Mulholland 1977). The presence of woodworking tools such as adzes, gouges, and axes suggests culling of unwanted trees that might compete with mast producing trees (e.g., oak, hickory, and walnut), and the manufacture of dugout canoes. The lithic materials recovered from Middle Archaic sites reflect a distinct preference for stone available from local or sub-regional sources, such as quartzite and rhyolite. The use of more local lithic sources, or at least those originating within 50–75 miles of a site, led Dincauze (1976) to theorize that Native American band or tribal territories were established within major river drainages, and that the scheduling of subsistence activities such as the seasonal pursuit of anadromous fish species may have developed in response to territoriality (Dincauze and Mulholland 1977).

Middle Archaic projectile points are very common on Block Island, as reflected in the collections of the Block Island Historical Society and local collectors. The points that have provenience indicate that there was a marked preference for larger wetlands on the island, including the salt ponds, when they were freshwater ponds. All the Middle Archaic points were recovered from multicomponent sites, indicating there was some degree of continuity in the use of the larger freshwater wetlands on the island from the Middle Archaic through Woodland periods. While many of these sites are now located near the existing coastline, during the Middle Archaic Period the coast would have been many hundreds of meters away. The congruence of Middle (and Late Archaic) sites with Woodland occupations is likely coincidental, with Middle (and Late) Archaic sites associated with inland wetlands and ponds, and Woodland sites situated in close proximity to the ocean and inland wetlands and ponds.

Late Archaic Period (6000–3800 B.P.)

Late Archaic occupations in southern New England are associated with three cultural traditions: the Laurentian, Small Stemmed, and Susquehanna. The Susquehanna Tradition is often placed in the Terminal (or "Transitional") Archaic Period, as here, in recognition of the distinctive settlement, subsistence, and mortuary patterns associated with this tradition. Each tradition spans well-defined periods of time based on radiocarbon dates and associated diagnostic tools, and each tradition is characterized by distinct differences in lithic technologies, preferences for raw materials, settlement patterns, and ceremonial practices.

The Laurentian Tradition is the earliest expression of the Late Archaic in the Northeast. Artifacts commonly associated with Laurentian occupations include woodworking tools (hones, axes, and adzes), ground slate points and knives (generally farther north in the Maritimes region), ulus, simple bannerstones or atlatl weights, and broad-bladed and side-notched Otter Creek, Vosburg, and Brewerton type projectile points (Ritchie 1980:79). Recovered lithic materials indicate a strong, if not exclusive, preference for quartzite, volcanic rock, and some argillites in southeastern New England. Laurentian Tradition sites in southeastern Connecticut and western Rhode Island contain very high percentages of Plainfield Formation quartzite. Plainfield Formation quartzite was obtained primarily from bedrock outcrops or cobbles found in eastern Connecticut and far western Rhode Island. Laurentian Tradition settlement patterns on the mainland indicate small, mobile groups moving their site locations on a fairly regular basis within well circumscribed territories (McBride 1984).

One of the most significant Laurentian Tradition sites discovered in recent years on Block Island (or in southern New England) is the Harbor Pond Site (RI 2554) identified by PAL during a wind farm transmission line survey (Waller 2013). The site is located within 100 m of Harbor Pond and very close to Trims Pond and the Great Salt Pond, which at the time the site was occupied would have been fresh water. The site contained one of the largest and most varied lithic assemblages ever identified in a Laurentian Tradition site in southern New England: projectile points, a ground-stone axe, a ground-stone celt, and drills (Joseph Waller 2015, personal communication). Equally significant are the technological aspects of the assemblage, including the source of the raw material. The majority of the assemblage was made from Plainfield Formation quartzite, identical to mainland Laurentian sites. However, unlike mainland Laurentian sites, the raw material associated with the Harbor Pond Site was obtained from both tabular (quarried) cores and beach cobbles. The quartzite assemblages on the mainland were obtained from quarrying veins of tabular quartzite directly within the formation. The quartzite assemblage from the Harbor Pond Site was obtained from quarrying Plainfield Formation quartzite and beach cobbles as indicated by the presence of cortex on quartzite debitage. This pattern suggests there was a resident (year-round) population of Laurentian Tradition people on Block Island by at least 5,000 years ago (if not earlier), as they were using preferred raw materials obtained from the mainland and Block island.

Diagnostic artifacts associated with Small Stemmed Tradition occupations in the Northeast include Squibnocket Stemmed, Wading River, and a host of small or narrow stemmed projectile points (Dincauze 1975). Regional archaeological data indicate Small Stemmed projectile point producers relied on a quartz cobble lithic industry (McBride 1984). Quartz cobbles from glacial outwash, riverbeds, or coastal contexts were the most common sources of raw material for Small Stemmed chipped-stone tools. In addition to quartz, there is a noticeable reliance on Narragansett Basin argillite for the production of Small Stemmed projectile points in eastern Rhode Island. Small Stemmed Tradition settlement patterns are characterized by large base camps concentrated along the well-drained, resource-rich banks of rivers and streams, ponds, and interior wetlands, supplemented by task-oriented, short-duration sites that targeted specific resources (Waller and Leveillee 2002). Small Stemmed projectile points are well represented from all the collections from Block Island and are often recovered from multicomponent sites that also yielded Laurentian Tradition and Woodland Period artifacts.

Terminal Archaic Period (3800–2700 B.P.)

The Terminal Archaic Period, also known as the "Transitional Archaic," is represented by the Susquehanna Tradition, which included the manufacture and widespread use and trade of steatite vessels and several broad-bladed projectile point/knife forms (Atlantic, Susquehanna Broad, and Coburn) and, in the later stages of the tradition, narrow bladed Orient Fishtail points. There is debate whether the Susquehanna Tradition developed out of local populations or was introduced into southern New England by peoples migrating from farther south. Evidence of the manufacture, use, and exchange of steatite bowls began about 3,600 years ago. For reasons that are not clear, the use of steatite appears to have declined by about 2900 B.P., perhaps because of the introduction and widespread use of ceramic vessels, sometimes referred to as the "container revolution" (Sassaman 1999).

There were a number of steatite quarries in Connecticut and Rhode Island that were actively used during the Terminal Archaic Period to manufacture stone bowls. Broad and thin Susquehanna Tradition bifaces were ideally suited for knives and possibly woodworking implements and are in marked contrast to the more linear, elongated, narrow, and thicker Small Stemmed projectiles. Susquehanna Tradition assemblages reflect different choices in raw materials from the preceding Laurentian and Narrow Stemmed traditions and include preferences for rhyolites, quartzite, argillites, and non-local cherts. The use of large (and heavy) steatite vessels suggests a trend toward reduced mobility and increased sedentism by resident populations. In this context, the predominance of non-local lithic materials may not represent a mobile settlement strategy but rather exchange networks between different groups of Susquehanna peoples across the region.

Terminal Archaic settlement patterns on the mainland were oriented toward coastal or riverine settings with a subsistence base focused on the acquisition of riverine or estuarine flora and fauna that included fish, nuts, and small- to medium-sized mammals (Pagoulatos 1988). There is also evidence of increased use of floodplain seed plants such as chenopodium (goosefoot). Better known expressions of Susquehanna Tradition culture are the cremation cemetery complexes common throughout southern New England (Dincauze 1968; Leveillee 2002; Pfeiffer 1980).

Susquehanna Tradition projectile points are common in Block Island collections but, as with earlier Late Archaic sites with the exception of the Laurentian Tradition Harbor Pond Site, no Susquehanna Tradition occupations have been isolated from the multicomponent sites identified on the island. Aside from projectile points, the only other diagnostic Susquehanna Tradition artifact found on Block Island was a single fragment of a steatite stone bowl (Chris Blaine 2015, personal communication).

Woodland Period (3000–400 B.P.)

The Woodland Period was a very dynamic cultural period in southern New England that included the development of coastal economies, sedentary villages, the introduction of maize horticulture, the introduction of new ideas and language from the Midwest, and increasing social and political complexity. Archaeologists have traditionally made a sharp distinction between the generalized Archaic Period settlement/subsistence patterns and Woodland Period horticulture and sedentism (Snow 1980). However, the transition from the Archaic into the Woodland Period should not be characterized as a strictly linear evolution from one stage to the next. The archaeological record on the mainland indicates Woodland peoples throughout the region continued to rely on a wide diversity of resources with the important addition of shellfish and a wide range of coastal/maritime resources among coastal peoples. It is during the Early Woodland Period on the mainland (ca. 2700–2000 B.P.) that the first evidence for the regular, and seasonal exploitation of shellfish and non-anadromous fish appears. This trend toward increased reliance on coastal and maritime resources continued throughout the Middle (2000–1000 B.P.) and Late (1000–450 B.P.) Woodland periods with a corresponding increase in sedentism. Other developments include increasing refinement of ceramic technologies, participation in long-distance trade and exchange networks, rising populations, and increased social and political complexity associated with the introduction of maize horticulture about 1000 B.P., and eventually year-round coastal and riverine horticultural villages. Like the Archaic Period, the Woodland Period can be subdivided into Early, Middle, and Late periods.

Early Woodland Period (2700–2000 B.P.)

Early Woodland settlement patterns on the mainland were characterized by medium-sized seasonal camps situated in a variety of ecological zones and habitats, including uplands, river valleys, and coastal zones. Early Woodland peoples do not appear to have been as mobile as their Archaic Period predecessors, but still organized their movements in synchrony with seasonally abundant resources that during this period included coastal zones. Early Woodland archaeological sites in southern New England are identified by projectile points of the Meadowood, Lagoon, and Rossville types and thick (10–12 mm) interior/exterior cord-marked, grit-tempered ceramics of the Vinette I ceramic type. On the mainland there are generally fewer Early Woodland occupations identified compared to those of earlier Archaic periods, which has led some archaeologists to hypothesize there may have been a population decline during the Early Woodland Period (Dincauze 1974; Lavin 1988). Fiedel (2001) suggests that an Early Woodland "collapse" may have resulted from climatic or environmental change, sociocultural change, or epidemics. Conversely, other archaeologists argue that the apparent underrepresentation of Early Woodland sites may stem from the difficulty in distinguishing Early Woodland from Late Archaic occupations, as both are characterized by a quartz cobble lithic industry and small, narrow-bladed projectile points with stems. The only apparent differences are the addition of ceramics in Early Woodland occupations and the appearance of small seasonal or temporary sites along the coast (Juli and McBride 1984). The association of Small Stemmed projectile points and a quartz cobble industry with Early Woodland radiocarbon dates indicates that, in the absence of ceramics or radiocarbon dates, some Early Woodland assemblages likely have been misattributed to the Late Archaic Small Stemmed Tradition.

Radiocarbon dates of 2720 ± 120 B.P., 2350 ± 140 B.P., and 2110 ± 120 B.P. obtained from the Greenwich Cove Site shell midden in Narragansett Bay indicate shellfish exploitation intensified about Narragansett Bay during the Early Woodland Period (Bernstein 1993). Small to medium-sized temporary or seasonal Early Woodland archaeological sites have been identified throughout Narragansett Bay in a pattern similar to what has been identified in other areas of coastal southern New England, which is in sharp contrast to the pattern identified on Block Island (see below). Radiocarbon dates of 2700–2200 B.P. were obtained from the RI 1428 Site on Block Island.

Middle Woodland Period (2000–1000 B.P.)

Middle Woodland settlement and subsistence patterns in southern New England continued to reflect a focus on coastal or riverine ecosystems. There was a trend toward fewer but larger seasonal camps along rivers, large wetlands, and coastal zones, with a corresponding increase in small temporary and task-specific sites in the interior. This pattern was particularly evident in the lower Connecticut River Valley, where McBride (1984) demonstrated a definite association with an increase in the size and duration of occupation of Middle Woodland sites associated with developing coastal and estuarine tidal marshes and an increase in temporary and task-specific sites in the interior. Bragdon (1996) identifies this pattern as "conditional sedentism" characterized by a trend toward large and more sedentary sites in increasingly circumscribed territories.

Diagnostic Middle Woodland artifacts include Jack's Reef Pentagonal and Corner-Notched and Fox Creek type projectile points, and dentate and rocker dentate-stamped ceramics. Middle Woodland occupations in coastal southern New England often are associated with non-local chert, jasper, and various amounts of hornfels from the Blue Hills area south of Boston (Luedtke 1987; Ritchie and Gould 1985). The use of Boston Basin lithics and exotic cherts and jaspers is in sharp contrast to the almost exclusive use of quartz and argillite associated with the Early Woodland quartz cobble lithic industry.

Late Woodland Period (1000–450 B.P.)

The nature and distribution of Late Woodland settlement and subsistence patterns is in sharp contrast with earlier Middle Woodland patterns. There continued to be a focus on coastal and estuarine resources for coastal groups but, with the introduction of maize horticulture, sedentary villages appeared for the first time in riverine and coastal areas. Late Woodland settlement types in coastal areas included specialized exploitation sites (shell middens, hunting and processing camps, lithic workshops, etc.), small domestic sites, and larger semi-permanent or permanent hamlets and villages (e.g., McBride 1984). Between A.D. 1200 and 1300, maize horticulture was the most important aspect of most Late Woodland subsistence economies. Associated with the intensification of maize horticulture were advances in storage and ceramic technology to store surplus grains and to more effectively meet the cooking requirements for high carbohydrate foods such as beans and maize. With an increased reliance on maize horticulture, and the corresponding need for large amounts of arable land associated with slash-and-burn horticultural practices, communities became increasingly tied to specific and localized territories. The result was decreased residential mobility with a corresponding increase in the number of logistical temporary and task-specific sites within a community's territory, as interior upland and coastal resources continued to be exploited by small groups on behalf of the village.

Increasing populations, reduction in communal mobility, and the growth of village populations, some as high as 200–300 people, resulted in the formation of well-defined territories and progressively complex social and political institutions. There also appears to have been an increase in conflict throughout the region, as communities became increasingly tied to their territories with a corresponding need to defend them. One study of Late Woodland burials in coastal Connecticut documented 119 burials dating to A.D. 1000–1600, of which 19 (16%) exhibited evidence of death by trauma in the form of crushed or missing skulls and multiple projectiles embedded in skeletal tissue or body cavities. Of the 119 burials, 6 (5%) were women and children, who constituted 31.5 percent of the population (McBride 2013). These data must be assessed carefully, as almost all the excavations and observations of trauma were done by non-professional archaeologists. The number of cases of trauma were most likely underestimated, as only the most obvious cases were identified. Nonetheless, this is an extraordinarily high percentage of the population who experienced conflict or death during the Late Woodland Period. Interestingly, by the Contact Period, social controls appear to have been put in place that precluded non-combatants as targets of conflict (McBride 2013).

Diagnostic artifacts found associated with Late Woodland occupations include triangular Madison and Levanna type projectile points and thinner walled (6–10 mm) cord-wrapped, stick-impressed, and incised ceramics. Diagnostic Levanna projectile points were most often manufactured of quartz, argillite from Narragansett Bay, and rhyolites derived from the Lynn Volcanic Suite and Blue Hills Area of northeastern Massachusetts and the Boston Basin on the mainland, or from glacial-derived cobbles of the same materials collected along the shore.

Woodland Period on Block Island

The Manisses Indians of Block Island are estimated to have numbered approximately 800–1,200 in the early seventeenth century. Contrary to popular belief, "Manisses" translates as "little island" not "little God's island." The island is only 10 square miles, making it the smallest permanently occupied tribal territory in southern New England. In contrast, Martha's Vineyard and Nantucket each is approximately 100 square miles and were home to several Native tribes. What Block Island lacks in terrestrial area and resources is more than made up by having some of the richest and most diverse coastal and marine resources in the region.

The Woodland Period settlement/subsistence patterns reconstructed for Block Island are very different from those of mainland coastal groups such as the Narragansett, Pequot, and Eastern Niantic. Block Island patterns exhibit a much stronger maritime subsistence focus than do mainland sites, even after the adoption of maize horticulture. Large, semi-permanent or permanent Early Woodland sites appeared on Block Island about 2700 B.P. and represent the first permanent villages in southern New England until the advent of maize horticulture on the mainland 1,500 years later. Woodland Period faunal assemblages on Block Island are dominated by coastal and maritime species, including shellfish, shallow and deepwater fish, migratory and resident water birds, and Grey and Harbor Seals (Bellantoni 1987). The few terrestrial animals recovered from Block Island sites include deer, beaver, dog, otter, and turkey, all in relatively low numbers compared with the number and variety of coastal and marine species.

At the Early Woodland RI 1428 Site along the northeast corner of the Great Salt Pond, fish represent 69 percent of the identified faunal remains based on the Number of Identified Specimens (NISP) recovered from middens and refuse pits. Seal represent 12%, followed by bird (8.2%) turtle (8.0%), small mammals such as dog and raccoon (2.3%), and turtle (10.1%), and deer (0.7%) (Table 4-3; Tveskov 1997). Table 4-3 provides a comparison of the coastal mainland RI 110 (Salt Pond Site), a Late Woodland year-round horticultural village, and RI 1428, an Early Woodland pre-horticultural year round village (Leveillee 2006; Waller 2000). Table 4-4 compares the faunal assemblage from RI 110 with that of RI 1428 and other faunal assemblages recovered from Block Island sites. The data from Block Island sites are from Bellantoni

Table 4-3. Faunal Remains from RI 110 and RI 1428.

Faunal Remains	RI 110	RI 1428
NISP % Terrestrial	18.0	10.9
NISP % Marine & Coastal	81.9	80.7
% Fish NISP	81.8	68.7
% Bird NISP	0.008	8.3
% Terrestrial Mammal NISP	11.6	3.0
% Seal NISP Mammal Taxon	0.4	79.7
% Deer NISP Mammal Taxon	46.4	4.7
No. of Terrestrial Species	7	4
No. of Marine & Coastal Species	14	8
No. of Bird Species	1	10

Table 4-4. Comparative Faunal Analysis, RI 110 and Block Island Sites.

Taxon	RI 110		RI 118		RI 120		RI 124		RI 1428	
	NISP	% of Taxon	NISP	% of Taxon	NISP	% of Taxon	NISP	% of Taxon	NISP	% of Taxon
Mammal										
Deer	316	46.5	5	26.3	2	25	4	14.3	7	4.7
Dog	355	52.2	3	15.8	1	12.5	4	14.3	22	14.8
Seal	3	0.4	10	52.6	5	62.5	20	71.4	118	79.8
Beaver	5	0.7	0	0	0	0	0	0	0	0
Otter	0	0	1	5.3	0	0	0	0	0	0
Wolf	1	0.1	0	0	0	0	0	0	0	0
Raccoon	1	0.1	0	0	0	0	0	0	1	0.7
Bird										
Turkey	5	100	0	0	0	0	0	0	0	0
Canada Goose	0	0	2	4.6	1	20	2	16.7	11	13.4
Mallard	0	0	11	25.0	1	20	2	16.7	6	7.3
Merganser	0	0	4	9.1	0	0	0	0	13	15.8
Loon	0	0	0	0	0	0	1	8.3	7	8.5
Greater Scaup	0	0	10	22.7	2	40	4	33.3	5	6.1
Wood Duck	0	0	2	4.6	1	20	0	0	2	2.5
Diving Duck	0	0	3	6.8	0	0	0	0	0	0
Eider	0	0	4	9.1	0	0	0	0	0	0
Bald Eagle	0	0	2	4.6	0	0	1	8.3	8	9.7
Horned Grebe	0	0	0	0	0	0	0	0	2	2.5
Gull	0	0	2	4.6	0	0	2	16.7	22	26.8
Golden Eye	0	0	3	6.8	0	0	0	0	5	6.2
Hawk	0	0	0	0	0	0	0	0	1	1.2
American Swan	0	0	1	2.1	0	0	0	0	0	0
Reptile										
Unidentified Turtle	366	100	0	0	0	0	0	0	78	100
Painted/Box Turtle	0	0	5	83.3	1	100	1	100	0	0
Snapping Turtle	0	0	1	16.7	0	0	0	0	0	0
Fish										
American Eel	2	0.04	0	0	0	0	0	0	0	0
Sturgeon	4,204	91.2	150	90.4	25	100	0	0	460	67.7
Bass	216	4.7	0	0	0	0	0	0	0	
Black Sea Bass	21	0.45	0	0	0	0	0	0	55	8.1
Striped Bass	2	0.04	6	3.6	0	0	0	0	26	3.8
Cod	2	0.04	0	0	0	0	0	0	41	6.0
Herring	3	0.05	0	0	0	0	0	0	0	0
Scup/Porgy/Bream	117	2.5	0	0	0	0	0	0	18	2.7
Sheepshead	4	0.08	0	0	0	0	0	0	0	0
Blackfish	23	0.49	0	0	0	0	0	0	65	9.6
Bluefish	0	0	10	6.0	0	0	0	0	0	0
Shark	8	0.13	0	0	0	0	0	0	0	0
Summer Flounder	5	0.1	0	0	0	0	0	0	14	2.1
White Perch	127	2.718	0	0	0	0	0	0	0	0

(1987); the RI 110 data was compiled by Dr. Sarah Sportman and provided to MPMRC by PAL. These data need to be interpreted with a degree of caution because the analysis was conducted by different faunal specialists and because RI 110 is a Late Woodland mainland horticultural village and RI 1428 is an Early Woodland pre-horticultural village. RI 120 and RI 124 date to the Late Woodland Period and RI 118 dates to the Contact Period. Only identified species were included in Tables 4-3 and 4-4. Each site yielded hundreds of unidentified mammal, fish, and bird remains that were not included in this analysis.

The NISP is not necessarily comparable between taxon given biases related to differential preservation and frequency of a NISP (e.g., one sturgeon can yield dozens of scups [plates] that are generally well preserved). Therefore, MPMRC only calculated the percentages of NISP within a taxon for this analysis. Nonetheless, these comparisons indicate some very important differences in the subsistence economies between the Narragansett and the Manisses. One of the more obvious differences is the very high percentages of seal compared to deer at the Block Island sites. Seal remains dominate the three Block Island assemblages analyzed by Bellantoni (1987), making up 53–79 percent of the total mammal assemblage with a mean of 66.5 percent (Table 4-4). Conversely, RI 110 is dominated by deer remains (46.4% of the mammal assemblage); seal remains constitute only 0.4 percent of the mammal assemblage. Thirteen bird species, mostly migratory, were identified at Block Island sites compared to only one for RI 110). Generally, the faunal assemblage from RI 110 reflects a strong orientation toward terrestrial resources, although the site contained a greater variety of fish species (n = 13) compared to the Block Island sites (n = 7). If fish are removed from the analysis, as their remains tend to overwhelm faunal assemblages, and only birds, mammals, and reptiles are included, seal constitutes 38 percent of the Block Island assemblages followed by bird (26.6%), turtle (25%), small mammal (8%) and deer (2.3%). As a whole, the Block Island faunal data indicate an overwhelming orientation to marine mammals, migratory birds, and fish at the expense of terrestrial resources during the Woodland Period. The only terrestrial resource that regularly occurs in high numbers at Block Island sites are mast products such as hickory, hazel, and acorn nut. This aspect of Block Island subsistence patterns is consistent with the management of mast trees on the southern end of the island inferred from early Euro-American deeds.

The lithic technology on Block Island also contrasts sharply with that of mainland sites and is best described as an expedient technology with very few form tools compared to mainland sites. A wide variety of lithic raw materials are so abundant in cobble form on Block Island beaches that there does not appear to have been any effort to invest in the manufacture or curation of more formal tools such as knives, scrapers, or drills (e.g., Tveskov 1992).

With little investment of time, cobbles could easily be split and modified to produce a usable edge, an appropriate angle for scraping or cutting, and a tip for piercing. The finished tool may not have been carefully shaped and flaked for durability and longevity and may not have lasted as long as more recognizable “formal” tools such as a knife, scraper, or drill, but once the tool was dull and expendable, another tool could easily be fashioned from the abundant supply of raw material on the beaches. Another difference between Block Island and mainland Woodland Period sites is the relative lack of diagnostic projectile points at sites on the island. Diagnostic Late Woodland Levanna points are common in the various collections on Block Island, but very few Early and Middle Woodland points have been identified on Block Island sites. Excavations at the Early Woodland RI 1428 recovered over 10,000 artifacts and pieces of debitage, almost all of quartz (Tveskov 1992, 1997). Only a single artifact that resembled a projectile point was recovered, and it did not resemble the point types commonly associated with Early Woodland sites on the mainland, where it would be common to recover many dozens of projectile points. It is likely that with the Manisses’ focus on large marine species such as seal and sturgeon rather than deer, they produced bone points of various types that were more effective than stone points.

There was an overwhelming preference for quartz in Early and Middle Woodland sites compared to Late Woodland sites on Block Island. Late Woodland sites exhibit a much higher percentage and diversity of high-quality lithic materials, including chalcedony, chert, jasper, and very high-quality quartzites compared with earlier sites. Cortex is evident on many of these materials, clearly indicating they were obtained from beach cobbles. Individuals familiar with lithic materials used by Woodland peoples in southern New England do not recognize many of these materials, suggesting their distribution may have been restricted to Block Island beaches. As noted in Chapter 3, Tim Ives, Rhode Island State Archaeologist and accomplished flintknapper, identified multiple cobbles of high-quality stone after a brief search of the beaches on the island. None of these materials or their potential bedrock sources were familiar to Dr. Ives (Figures 4-3 and 4-4). Why only Late Woodland peoples carefully selected such high-quality materials and earlier Woodland or Archaic Period peoples did not is unclear.

Figure 4-3. Exotic lithic materials.

Prior to the Hurricane Sandy surveys, the Woodland Period settlement patterns documented on Block Island were characterized by large year-round villages along the salt ponds with temporary and task-specific sites throughout the interior of the island associated with ponds and wetlands. The distribution of previously reported Woodland Period and Contact Period sites shows a strong clustering around the Great Salt Pond (Figure 4-5). Not considered in earlier reconstructions of Late Woodland and Contact Period settlement patterns was the impact of the introduction of maize horticulture (ca. 1000 B.P.), which undoubtedly increased the carrying capacity of the island with resultant effects on the island's settlement and subsistence patterns and population. While it is difficult to estimate the number of contemporaneous Early, Middle, and Late Woodland villages, seventeenth-century sources indicate there were five or six villages in the early to mid-seventeenth century (see below). An increase in population, which inevitably followed the introduction of maize horticulture, would have increased the demand for suitable soils. Table 3-4 indicates that the best

Figure 4-4. Exotic lithic materials.

soils are concentrated in the Corn Neck and southeast areas of Block Island. This distribution likely influenced Late Woodland and Contact Period settlement patterns as villages were relocated periodically to be in closer proximity to good agricultural soils.

Both the mainland and Block Island settlement patterns are characterized by large permanent or semi-permanent villages situated adjacent to tidal marshes, estuaries, and salt ponds with numerous small temporary and task-specific logistical sites located adjacent to interior freshwater wetlands and ponds. As discussed above, Block Island settlement patterns are now believed to be more complex than previously thought. While larger sites with longer durations of occupations are concentrated along the salt ponds, only limited archaeological surveys have been conducted in interior areas away from the salt ponds, where we might expect Late Woodland and Contact Period horticultural sites or seasonal camps along the seaward coasts.

Contact and Early Post-Contact Period Manisses Settlement Patterns

Relatively few Contact Period sites have been identified on Block Island, which is not surprising given that the Contact Period is measured in decades, while earlier Woodland Periods are measured in centuries. Contact Period occupations on Block Island have been identified from previous CRM surveys (McBride 2007; Waller 2013b) (Figure 4-5).

Important clues regarding the nature and distribution of Contact Period sites and land use patterns can be found in John Underhill's seventeenth-century narrative of the Pequot War in *Newes From America* (Underhill 1638). In August (Winthrop in Hosmer 1908) or September (Underhill 1638) 1636, a force of 90 soldiers from Massachusetts Bay landed on Block Island. The English waded ashore near what is now the Crescent Beach area. After a brief fight, the English established a base camp in one of the abandoned villages near where they landed. Archaeological investigations beneath Corn Neck Road prior to road

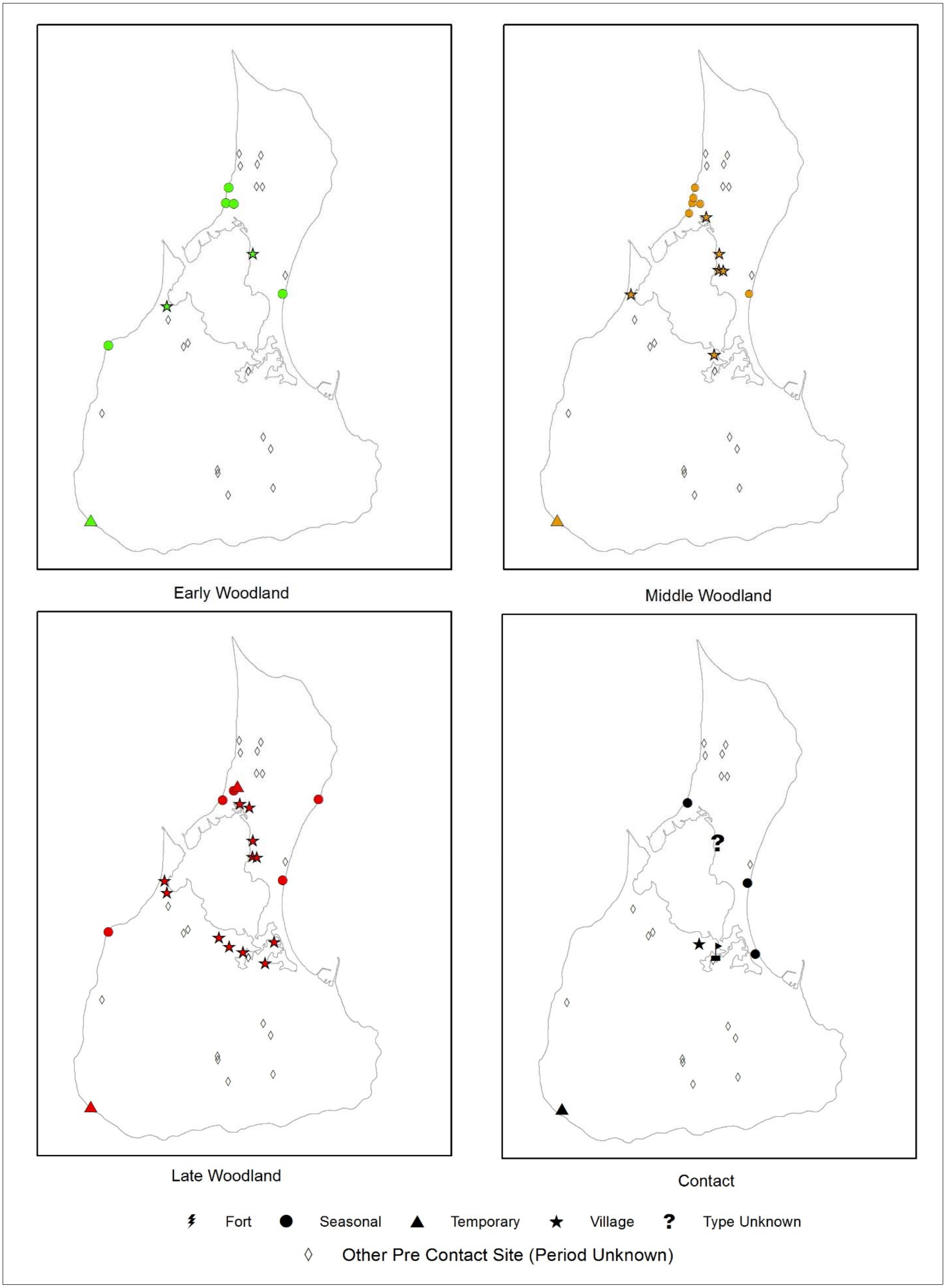

Figure 4-5. Woodland and Contact Period settlement patterns.

repairs necessitated because of impacts from Hurricane Sandy (Waller 2013b) identified the Contact Period Crescent Beach Site (RI 2555), which yielded Late Woodland/Contact Period ceramics, two pieces of European flint, and a musket ball. RI 2555 and a second potential Contact Period site (described in Chapter 6) may be associated with the brief English encampment described by Underhill.

It is difficult to reconstruct Contact and early Post-Contact period Manisses settlement patterns on Block Island with any degree of confidence, although several inferences can be made. Most importantly, five or six villages were described by English soldiers during the Pequot War and, based on the descriptions, they were far apart and not all located in the proximity of the salt ponds. One set of villages was described as two miles apart and another set three miles apart. Two of the villages contained 30 wigwams; assuming an average of 7 people per wigwam, this suggests a village population of about 200. Assuming an average of 150–200 people per village, the Native population of Block Island may have been as high as 1,000 people, suggesting a population density of 38 people/sq km, an extraordinary high density even for coastal zones. For comparison, the 2010 census for Block Island counted 1,051 residents. Scott Nixon (2004) estimated the population densities on the offshore islands of Nantucket, Martha's Vineyard, and Block Island, with higher carrying capacities than the mainland coastal zone, at 12–20 people/sq km. The addition of maize horticulture and the fact that the Manisses may have escaped the 1633–1634 small pox epidemics may have contributed to the high population density estimated for Block Island.

A later seventeenth-century source supports the contention that there were six Manisses villages on Block Island at the end of the Contact Period. In 1663, Thomas Terry, one of the original Block Island Proprietors, gave six acres of his land to six Block Island sachems (Ninnecunshus, Jaguante, Tunkawatten, Repleahe, Saconosh, and Senatick) so they would not be forced off the island. One or more of these sachems had sold lands on the south end of the island to several proprietors in 1661—including John Alcock (Lot 7), Peter George (Lots 8 and 9), Samuel Deering (Lot 16), and Thomas Terry (Lots 4 and 5)—the only example of a Native land sale to the English on Block Island (New Shoreham Town Book No. 1:30–31 1663). These lands may have been occupied by these sachems, as it appears that after their sale the sachems had no land upon which to reside, which is why Thomas Terry gave them six acres of his land on the southeast corner of Fresh (Tonnotounknug) Pond. Three Manissean place names are associated with these lands (Figure 4-6).

Figure 4-6. Original settlers' lots, 1661 and Native land sales to English.

CHAPTER FIVE

RESULTS OF PHASE I SURVEY

A total of 163 HDADs were identified by the MPMRC during the Phase I Hurricane survey (Table 5-1; Figure 5-1). Appendix A provides more detailed maps of HDAD locations and estimated boundaries from the Phase I survey. Appendix B contains the HDAD forms summarizing each identified resource. Fortythree HDADs were potentially associated with previously reported archaeological sites. The remaining 120 HDADs are archaeological resources discovered during the Phase I survey.

Table 5-1. HDADs by Region.

Region	# HDADs	% Total HDADs	Coastline Length (m)	% Coastline	HDADs Length (m)	% Total Length	Avg. HDAD Length (m)
North	2	1.2	3,130	7.6	1,393	20.6	14
South	35	21.5	8,650	20.7	1,036	13.5	30
West	44	27.1	5,600	13.4	28	7.6	32
East	28	17.1	8,100	21.2	1,337	21.2	48
Salt Ponds	54	33.1	15,000	37.1	1,445	37.1	27

MPMRC defined five geographic regions on the Block Island coastline for the purposes of comparison and analysis of the Phase I data. The boundaries of the seaward-facing regions were somewhat arbitrarily defined based on the assumption that prevailing winds might be a factor in HDAD location. The Salt Ponds region is more easily segregated from the seaward-facing coastlines. The ponds provide a unique set of coastal and lacustrine resources that are not available along the outer coastlines. The variability in the orientation of landforms around the salt ponds also provided opportunities to take advantage of or provide protection from prevailing winds and coastal storms depending on the season. The North region is dominated primarily by sand dunes and contains few stable coastal landforms, such as bluffs. The South region is characterized by high elevation bluffs. The East and West regions are more variable than the others with respect to orientation, elevation and character of nearshore and shoreline environments.

The frequency of identified archaeological deposits varied among the regions. The North region and adjacent sections of the East and West regions had the lowest number and linear density of HDADs. Both HDADs identified in the North region were found on low elevation bluffs. The dunes did not seem to contain any evidence of human occupation with the exception of scattered twentieth-century materials. The highest linear density of HDADs was encountered in the western section of the Salt Ponds region near Harbor Pond (Figure 5-1).

In aggregate, the HDADs yielded a diverse array of cultural material representing at least 8,000 years of Native American and Euro-American settlement and use of Block Island's coastlines. HDAD size varied from single artifact find spots to upwards of 450 linear meters of eroded shoreline. All HDADs were damaged by Hurricane Sandy, though the specific character of erosion or deposition differed depending on landform elevation, shoreline profile, nearshore bathymetry, sediment texture, and orientation relative to prevailing storm winds and waves.

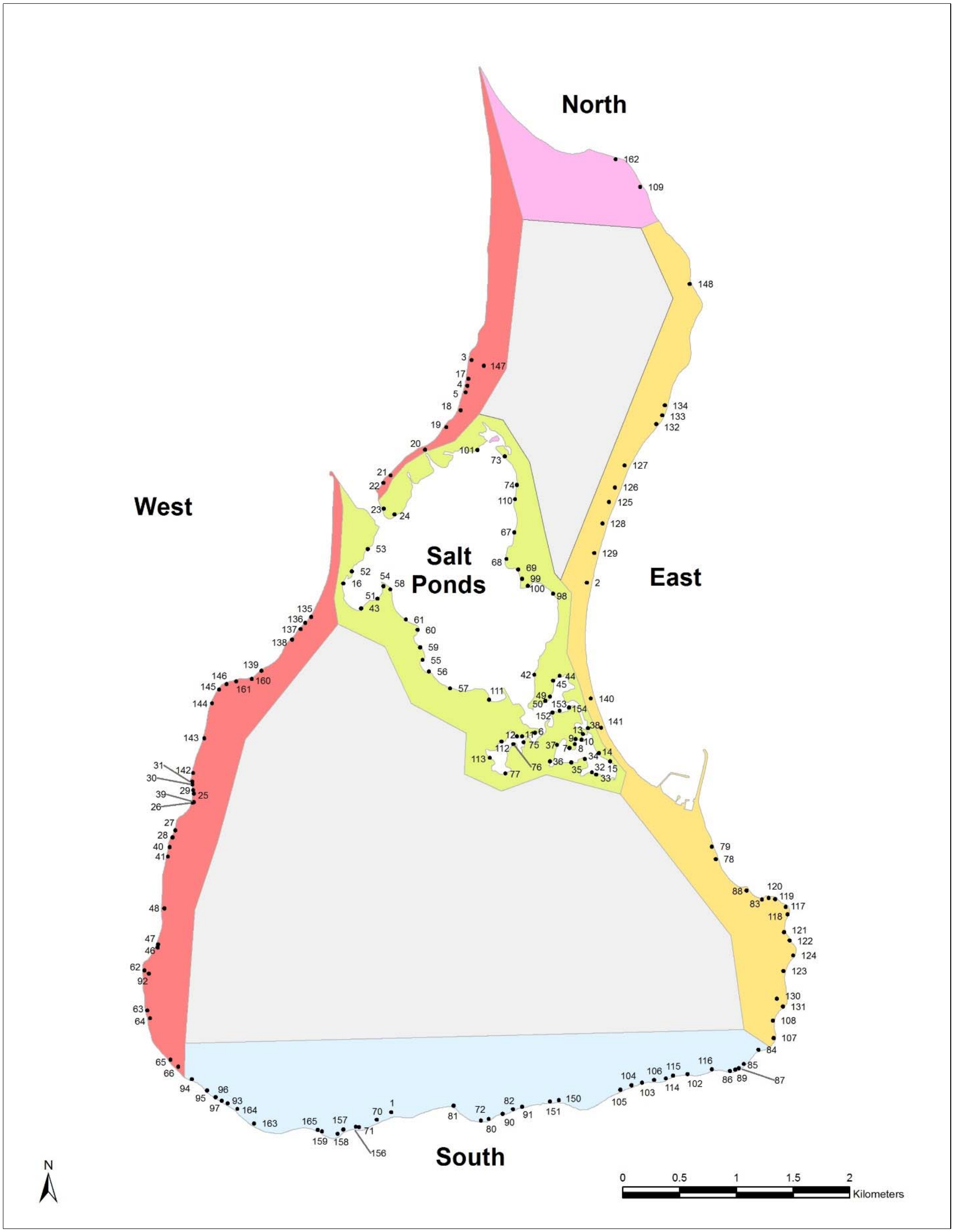

Figure 5-1. Phase I identified HDADs.

Debitage from the initial processing of cobbles and their manufacture into stone implements constitutes the majority of the Phase I artifacts. Quartz dominated the pre-contact assemblage with over 2,000 pieces of debitage identified. Over 90% of all HDADs yielded quartz artifacts during the Phase I survey. Quartzite was the second most abundant lithic material with a total of 209 pieces of quartzite from 67 HDADs (41% of the total), followed by 31 pieces of rhyolite, 25 pieces of argillite, and 10 pieces of basalt. Higher-quality lithics were recovered in substantially lower numbers: 2 chert, 2 jasper, 1 chalcedony, and 1 siliceous siltstone flake.

Mirroring the pattern from previous archaeological investigations at RI 1428 (see Chapter 4), form tools represent a small percentage of the Phase I pre-contact assemblages. Seventy-five fully or partially formed tools were recovered: 32 bifaces, 21 unifaces, 5 projectile points, 5 chopping tools, 1 abrader, 2 pestles, 1 mortar, 1 knife, 1 scraper, 1 utilized flake, and 3 cobble implements. The Phase I lithic assemblage includes just three cores—a small number in comparison to the relative abundance of primary reduction flakes and shatter found along the shorelines.

Projectile points included a quartz Late Woodland Madison point from HDAD 36, a quartz Late Woodland Levanna Point from HDAD 5, a quartzite Middle Archaic Neville point from HDAD 128, and a quartz unidentified point tip and a quartz Late Archaic Squibnocket Stemmed point, both from HDAD 134. The raw materials used for tools and cores broadly followed the proportions of each material in the debitage assemblage with 45 quartz, 17 quartzite, 5 rhyolite, 3 argillite, and 4 other or unidentified materials. No Native American ceramics of any period were observed or collected during the Phase I survey.

A variety of faunal remains were recorded, including several fragments of uncalcined animal bone of apparent recent origins. Shell was nearly ubiquitous throughout the shoreline study area. Much of the shell at lower elevations was naturally deposited by wave action (“shell hash”). The lower densities of shellfish remains at higher elevations may be from gulls or other shore birds or associated with modern human activities. Shell was collected during the Phase I survey only if MPMRC suspected it to be culturally modified or deposited during the Pre- or Post-Contact periods. A small number of charred wood fragments were collected from relatively intact stratigraphies to aid in radiometric or Accelerator Mass Spectrometry (AMS) dating of archaeological deposits. No such analyses were conducted as part of the Hurricane Sandy surveys.

Figure 5-2 depicts the artifact diversity of the pre-contact HDADs as a Rank (1–3) based on the number of major artifact categories represented in each assemblage and the frequency of artifacts within each category (e.g., split cobbles, cores, primary flakes, secondary flakes, shatter, tertiary flakes) and tools (e.g., knives, scrapers, projectile points). The diversity index ranks are as follows:

Rank 1 (First): A high lithic density and wide range of artifact categories representing all stages of manufacture, resource acquisition and processing, and tool maintenance;

Rank 2 (Second): Moderate lithic density and fewer artifact categories that include primary, secondary and tertiary flakes indicating activities related to lithic procurement and manufacture and evidence of some resource procurement and processing activities; and

Rank 3 (Third): Low artifact density and limited artifact diversity primarily consisting of primary and some secondary flakes.

While HDADS characterized by lower artifact diversity tend to be concentrated along the southern coast of the island, they do occur throughout the island, which suggests lithic procurement and initial processing occurred wherever raw material was available (virtually everywhere along the coast). Figure 5-2 also

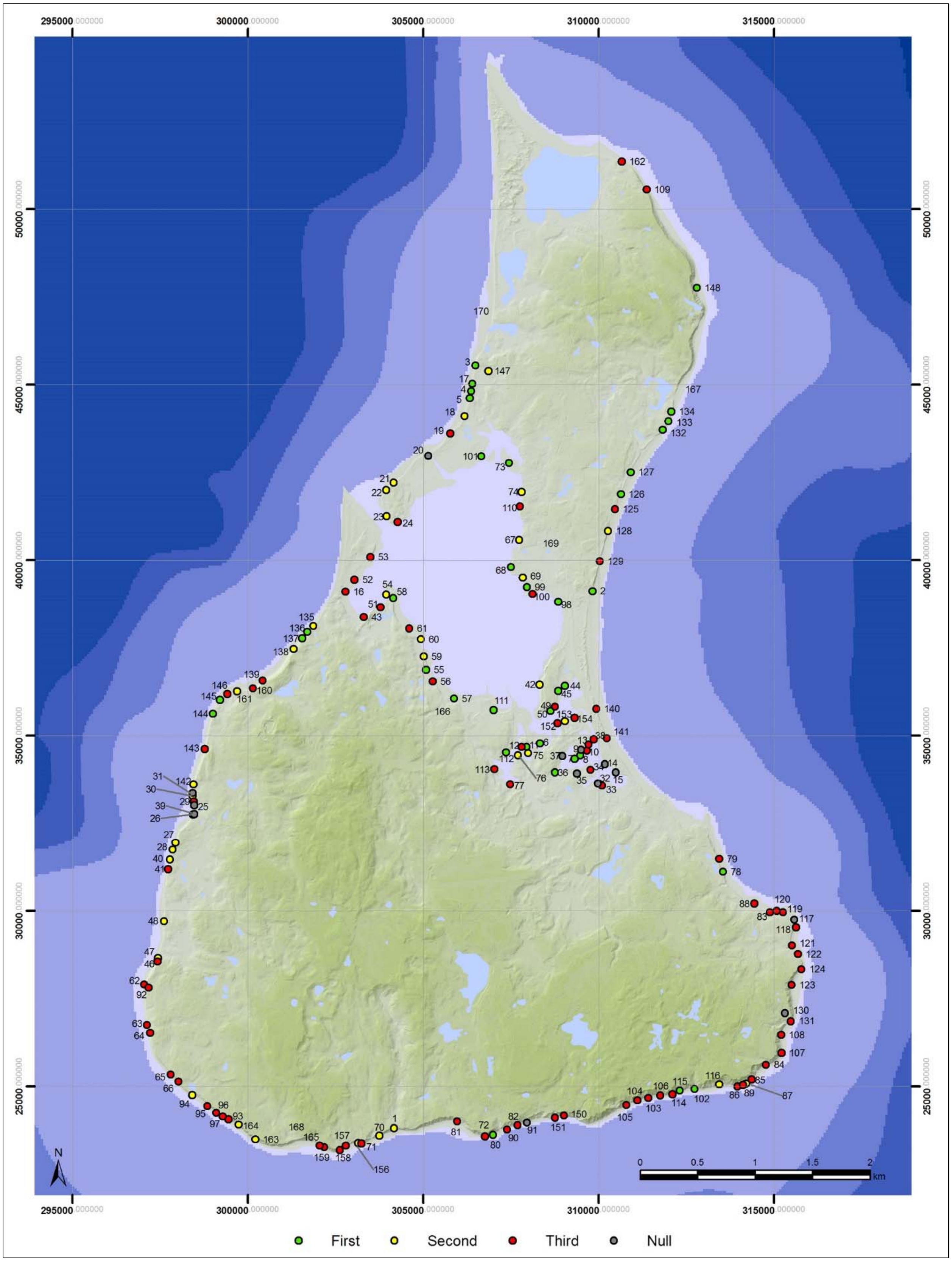

Figure 5-2. HDAD rank.

indicates that HDADs characterized by higher artifact diversity are more frequently located in the northern half of the island, particularly along the salt ponds and the northeastern and west central portions of the coastline. The seaward coastline sections with HDADs of higher artifact diversity are near large expanses of inland wetlands and ponds known to have been favored locations for pre-contact settlements.

Contrary to MPMRC's sensitivity assessment for post-contact resources along the immediate shoreline, artifacts from the eighteenth century through the present were recovered from many of the HDADs. Nine of the 163 HDADs (5.5%) yielded only post-contact artifacts. Numerous sherds of redwares, creamwares, pearlwares, salt-glazed stonewares, whitewares, and ironstone were identified, along with a much small number of yellow ware sherds. Post-contact metals, glass, and a few fragments of kaolin (ball clay) pipes were also recovered. No diagnostic seventeenth-century artifacts were identified in the Phase I survey.

Two HDADs were identified solely by the presence of cultural features or suspected cultural features; no artifacts were observed or collected from these locations. HDAD 39 is a post-contact stone foundation, and HDAD 117 contained only a black soil stain identified in an eroding bluff. HDADs 32 and 37 are large post-contact dump sites on Harbor Pond. The artifacts observed by MPMRC suggest the dumps were used from the nineteenth through the early or mid-twentieth centuries and probably contained hundreds of thousands of fragments of glass, ceramic, metals, and other artifacts.

Recommendations for Phase II Evaluations

MPMRC recommended to the RIHPHC on August 15, 2014, that a representative 20 percent sample of HDADs (33 of 163) be selected for Phase II surveys from the five geographic regions, taking into account property access, material cultural diversity/complexity, integrity, threats, and archaeological potential. The RIHPHC concurred with MPMRC's recommendations and issued a permit authorizing the Phase II surveys on September 14, 2014.

A sample of HDADs within each region was selected for Phase II testing using a ranking system based on the following criteria:

1. Integrity: low, medium, high
2. Archaeological potential: low, medium, high (based on elevation)
3. Threat: low, medium, high (based on elevation and Shoreline Change Rate)
4. Site complexity: lithic diversity and presence of paleosols and cultural features.

Each HDAD was assigned a score from 0 (low) to 2 (high) for Criteria 1–4. The cumulative score was then used to determine the ranking, with the highest rank assigned to those HDADS with the most integrity, highest archaeological potential, under the greatest threat, and with the greatest site complexity. Although the cumulative score was used to prioritize Phase II investigations, physical access and permission to conduct Phase II surveys of HDADs proved the most important consideration and constraint.

Table 5-2 presents the assessment of archaeological potential, integrity, and threat by region. The HDADs along the western, southern, and eastern coasts were determined to have the greatest potential to yield new information about pre-contact Native American use of Block Island's coasts. The HDADs in the East and West regions were also the most heavily impacted by Hurricane Sandy and threatened by ongoing coastal erosion. Most of the Phase II efforts were directed within these areas and to a lesser extent on HDADs within the Salt Pond Region, where the threats are low and where there have already been extensive archaeological investigations.

Table 5-2. Phase II Sites by Time Period.

HDAD	RI Site #	Middle Archaic	Laurentian Late Archaic	Narrow Stem Late Archaic	Susquehanna Terminal Archaic	Early Woodland	Middle Woodland	Late Woodland	Contact	Unknown
11/12	118							X	X	
132/133	137		X	X			X	X		
166	1249							X		
67	1380		X							
153/154	1747							X		
110	2451	X	X	X	X	X	X	X	X	
18	2621							X	X	
3	2622		X	X	X	X	X			
4	2623		X							X
125	2624									X
145	2625					X		X		
1	2626									X
81	2627									X
66	2628					X		X		
157	2629									X
5	2630					X	X	X		
65	2632									X
71	2633									X
83	2634									X
86	2635									X
95	2636									X
93	2637									X
96	2638									X
97	2639									X
116	2640									X
120	2641									X
127	2643									X
163	2648									X
164	2649									X
168	2652									X
169	2653						X	X		
94	2654									X
73	2702									X

The final step in the analysis of the Phase I data was re-examining the HDAD data and distributions to determine which HDADs warranted a RI site number and which HDADs could be combined into a single site.

CHAPTER SIX

RESULTS OF PHASE II SURVEYS

Summary

The Phase II surveys of archaeological sites in Rhode Island that were damaged by Hurricane Sandy were conducted under RIHPHC Permit No. 14-23, issued on September 11, 2014 (Appendix C). MPMRC correspondence with property owners and other preservation stakeholders is provided in Appendix D.

The goal of the Phase II surveys was to enable National Register eligibility evaluations for a sample of 33 sites damaged by Hurricane Sandy. The surveys were designed to assess various attributes of the sites within the coastal zone impacted by Hurricane Sandy and threatened by continued erosion with respect to site content (cultural materials and features), internal structure (nature and duration of occupation), age, integrity, site limits, and potential to yield additional information. There were a number of environmental constraints that limited the nature and extent of Phase II archaeological investigations, potentially making it difficult to assess National Register eligibility. The RIHPHC and CRMC mandated that Phase II investigations were to “avoid areas that remain naturally stabilized, such as those beneath thick overburden (such as dunes) or those consolidated by dense root systems” (RFP #7536370). While these restrictions presented significant challenges to the collection of sufficient information to assess National Register eligibility, there were two mitigating factors that greatly enhanced the evaluations: the horizontal extent of exposed paleosols that characterized many of the seaward coastal sites at low elevations, and the ability to evaluate properties within the well-defined pre-contact contexts that MPMRC developed for Block Island.

Phase II surveys were conducted on 33 HDADs ranging in age from the Late Archaic through the Contact periods (Table 6-1, Figure 6-1). MPMRC excavated a total of 575, 50-x-50-cm shovel test pits (STPs) and 144, 1-x-1 m excavation units (EUs) during the Phase II surveys. Archaeological investigations recovered over 11,500 lithic artifacts, 1,470 Native American ceramics, and hundreds of faunal (Table 6-2) and botanical remains (Table 6-3) from 88 identified features. Individual artifact inventories for each HDAD and site identified during the Hurricane Sandy surveys are provided in Appendix E. The sites were dated from diagnostic artifacts, primarily ceramics. A relatively high percentage of sites (36.3%; n = 12) could be dated to the Woodland or Contact periods. Nine of these sites were multicomponent Woodland/ Contact Period occupations suggesting a high degree of continuity in Woodland and Contact Period settlement patterns.

The Phase II surveys greatly increased our understanding of Native American settlement patterns on Block Island during the Woodland and Contact Periods with subsequent revisions in the site types associated with Woodland and Contact Period historic contexts. Previous reconstructions of Block Island Woodland and Contact Period settlement patterns were overly simplistic and assumed that because the island was so small it would reduce the range of site types and movements of people. In the previous model, large semi-permanent or permanent villages were expected to be located along the margins of the salt ponds and numerous small task-specific sites were located within easy walking distance to the larger sites, particularly in areas near wetlands and ponds. The Hurricane Sandy surveys suggest that the Woodland and Contact Period settlement system included substantial and repeated seasonal use of seaward shorelines, likely for fishing or other marine resource exploitation. Discussion and interpretation of the new site types follow the results of the Phase II survey for each site below.

Table 6-1. Phase II Archaeological Sites by Time Period.

RI Site #	HDAD	Middle Archaic	Laurentian Late Archaic	Narrow Stem Late Archaic	Susquehanna Terminal Archaic	Early Woodland	Middle Woodland	Late Woodland	Contact	Unknown
118	11/12							X	X	
137	132/133		X	X				X		X
1249	166							X		
1380	67		X				X	X	X	
1747	153/154							X		
2541	110	X	X	X	X	X	X	X	X	
2621	18							X	X	
2622	3		X	X	X	X	X			
2623	4		X							X
2624	125									X
2625	145					X		X		
2626	1									X
2627	81									X
2628	66					X		X		
2629	157									X
2630	5					X	X	X		
2632	65									X
2633	71									X
2634	83									X
2635	86									X
2636	95									X
2637	93									X
2638	96									X
2639	97									X
2640	116									X
2641	120									X
2643	127									X
2648	163									X
2649	164									X
2652	168									X
2653	169						X	X		
2654	94									X
2703	73									X

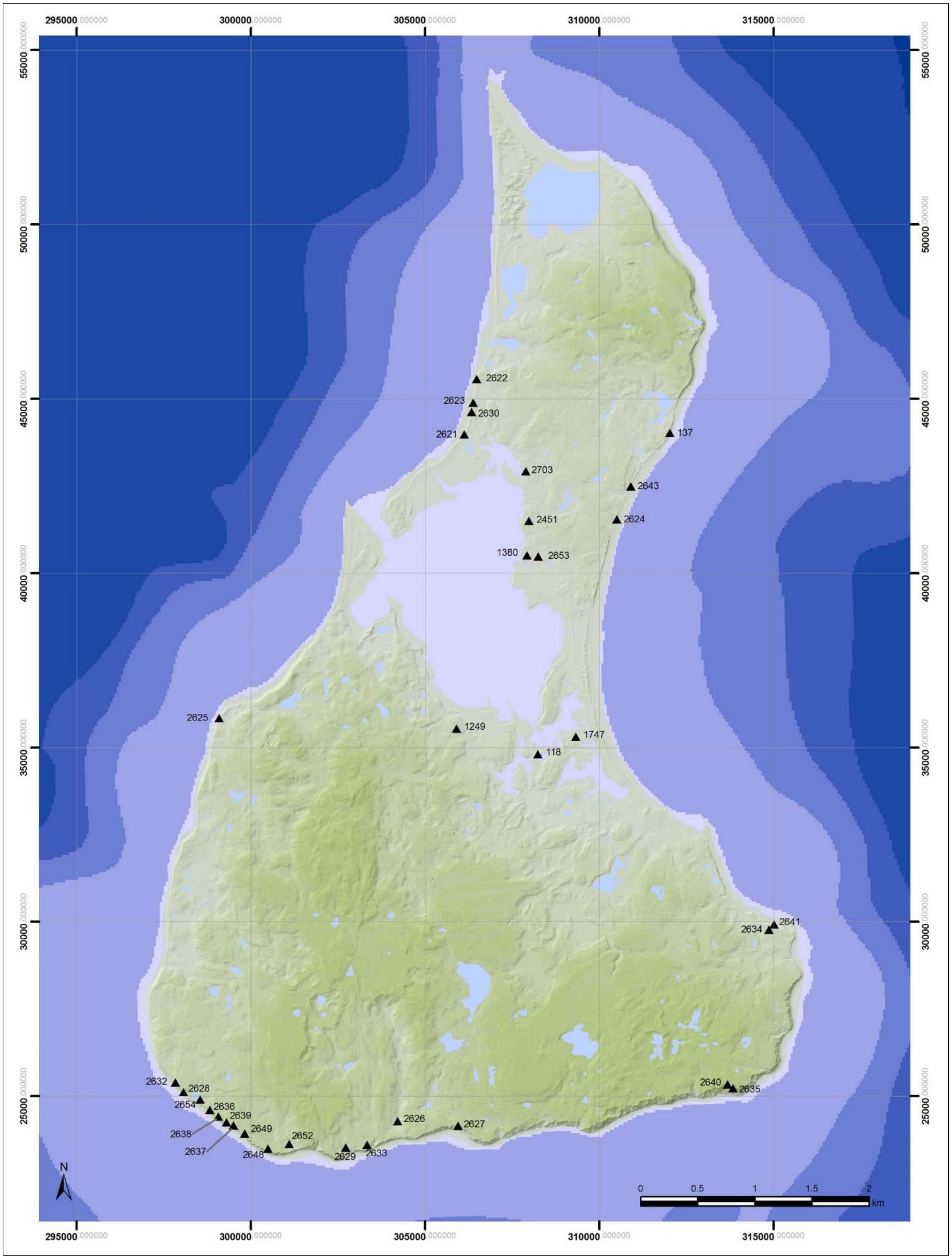

Figure 6-1. Phase II tested sites.

Table 6-2. Faunal Remains, Phase II Tested Sites.

	RI 137	RI 1249	RI 2621	RI 2622	RI 2623	RI 2624	RI 2628	RI 2630	RI 2643	RI 2648	RI 2653	Totals
Fish												
Atlantic Cod		5										5
Atlantic Sturgeon		6	143	6	9						3	168
Calcined		1,125		4							56	1,185
Flounder		1										1
Tautog			3								8	11
Unidentified		36									139	175
Unidentified Scales											17	17
Vertebrae		6,715										6,715
Bird												
Unidentified		38		1							34	73
Mammal												
Unidentified		1		2							12	15
Turtle												
Turtle (Testudine)		2										2
Faunal												
Fish/Bird											562	562
Unidentified		389	245								37	671
Shellfish												
Atlantic Bay Scallop			19								7,885	7,906
Atlantic Surf Clam											4	4
Blue Mussel											308	308
Common Periwinkle			1									3
Eastern Oyster		2,642									7,042	9,688
Green Razor Clam											1	1
Northern Quahog			124	4							1,427	1,568
Ribbed Mussel											31	31
Sea Scallop					1							1
Soft Shell Clam											2,377	2,384

Table 6-3. Botanical Remains, Phase II Tested Sites.

Botanicals	RI 137	RI 1249	RI 2621	RI 2622	RI 2623	RI 2624	RI 2630	RI 2643	RI 2648	RI 2653	Totals
Arrow-Wood Seed					1						1
Bayberry Seed			8	9	3						20
Betulaceae Seed				1							1
Blueberry Seed				1							1
Bulrush Seed			1		1						2
Butter-and-Eggs Seed	3			2	2					1	8
Buttercup Seed				1							1
Compositae Seed										6	6
Copperleaf Seed	1				1						2
Cornaceae Seed	18		26	8	16	1		4		3	79
Dock Seed			1							1	2
Elderberry Seed					1						1
Euphorbiaceae Seed				2							2
Galium Seed				8							8
Gaylussica Seed				1							1
Goosefoot Seed				2							2
Hazelnut Nutshell			5	3							8
Hickory Nutshell			4	146	4		1	4	1	1	167
Huckleberry Seed				2							2
Hypericacease Seed					2						2
Leguminosae Seed					4						4
Nutmeat				22							22
Oak Nutshell				2	1						3
Parenchymous Tissue	1		15	80	6	16		1			119
Polygonaceae Seed			3	1	1					1	6
Raspberry Seed				3							3
Scleria Seed			4	12				1			17
Sedge Seed				1							1
Smartweed Seed		1									1
Spurge Seed	3		2	58	14	2	1	4			88
Unidentified Seed	15							8			23
Viburnum Seed								1			1
Vetch Seed					1						1
Wood	914	201	1,087	3,256	2,432	165	675	418	16	262	9,824
Zea Mays			1								1

Results of Phase II Testing by Site

RI 118 (includes HDADs 6, 11, and 12)

Site Setting and Description

RI 118, also known as Fort Island, is located on a 4-acre island in Trims Pond on the south end of the Great Salt Pond. The island is now bisected north to south by Ocean Avenue, which was constructed in the late 1800s. Fort Island lies at a maximum elevation of 6.7 m (22 ft) above sea level. The tested area lies at an average elevation of 8 ft (2.4 m) above mean sea level (amsl) and is characterized by Canton and Charlton very stony fine sandy loams with 15 to 25 percent slopes (USDA-NRCS 2015). Multiple HDADs (HDADs 6, 11, and 12) were identified on Fort Island during the Phase I survey. Phase II testing indicated all these archaeological deposits are part of the multicomponent RI 118. The site has been known to archaeologists, antiquarians, and artifact collectors for over a century and portions were excavated as far back as the nineteenth century. In 1975, a shell midden associated with Fort Island was impacted from road construction and was excavated and sampled. RI 118 is a contributing resource to the National Register-listed Great Salt Pond Archaeological District.

Phase II Summary

A total of ten 50-x-50-cm STPs were excavated on the east side of Ocean Avenue (Figure 6-2). Transect One was placed in roughly an east–west orientation along the southern edge of the island, paralleling the beach line. Transect Two was aligned southeast to northwest, paralleling Ocean Avenue. Test pits were excavated at 5-m intervals on each transect. Of the ten test pits excavated, only one test pit contained no cultural material. Soil stratigraphy indicated areas of fill adjacent to Ocean Avenue (see Appendix F for representative soil profiles from Phase II surveys). Most artifacts were found in the plow zone, which extended to 20–30 cm below surface (cmbs).

Material culture recovered from the other nine test pits included 49 quartz debitage, 1 quartzite flake (Tables 6-4 and 6-5, Figure 6-3), 1 unidentified shell fragment, 1 clear and 1 aqua untyped bottle glass fragments. Two additional quartz, green, clear and brown bottle glass were also found along with plastic and asphalt in the fill, an obviously disturbed context. No features were identified during the Phase II testing. Based on the Phase II testing, it does not appear that any of the Contact Period components identified to the west of Ocean Avenue extend to the east side of Ocean Avenue. The artifacts recovered from this limited Phase II testing fit within the known context for Pre-Contact, Contact, and Post-Contact Period use and occupation of Fort Island.

Site Condition, Future Threats, and Significance

Areas of modern disturbance were documented. Because this site is on the southern end of the Great Salt Pond, it is well protected from the most severe erosion and storm surge. This site is part of the previously designated Great Salt Pond Archaeological District and is listed in the National Register.

RI 137 (includes HDADs 132 and 133)

Site Setting and Description

RI 137 is identified as a Late Woodland seasonal spring fishing camp located on an east-facing shoreline in the northeastern section of the island. The site was originally identified during a Phase I survey conducted in 1975 by the RIHPC, which recovered concentrations of lithic debitage and one untyped projectile point. The Public Archaeology Survey Team (PAST) conducted a walkover survey of the site in 1986.

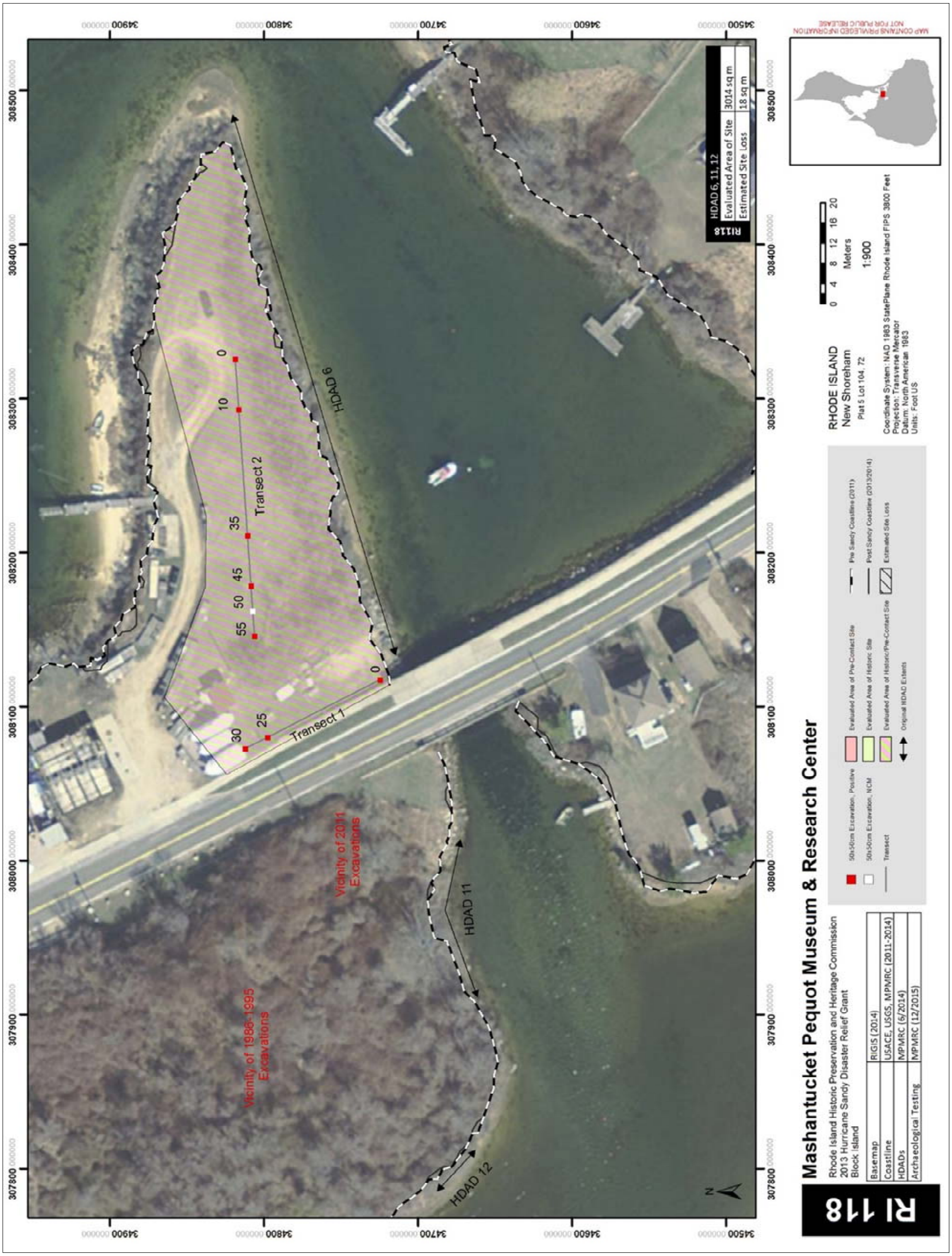

Figure 6-2. Phase II testing, RI 118.

Table 6-4. Lithic Material, RI 118.

Material	Count	Percentage
Quartz	49	98
Quartzite	1	2

Table 6-5. Lithic Type, RI 118.

Type	Count	Percentage
Angular Debris	18	36
Primary Reduction Flake/Debris	19	38
Secondary Flake	11	22
Split Cobble	2	4

Figure 6-3. Lithic sample, RI 118.

The Hurricane Sandy Phase I survey identified two eroded archaeological deposits (HDADs 132 and 133) in proximity to RI 137. Phase II survey indicated both deposits are associated with the previously reported Late Woodland site. Similar to the other sites identified as seasonal spring fishing camps, RI 137 is located immediately adjacent to a large freshwater wetland that was likely an important criterion in site location (Figure 6-4). The site is approximately 300 m north of Mansion Beach on Jerrys Point (Figures 6-5 and 6-6). The tested area lies at an average elevation of 3.7 m (12 ft) amsl. The soils adjacent to the beach are described as Gloucester-Bridgehampton complex, rolling. Exposed soils along the eroded bank revealed intact paleosols (Figure 6-5).

Phase II Summary

During the Phase II excavations a total horizontal exposure of 53 sq m along the vertical face of the eroded bluff were scraped and inspected, resulting in MPMRC's identification of 16 cultural features (Figures 6-7 and 6-8). Identified pre-contact features included two hearths, nine post molds and two untyped features (Figures 6-9 to 6-12; Table 6-6). Three of the features were modern. A large number and variety of pre-contact artifacts were recovered, including 749 lithic artifacts (Table 6-7) and two Late Woodland ceramics. Ninety-four percent of the lithic assemblage was quartz. Quartzite was the second most abundant lithic material, representing just 3 percent of the assemblage. Argillite, basalt, feldspar, gneiss, graphite, and ochre each represents less than 1 percent of the recovered materials (Table 6-8; Figure 6-13). Primary reduction debris (flakes and shatter) represent just over 50 percent of the debitage recovered during the Phase II survey, suggesting that beach cobbles were used as raw material.

Lithic tools include 1 gouge, 2 bifaces, 5 cores, 2 hammerstones, 2 scrapers, 1 uniface, and 1 utilized flake (Table 6-7; Figure 6-14). A quartzite Late Archaic Brewerton-Eared projectile point was recovered during the Phase I survey (Figure 6-15), but no additional diagnostic artifacts from this period were found during the Phase II investigations. The lithic density was relatively low (14 artifacts/sq m; Figure 6-16) compared to other sites identified as seasonal spring fishing camps. Other artifacts include two aboriginal ceramic sherds: one Middle Woodland and one Late Woodland (Table 6-9). Two unidentified bone fragments were recovered from Feature 10, identified as a hearth. A number of charred botanicals were also recovered from Feature 10, including butter-and-eggs (*Linaria vulgaris*), copperleaf (*Acalyphinae*), dogwood (*Cornaceae*), and spurge (*Euphorbiaceae*) seeds. One fragment of unidentified parenchymous tissue was also recovered (Table 6-6). All of the seeds represent species that are considered weedy plants that are not economically useful and probably represent "background" noise or accidental inclusions. Over 900 fragments of unidentified charred wood were recovered from Features 9 and 10. Post-contact artifacts recovered include iron nails, blue-green flat glass, and pearlware, creamware, whiteware, stoneware, red earthenware and ironstone ceramics (Table 6-10).

The large numbers and variety of artifacts together with the features indicate that RI 137 was relatively complex with duration of occupation of at least several weeks. The presence of a single parenchyma tissue fragment may indicate a spring occupation. The site was minimally occupied during the Middle and Late Woodland periods based on the aboriginal ceramics recovered. The Brewerton Eared point suggests an earlier Laurentian Late Archaic component of the site. The site is tentatively interpreted as a seasonal spring fishing camp based on similarity of location and lithic and botanical assemblages compared to other sites along West and East beaches. On the basis of the features and lithic assemblage, the inhabitants of the site were engaged in a variety of tasks, but precisely what these were is unclear until additional analyses are conducted. The variety of recovered tools, as well as evidence of tool manufacture, use, and maintenance, indicates a variety of tasks. The low density of post-contact domestic and architectural artifacts suggests the presence of an eighteenth- to nineteenth-century domestic occupation and possible building in the general vicinity.

Figure 6-4. RI 137 and associated wetlands.

Figure 6-5. View of site facing north, area of exposed paleosol, RI 137.

Figure 6-6. View of site facing north, RI 137.

Figure 6-7. Dunes and vegetation covering paleosol, RI 137.

Figure 6-8. Phase II testing, RI 137.

Figure 6-9. Feature 2, RI 137.

Figure 6-10. Feature 11 (post) profile, RI 137.

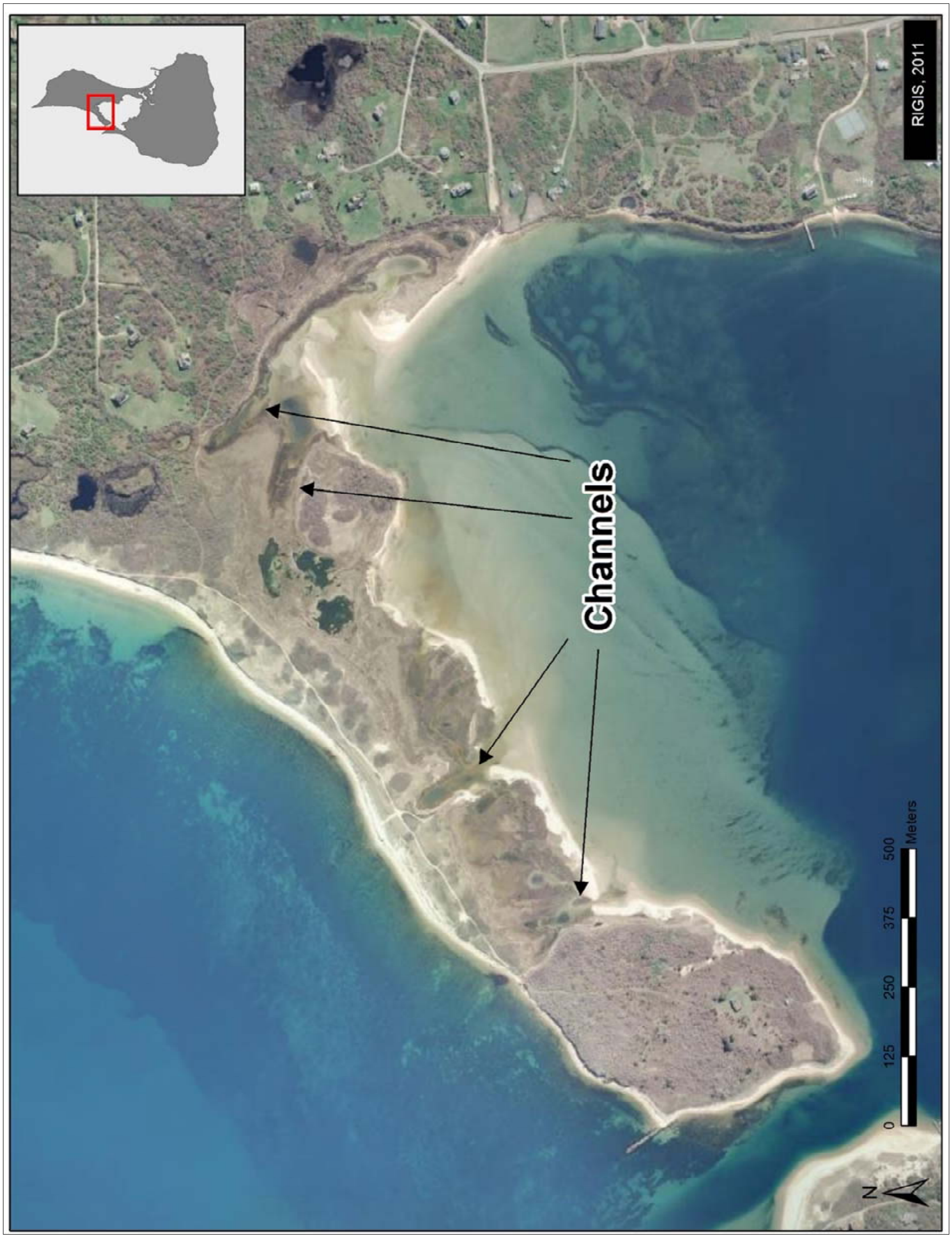

Figure 6-11. Feature 15 (refuse pit), RI 137.

Figure 6-12. Feature 9 (hearth), RI 137.

Table 6-6. Features and Associated Materials, RI 137.

Feature #	10	16	N/A
Feature type	Hearth	Refuse	Non-Feature
Botanicals			
Butter-and-Eggs Seed	3		
Copperleaf Seed	1		
Cornaceae Seed	6	12	
Parenchymous Tissue	1		
Spurge Seed		3	
Unidentified Seed	11	4	
Wood	600	306	8
Fish			
Shellfish			
Faunal			
	2 (unidentified)		
Ceramic			
Middle Woodland			1
Late Woodland			1
Lithic			
Quartz Gouge			1

Table 6-7. Lithic Type, RI 137.

Type	Count	Percentage
Angular Debris	43	5.74
Biface	2	0.27
Core	5	0.67
Fire-Cracked Rock	10	1.34
Hammerstone	2	0.27
Other	3	0.40
Primary Reduction Flake/Debris	375	50.07
Scraper	2	0.27
Secondary Flake	253	33.78
Split Cobble	8	1.07
Tertiary Flake	44	5.87
Uniface	1	0.13
Utilized Flake	1	0.13

Table 6-8. Lithic Material, RI 137.

Material	Count	Percentage
Argillite	3	0.40
Basalt	1	0.13
Feldspar	3	0.40
Gneiss	3	0.40
Granite	4	0.53
Graphite	1	0.13
Ochre	1	0.13
Quartz	703	93.86
Quartzite	23	3.07
Schist	1	0.13
Unknown	6	0.80

Figure 6-13. Lithic sample, RI 137.

Figure 6-14. Lithic tools, RI 137.

Figure 6-15. Brewerton Eared projectile point, RI 137.

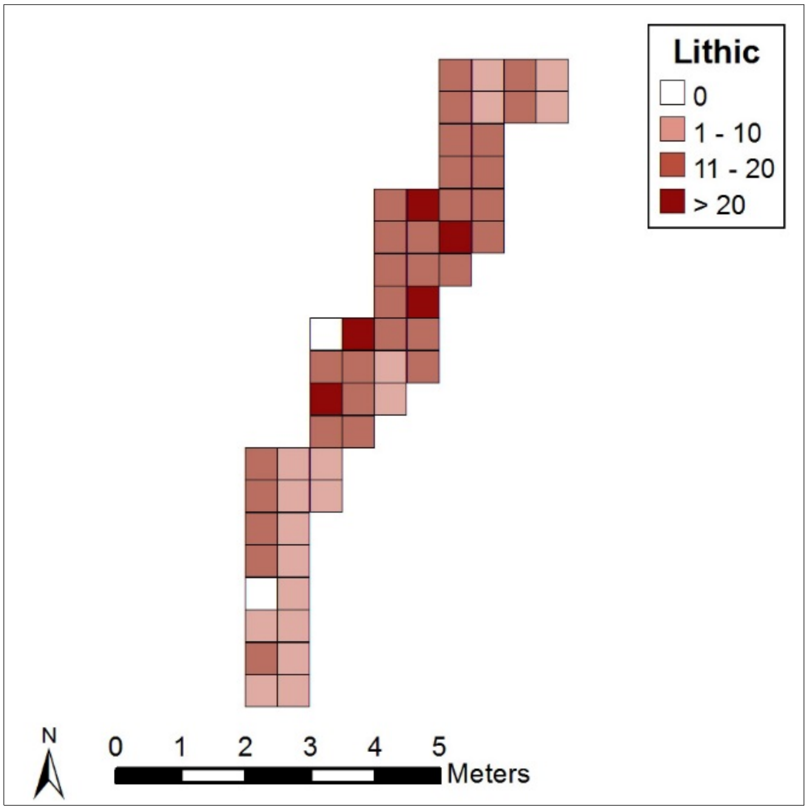

Figure 6-16. Lithic density, RI 137.

Table 6-9. Aboriginal Ceramics, RI 137.

Count	Temper	Description	Thickness	Time Period
1	Medium grit	Unknown	n/a	Middle Woodland
1	Not discernible	Unknown	n/a	Late Woodland

Table 6-10. Post-Contact Ceramics, RI 137.

Type	Count	Percentage
Untyped creamware	3	25.0
Blue transfer-printed pearlware	2	16.7
Untyped pearlware	1	8.3
Red earthenware (no glaze)	1	8.3
Untyped stoneware	2	16.7
Untyped whiteware	1	8.3
Ironstone	1	8.3
Red earthenware (brown lead glaze)	1	8.3
Total	**12**	100.0

Site Condition, Future Threats, and Significance

Soil profiles indicate that the integrity of RI 137 is good and that significant archaeological deposits remain intact under the protective cover of sand dunes and vegetation. The site has undergone moderate erosion and is at risk for additional damage from future storm events. The Shoreline Change Distance and Shoreline Change Rate indicate that the rate of shoreline loss from 1952 through 2013 was 0.12 m/yr (0.4 ft/yr). An estimated 7.6 m (25 ft) of shoreline has been lost from this site in the last 60 years (Figure 6-17). It is MPMRC's opinion that RI 137 is eligible for listing in the National Register under Criterion D. The site may yield important new information on Late Woodland seasonal use of Block Island's eastern shoreline during the Late Archaic Period and Middle to Late Woodland periods. The post molds may be associated with one or more pre-contact structures. The presence of multiple intact cultural features further suggests that data on the specific plant and animal species targeted during the pre-contact Native American use of the site may be preserved in the landward sections of the site.

RI 1380 (includes HDAD 67)

Site Setting and Description

The Phase I walkover survey located a concentration of lithics (HDAD 67) eroding from the beach along the east shore of the Great Salt Pond. Phase II survey indicated the eroded archaeological deposits are part of RI 1380. Phase I testing was conducted by Rhode Island College in 1985 and yielded a largely quartz assemblage with a few quartzite and argillite flakes and a small number of aboriginal ceramic sherds.

RI 1380 lies on a terrace overlooking the Great Salt Pond, roughly 120 m north of a kettle hole. Other nearby archaeological sites include RI 2653, located 160 m to the east, and RI 2451, located 30 m to the north. Soils in the area are characterized as Bridgehampton silt loam, till substratum, 3 to 8 percent slopes. The tested area lies at an average elevation of 3.7 m (12 ft) amsl. The parcel is mainly overgrown with scrub, sumac, and raspberry brambles with grass strips mown for beach/pond access (Figures 6-18 and 6-19).

Phase II Summary

Due to the secondary growth that covered much of the site, Phase II testing was confined to the cleared, mowed areas (Figure 6-19). A total of seventy-one 50-x-50-cm STPs were excavated at 5-m intervals along transects that followed the clearings (Figures 6-20 and 6-21). Two of the clearings were oriented roughly east–west, perpendicular to the shore of the Great Salt Pond. One transect was oriented north–south, paralleling the shoreline of the Great Salt Pond. Only one STP yielded no cultural remains. Seven features were identified: four posts and three unidentified features (Figure 6-22; Table 6-11).

A relatively high density of pre-contact artifacts was recovered during the Phase II testing: 526 lithics consisting of quartz (67%), quartzite (14%), rhyolite (8%), argillite (4%) and less than 1 percent each of basalt, chalcedony, chert, gneiss, granite, jasper, ochre, sandstone, slate and schist (Table 6-12; Figure 6-23). Tools recovered include bifaces, cores, hammerstones, projectile points (a quartzite Brewerton Side-Notched point and a quartz Squibnocket triangle, two are unidentified), scrapers, unifaces, and a utilized flake (Table 6-13; Figure 6-24). In addition, 3 aboriginal ceramic sherds were recovered dating to the Middle and Late Woodland periods (Table 6-14; Figure 6-25). Faunal remains included calcined bone fragments, unidentified calcined mammal bone, softshell clam, and scallop (Table 6-11).

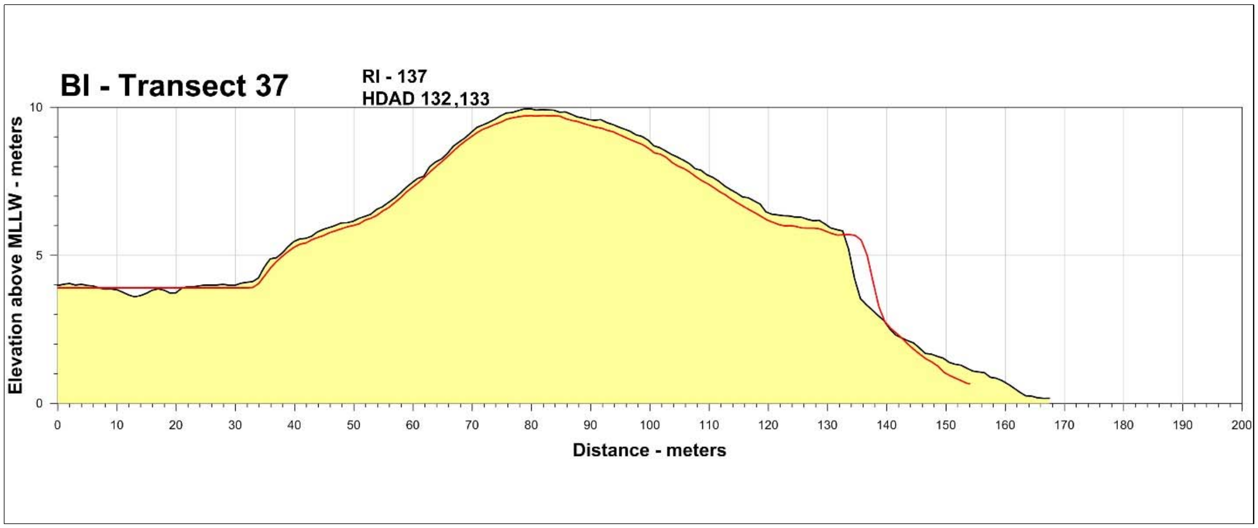

Figure 6-17. Bluff Erosion Profile, RI 137.

Figure 6-18. View of site facing east, RI 1380.

Figure 6-19. View of site facing northeast, RI 1380.

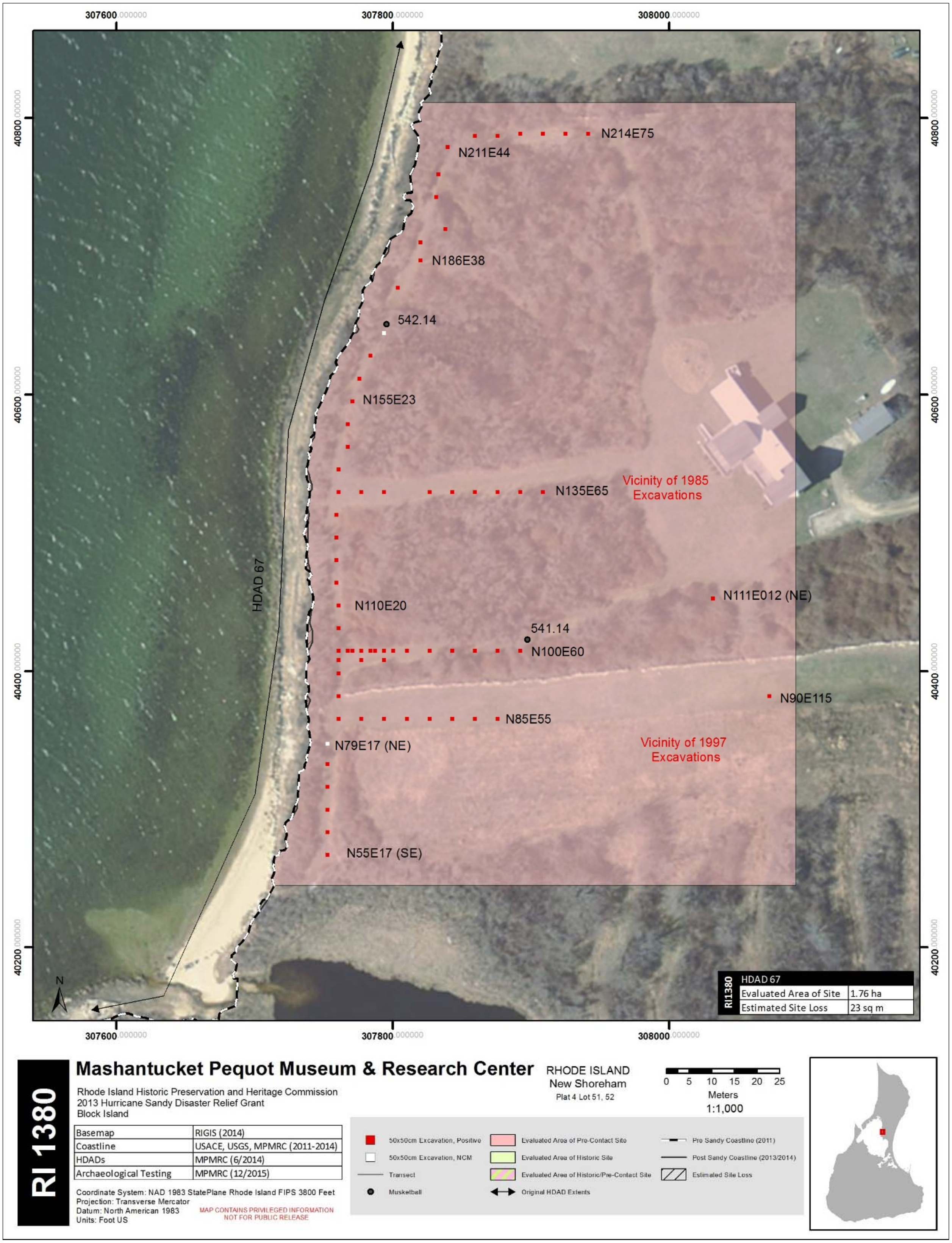

Figure 6-20. Phase II testing, RI 1380.

Figure 6-21 MPMRC staff conducting Phase II testing, RI 1380.

Figure 6-22. Feature 7 profile, RI 1380.

Table 6-11. Features and Associated Materials, RI 1380.

Feature #	N/A
Feature Type	Non-Feature
Botanicals	
Fish	
Shellfish	
Atlantic Bay Scallop	1
Common Atlantic Slipper	9
Soft Shell Clam	7
Unidentified	22
Faunal	
Unidentified Calcined	5
Unidentified Mammal Calcined	1
Aboriginal Ceramic	
Middle Woodland	1
Late Woodland	1
Unidentified	1
Lithic	
Brewerton Side-Notched	1
Squibnocket Triangle Base Fragment	1

Table 6-12. Lithic Material, RI 1830.

Material	Count	Percentage
Argillite	20	3.80
Basalt	2	0.38
Chalcedony	2	0.38
Chert	1	0.19
Gneiss	7	1.33
Granite	3	0.57
Jasper	1	0.19
Ochre	2	0.38
Quartz	354	67.30
Quartzite	73	13.88
Rhyolite	43	8.17
Sandstone	1	0.19
Schist	5	0.95
Slate	5	0.95
Unidentified	7	1.33

Figure 6-23. Lithic sample, RI 1380.

Table 6-13. Lithic Type, RI 1380.

Type	Count	Percentage
Angular Debris	88	16.73
Biface	6	1.14
Core	5	0.95
Hammerstone	6	1.14
Primary Reduction Flake/Debris	125	23.76
Projectile Point	4	0.76
Scraper	2	0.38
Secondary Flake	246	46.77
Split Cobble	3	0.57
Tertiary Flake	27	5.13
Untyped Artifact	10	1.90
Uniface	3	0.57
Utilized Flake	1	0.19

Figure 6-24. Lithic tools, RI 1380.

Table 6-14. Aboriginal Ceramics, RI 1380.

Count	Temper	Description	Thickness	Time Period
1	Medium grit	Exterior: cord-marked	n/a	Middle Woodland
1	Fine grit	Interior/exterior: smooth	n/a	Late Woodland
1	Medium grit	Unknown	n/a	Unknown

Figure 6-25. Cord-marked Middle Woodland ceramic, RI 1380.

This multicomponent site dates to the Late Archaic and Late Woodland periods based on the recovery of diagnostic projectile points and aboriginal ceramics. The range of activity at this site included all stages of lithic manufacture, while the bone, shell, and seed remains also indicate domestic activities related to food procurement and processing.

Recovered post-contact artifacts included whiteware, ironstone, stoneware, pearlware, and two manganese decorated Westerwald stoneware sherds; window glass; kaolin pipe bowl fragment; nails; unidentified iron fragments; and two musket balls (Tables 6-15 and 6-16). The musket balls were recovered during a metal detecting survey of the two clearings (Figure 6-26). Although no evidence of post-contact structures was found, the ceramics suggest eighteenth- to twentieth-century domestic occupation.

Table 6-15. Post-Contact Ceramics, RI 1380.

Type	Count	Feature #	Percentage
Ironstone	1		11
Westerwald stoneware	2		22
Untyped whiteware	2		22
Untyped salt glazed stoneware	1		11
Blue transfer-printed whiteware	1		11
Untyped refined earthenware	1	7	11
Untyped pearlware	1		11
Total	**9**		

Table 6-16. Musket Balls, RI 1830.

Site #	Inventory #	Weight (gm)	Diameter (in)	Condition
200-1380	541.14	3.1	0.33	Impacted
200-1380	542.14	30.6	0.70	Impacted
200-2451	2.15	15.4	0.56	Impacted
200-2451	3.15	26.2	0.66	Dropped
200-2451	7.15	3.2	0.33	Impacted
200-2451	10.15	1.7	0.27	Impacted
200-2451	11.15	15.6	0.56	Impacted
200-2451	12.15	3.1	0.33	Impacted
200-2451	13.15	19.8	0.60	Impacted

The two musket balls are potentially very significant as they may be related to the Massachusetts Bay raid on the island in late August 1636. Both were impacted and have diameters of 0.33 inch and 0.70 inch (Table 6-16; Figure 6-27). A 0.70-inch diameter musket ball is quite large and would have been fired by a 0.72- to 0.75-inch caliber gun. Calibers of that size are typically associated with seventeenth-century full muskets. While the musket balls could simply be related to hunting, the recovery of seven other musket balls from RI 2451 located 250 m to the north strongly suggests all nine musket balls are associated with the raid (Figure 6-28).

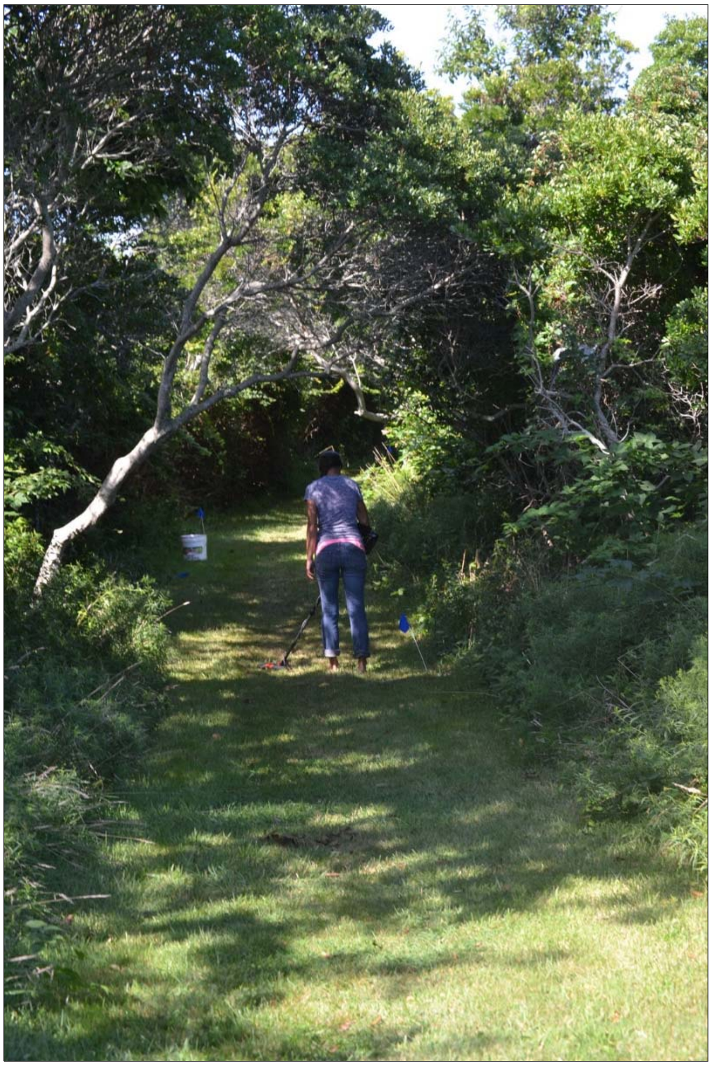

Figure 6-26 Metal detecting, RI 1380.

Site Condition, Future Threats, and Significance

While RI 1380 experiences minor impacts from tidal erosion, its sheltered location within the Great Salt Pond offers protection from all but the most severe storm and erosional events. Phase II testing indicated the site has potential to provide information on the nature of Late Archaic and Woodland land use and occupation along the Great Salt Pond. This site is listed in the National Register as a contributing resource to the Great Salt Pond Archaeology District. The Hurricane Sandy surveys indicate it is also significant under the Contact Period historic context "social and economic impacts on the Native inhabitants following contact and sustained interaction with Europeans" as a battlefield site associated with the Pequot War (1636–1637).

Figure 6-27 Musket balls, RI 1380.

Figure 6-28 Locations of musket ball recoveries from RI 1380 (South) and RI 2451 (North).

RI 1747 (includes HDADs 153 and 154)

Site Setting and Description

This site is located in the northeast corner of Trims Pond near the inlet that flows into Harbor Pond (Figures 6-29 and 6-30). HDADs 153 and 154, identified during the Phase I survey, were subsequently incorporated into RI 1747. RI 1747 was first identified during a Phase I survey in 1989 that recovered quartz, quartzite, felsite, and chert artifacts along with aboriginal ceramics.

The soils are described as Merrimac fine sandy loam with 3 to 8 percent slopes. The tested area lies at an average elevation of 2.4 m (8 ft) amsl. This site is protected from severe erosion by the neck of land that forms the southern end of the Great Salt Pond (Figure 6-29).

Phase II Summary

The Phase II survey consisted of two transects placed along existing paths. Fourteen 50-x-50-cm STPs were placed at 5-m intervals and one 1-x-1-m EU was excavated to further define a feature (Figures 6-31 and 6-32). Thirteen test pits yielded cultural materials, including a total of 501 lithics consisting of 69 percent quartz, 13 percent quartzite, 7 percent argillite, 5 percent rhyolite, less than 2 percent schist, and 1 percent or less of the basalt, gneiss, felsite, jasper, ochre, and slate (Table 6-17; Figures 6-33 and 6-34). Tools included 6 cores, 4 bifaces, 1 hammerstone, 3 uniface, 5 unidentified projectile points and 1 Late Archaic Vosburg projectile point (Table 6-18; Figures 6-35 and 6-36). Twenty-four aboriginal Late Woodland ceramic sherds were also recovered (Table 6-19; Figure 6-37). Botanical remains included 5 charred hickory nutshells and 2 charred unidentified nutshells. Nineteen pieces of charred wood were also recovered. Faunal remains included 1 Atlantic Sturgeon bone and 3 unidentified calcined bone fragments and 7 quahog, 1 scallop, and 2 oyster shell fragments (Table 6-20).

Post-contact artifacts include a total of 8 ceramic sherds of creamware, pearlware, and earthenware (Table 6-21), and small numbers of iron nails, a metal spoon handle, wire fragments (2 cuprous, and 2 iron), unidentified iron fragments, and glass fragments. The low density of post-contact material suggest these artifacts may be associated with informal refuse disposal from one or more late eighteenth- to twentieth-century households.

This pre-contact assemblage represents a complex, multicomponent occupation where a number of activities related to the procurement and processing of a variety of resources occurred. Diagnostic artifacts, in particular the Vosburg projectile point, indicate a Late Archaic occupation, while the ceramics indicate reuse of the site during the Late Woodland Period. It is possible that the artifacts collected along the water's edge during the Phase I survey represent task-specific activities separate from the main assemblage, which is farther inland.

Site Condition, Future Threats, and Significance

RI 1747 is well protected from storm damage and the threat level is considered low. The site lies within the Great Salt Pond Archaeological District and MPMRC recommends it as eligible for listing in the National Register as a contributing resource to the district.

Figure 6-29. Trims Pond shoreline view facing east, RI 1747.

Figure 6-30. View facing north across Trims Pond, RI 1747.

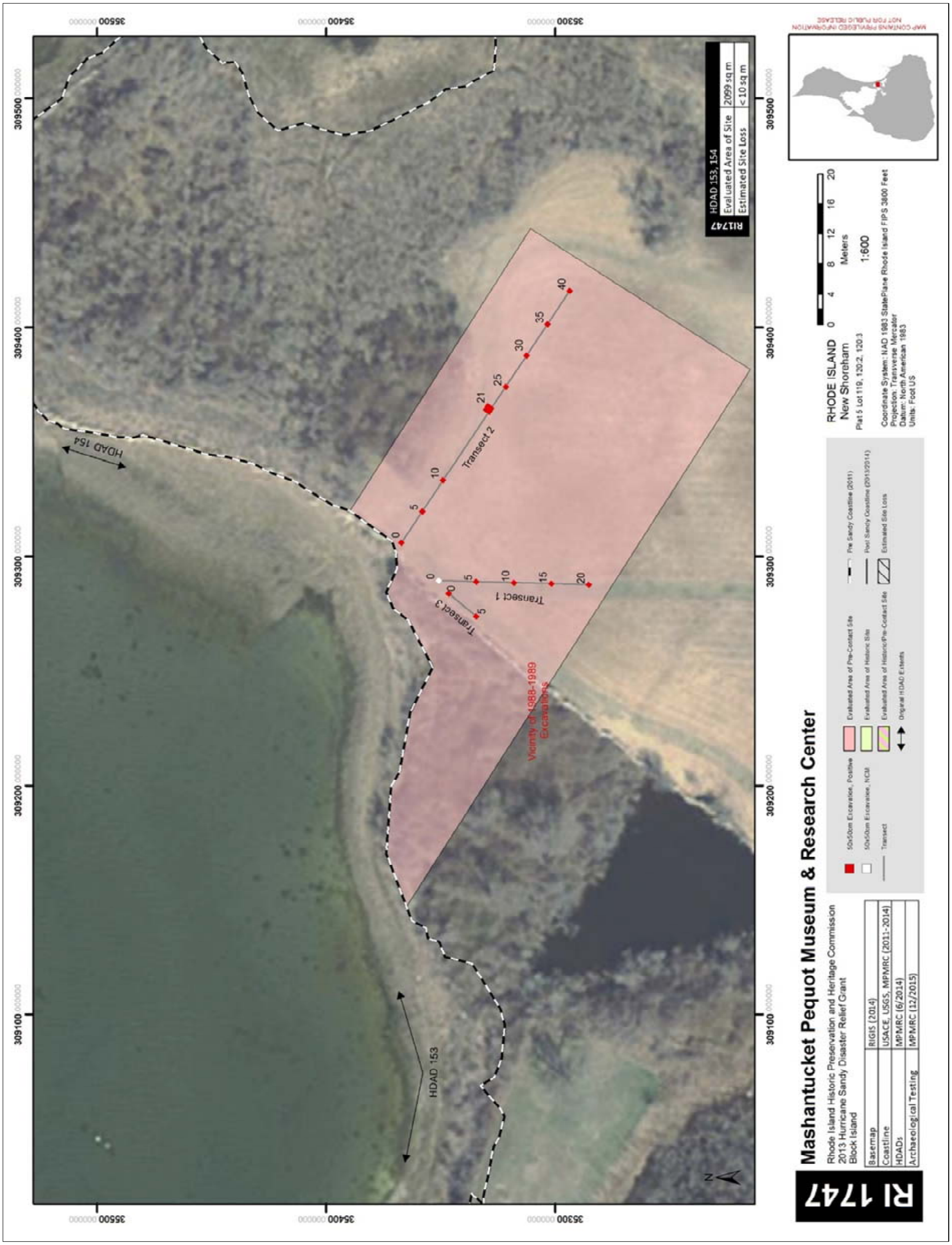

Figure 6-31. Phase II testing, RI 1747.

Figure 6-32. Feature 1 profile, RI 1747.

Table 6-17. Lithic Materials, RI 1747.

Material	Count	Percentage
Argillite	33	6.59
Basalt	4	0.80
Felsite	1	0.20
Gabbro	1	0.20
Gneiss	7	1.40
Granite	1	0.20
Jasper	1	0.20
Ochre	1	0.20
Quartz	348	69.46
Quartzite	63	12.57
Rhyolite	27	5.39
Schist	9	1.80
Slate	1	0.20
Unidentified	4	0.80

Figure 6-33. Lithic sample, RI 1747.

Figure 6-34. Lithic sample, RI 1747.

Table 6-18. Lithic Type, RI 1747.

Type	Count	Percentage
Angular Debris	124	24.75
Biface	4	0.80
Core	6	1.20
Fire Cracked Rock	14	2.79
Hammerstone	1	0.20
Other	2	0.40
Paint Pot	1	0.20
Primary Reduction Flake /Debris	136	27.15
Projectile Points	6	1.20
Secondary Flake	177	35.33
Split Cobble	6	1.20
Tertiary Flake	19	3.79
Uniface	3	0.60
Utilized Flake	2	0.40

Figure 6-35. Lithic tools, RI 1747.

Figure 6-36. Argillite Vosburg projectile point, RI 1747.

Table 6-19. Aboriginal Ceramics, RI 1747.

Count	Temper	Description	Thickness (mm)	Time Period
5	Fine grit	Interior/exterior: smooth	6.4, 8.71	Late Woodland
5	Not discernible	Incised	10.75, 7.71	Late Woodland
6	Not discernible	Interior/exterior: smooth	8.3, 10	Late Woodland
1	Not discernible	Rim, incised, interior: smooth	7.19	Late Woodland
1	Not discernible	Rim, cord-marked	6.22	Late Woodland
1	Not discernible	Rim, cord-marked, interior: smooth	8.17	Late Woodland
4	Not discernible	Interior/exterior: smooth	8.17, 8.64, 7.89, 7.93	Late Woodland
1	Not discernible	Rim, interior/exterior: smooth	8.86	Late Woodland

Figure 6-37. Late Woodland incised ceramics, RI 1747.

Table 6-20. Feature and Associated Materials, RI 1747.

Feature #	**1**
Feature Type	Undetermined
Botanicals	
Hickory Nutshell	5
Wood	19
Fish	
Atlantic Sturgeon	1
Shellfish	
Atlantic Bay Scallop	1
Eastern Oyster	2
Northern Quahog	7
Faunal	
Unidentified Calcined	2
Unidentified Mammal Calcined	1
Aboriginal Ceramic	
Late Woodland	24
Lithic	
Vosburg Projectile Point	1

Table 6-21. Post-Contact Ceramics, RI 1747.

Type	Count	Percentage
Untyped creamware	2	25
Annular pearlware	2	25
Untyped pearlware	2	25
Refined earthenware (no glaze)	1	13
Red earthenware (no glaze)	1	13
Total	**8**	100

RI 2451 (formerly HDAD 110)

Site Setting and Description

This site is located west of Corn Neck Road and situated on a bluff along the east side of the Great Salt Pond at an average elevation of 6.7 m (22 ft) above sea level (Figure 6-38). The soils are characterized as Broadbrook silt loam with 3 to 8 percent slope. This site was originally located during a Phase I reconnaissance survey for a proposed house construction. The Phase I survey identified a Late Woodland Period occupation based on the recovery of aboriginal ceramics and a charred maize kernel from a hearth. The survey also recovered quartz, quartzite, and argillite debitage. A sperm whale tooth and a quartzite chopper were surface collected from the edge of the Great Salt Pond during the earlier survey (Figures 6-39 and 6-40). Based on the Phase I testing, the site represents Early and Late Woodland Period occupations.

Phase II Summary

The Phase II survey was conducted in 2015 by MPMRC in conjunction with the Eastern Connecticut State University Archaeology field school. Twenty-six 50-x-50-cm STPs were excavated at 5-m intervals in areas that were clear of vegetation and did not contain poison ivy (Figure 6-41). A metal detector survey was also conducted.

The Phase II survey recovered 361 lithics: quartz, quartzite, rhyolite, and less than 1 percent each of argillite, basalt, chalcedony, chert, granite, graphite, mudstone, ochre, schist, and unidentified lithics (Table 6-22; Figure 6-42). Tools included 1 quartz biface, 3 cores, and graphite (Table 6-23; Figure 6-43). Ten aboriginal ceramic sherds were recovered dating to the Early and Late Woodland periods (Table 6-24; Figure 6-44). A single feature was encountered in a shovel test pit containing fire-cracked rock, charred wood, and quartz debitage. The metal detector survey recovered 7 musket balls (Table 6-25; Figures 6-41, 6-45, and 6-46), 3 cuprous buttons (likely eighteenth or nineteenth century), 1 white metal button (twentieth-century), 1 cuprous pin, and 2 unidentified metal fragments.

The seven musket balls are potentially very significant as they may be related to the Massachusetts Bay raid on the island in late August 1636. The musket ball diameters were 0.27–0.66 in, which is a range and mix of diameters often recovered from Pequot War battlefields in Mystic, Connecticut (McBride et al. 2012, McBride 2013). Small-diameter musket balls (e.g., 0.27–0.33 in) suggest a load of buckshot, which was typically used if the enemy was within 10–15 m. Alternatively the musket could have been loaded with "buck and ball," a combination of large and small musket balls. Those musket balls with a diameter of 0.56–0.66 in could also indicate they were fired from a carbine (smaller length and barrel diameter compared to a full musket) and/or pistol (Table 6-25). It is unlikely the musket balls were related to hunting activity given their concentration and variation in diameter. The musket balls are likely related to the two

Figure 6-38 View facing west toward the Great Salt Pond, RI 2451.

Figure 6-39. Quartzite chopper, RI 2451.

Figure 6-40. Sperm whale tooth, RI 2451.

Figure 6-41. Phase II testing and musket ball distributions, RI 2451.

Table 6-22. Lithic Materials, RI 2451.

Material	Count	Percentage
Argillite	3	0.83
Basalt	2	0.55
Chalcedony	2	0.55
Chert	3	0.83
Granite	1	0.28
Graphite	2	0.55
Mudstone	2	0.55
Ochre	1	0.28
Quartz	307	85.04
Quartzite	19	5.26
Rhyolite	16	4.43
Schist	2	0.55
Unidentified	1	0.28

Figure 6-42. Lithic sample, RI 2451.

Table 6-23. Lithic Types, RI 2451.

Type	Count	Percentage
Angular debris	100	27.78
Biface	1	0.28
Core	3	0.83
Primary reduction flake/debris	73	20.28
Secondary flake	180	50.00
Split cobble	2	0.56
Utilized angular debris	1	0.28

Figure 6-43. Lithic tools, RI 2451.

Figure 6-44. Early Woodland Vinette I cord-marked ceramics, RI 2451.

Table 6-24. Aboriginal Ceramics, RI 2451.

Count	Temper	Description	Thickness (mm)	Time Period
1	Not discernible	Interior/exterior: smooth	7.1	Late Woodland
9	Coarse grit	Vinette I cord-marked	8.8, 9.3	Early Woodland

Table 6-25. Musket Balls, RI 2451.

Site #	Inventory #	Weight (gm)	Diameter (in)	Condition
200-1380	541.14	3.1	0.33	Impacted
200-1380	542.14	30.6	0.70	Impacted
200-2451	2.15	15.4	0.56	Impacted
200-2451	3.15	26.2	0.66	Dropped
200-2451	7.15	3.2	0.33	Impacted
200-2451	10.15	1.7	0.27	Impacted
200-2451	11.15	15.6	0.56	Impacted
200-2451	12.15	3.1	0.33	Impacted
200-2451	13.15	19.8	0.60	Impacted

Figure 6-45. Musket balls, RI 2451.

Figure 6-46. Musket balls from RI 2451 (North) and RI 1380 (South).

musket balls recovered from RI 1380 located 250 m to the south and also believed associated with the Massachusetts Bay Raid.

Site Condition and Future Threats

RI 2451 lies along the Great Salt Pond and is therefore not particularly threatened by major storm events, although light erosion was observed along the bluff edge. The range and diversity of artifacts recovered indicate the site has the potential to yield additional information on Early and Late Woodland land use and occupation along the Great Salt Pond. The site lies within the Great Salt Pond Archaeological District and is considered potentially eligible for listing in the National Register as a contributing resource to the district. Additional archaeological investigations would be needed to assess RI 2451's significance under the Contact Period historic context "social and economic impacts on the Native inhabitants following contact and sustained interaction with Europeans" as a battlefield site associated with the Pequot War.

RI 2621 (formerly HDAD 18)

Site Setting and Description

RI 2621 is a multicomponent, primarily Late Woodland site, located along West Beach approximately 1,000 m north of the breachway, identified as HDAD 18 during the Phase I survey. RI 2621 is one of four sites, including RI 2622, RI 2623, RI 2630, located along West Beach believed to be seasonal spring fishing camps. All four sites are located adjacent to a 1,200-m-long stretch of freshwater wetlands, which was likely an important criterion in site location (Figure 6-47). RI 2621 is situated along the beach at the 7-ft elevation on soils classified as beaches, cobbly surface with Hooksan sand, with 3 to 8 percent slopes. The site extends for approximately 70 m along the beach and is located approximately 100 m southwest of the nearest freshwater wetland. The site likely extends toward the wetlands located 100 m to the east, but the site area away from the immediate coastline was not tested to avoid any disturbance to the dunes and vegetation. The site extent was defined by the presence of approximately 100 sq m of exposed paleosol and associated lithic debitage (Figures 6-48 to 6-51).

Phase II Summary

The Phase II survey consisted of removing the sand layer above the paleosol and shovel scraping and troweling the thin (5-cm) exposed paleosol to the B horizon to identify potential features (Figure 6-49). The layer of sand and remaining paleosol were removed only in areas with no vegetation cover. All artifacts were collected during scraping and several saved for specialty analysis (starch grain, lipids, etc.). Features were drawn and photographed in plan and bisected, and all feature matrixes were collected for flotation. The bisected features were drawn and photographed in profile. Flotation (water separation) was done in the field using the adjacent waters to remove the sediment. The remaining heavy fraction was collected in the screens while the light fraction was scooped in nets fitted with nylon mesh. After drying, all samples were sorted to recover any cultural material from both the light and heavy fractions. An area of 91 sq m was scraped by exposing the thin layer of sand and paleosol that partially covered the site in two areas separated by 16 m (North and South areas). A total of 33 sq m was stripped in the North Area and 58 sq m in the South Area (Figure 6-48). Thirty features were identified in the southern area, including a hearth, 23 posts, and six shallow basin features (Figure 6-49, 6-52 to 6-57). Three refuse pits were identified in the North Area, which was overlain by an organically enriched sandy soil that yielded faunal and botanical remains, ceramics, and lithics (Figures 6-52 and 6-53). Preservation of faunal remains was generally poor as none of the features contained shellfish. The northern area was associated with refuse disposal and the southern area with domestic activities such as lithic manufacture, plant processing, and cooking.

Figure 6-47. Sites and associated wetlands, RI 2621, RI 2622, RI 2623, and RI 2630.

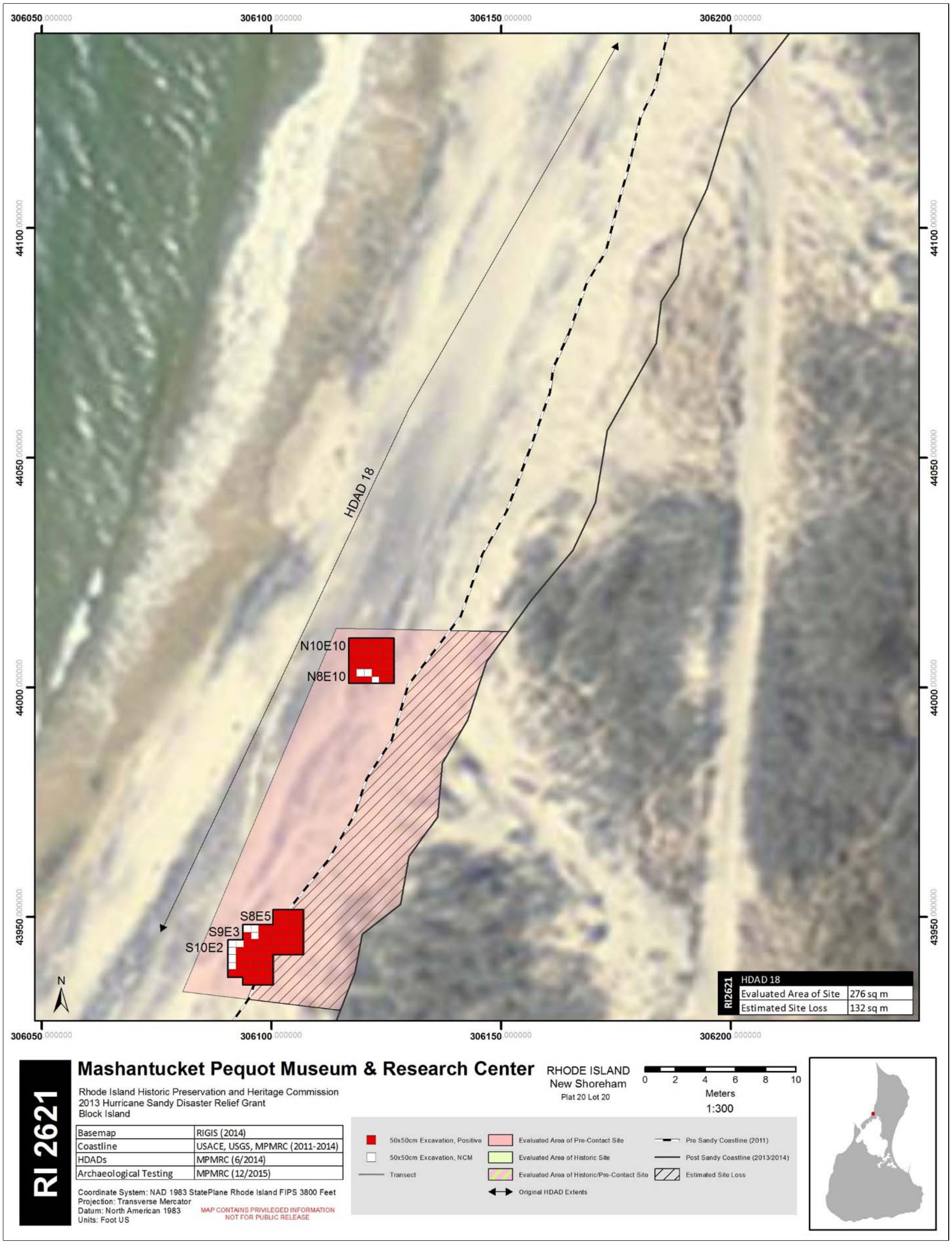

Figure 6-48. Phase II testing, RI 2621.

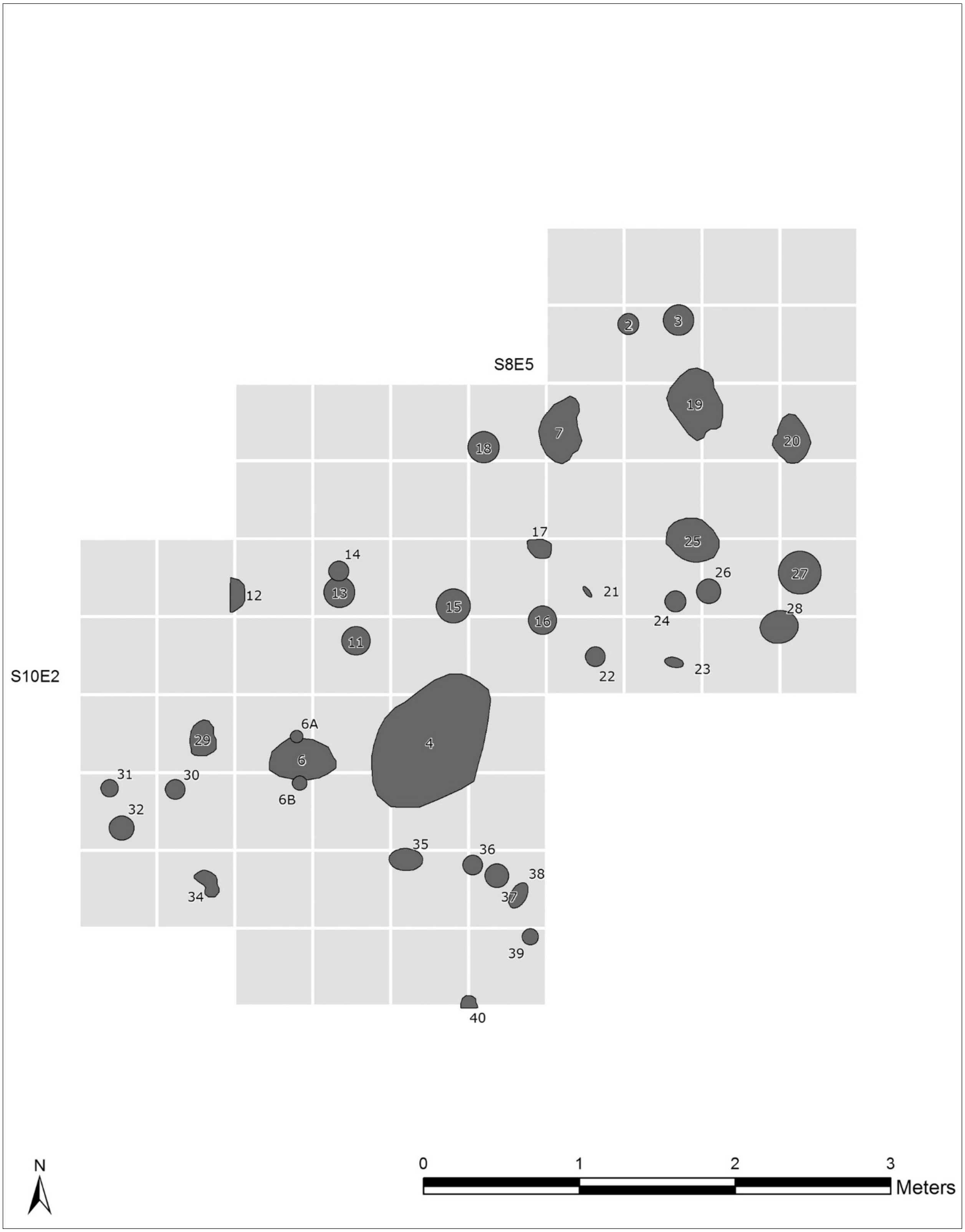

Figure 6-49. Features, RI 2621.

Figure 6-50. View to north, South Area foreground, North Area background, RI 2621.

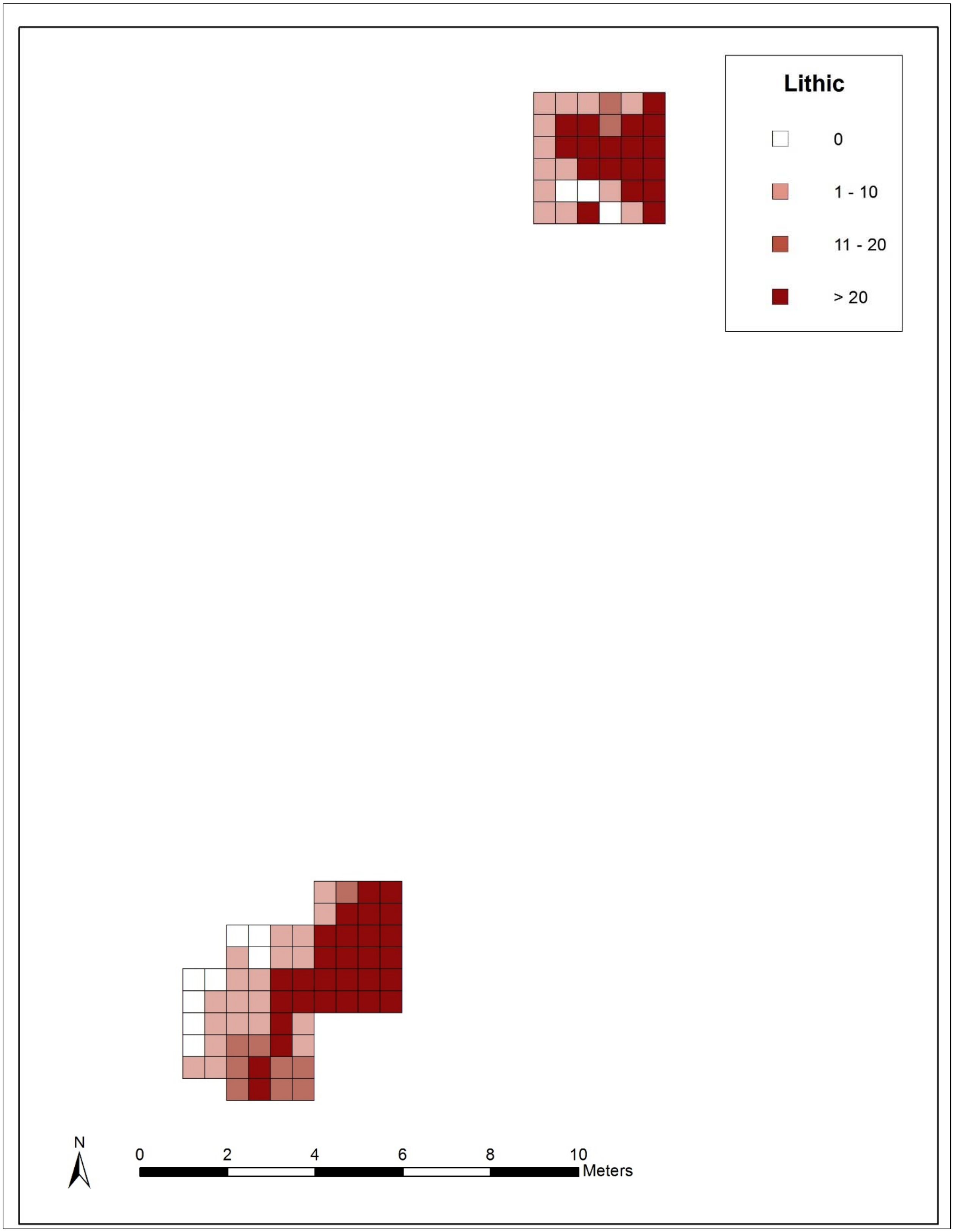

Figure 6-51. Lithic density, North and South areas, RI 2621.

Figure 6-52. Feature 1, North Area, RI 2621.

Figure 6-53. Organically enriched dark sands (Feature 1) overlying refuse pit (Feature 33), RI 2621.

Figure 6-54. Feature 33, RI 2621.

Figure 6-55. Feature 9, RI 2621.

Figure 6-56. Feature 10, RI 2621.

Figure 6-57. Feature 4, South Area; North Area in background, RI 2621.

The lithic assemblage recovered from the two areas was the most diverse in terms of materials and tool types of any sites tested during the Phase II survey. The northern area had a much higher density of lithics, averaging greater than 20 lithics/sq m compared to the southern area with 11–20 lithics/sq m (Figure 6-51). The higher density is likely the result of disposal of tools and debitage rather than production and use.

RI 2621 is one of the few sites evaluated during the Hurricane Sandy surveys to yield ground/pecked stone fishing equipment. The recovery of a net sinker in Feature 1 indicates that net fishing of species other than Atlantic Sturgeon and Tautog took place, as neither of those two species were acquired by net (Figure 6-58). A total of 2,269 lithic artifacts were recovered during the Phase II survey, largely consisting of quartz (69%), followed by quartzite (11%) rhyolite (7%), argillite (3%) and low percentages of other materials identified as chert, chalcedony, jasper, and a variety of other unidentified high-quality lithics materials (Table 6-26; Figures 6-59 and 6-60). The diversity of lithic materials observed at RI 2621 is characteristic of Late Woodland sites on Block Island and may serve as a diagnostic attribute of the period in the absence of projectile points or pottery. The majority of the materials cannot be identified to the source, and it is likely they are only available in cobble form on Block Island. Recovered tools included projectile points, bifaces, unifaces, choppers, a net sinker, and hammerstones. Diagnostic projectile points included a Late Archaic Brewerton point and four Levanna points (Figure 6-61). The lithic assemblage reflects a wide range of lithic manufacturing, tool use, and maintenance as would be expected in a site occupied over several weeks associated with a number of subsistence activities (Table 6-27).

Several thousand pre-contact artifacts were recovered, including 730 aboriginal ceramics from the Middle (n = 3; 4.0%) and Late Woodland (n = 686; 94.0%) periods (Table 6-28; Figure 6-62). Although 3 ceramics were identified as Middle Woodland based on medium-sized grit and thickness, these characteristics overlap with some Late Woodland ceramics, so it is more likely that all the ceramics date to the Late Woodland Period. In addition, no diagnostic Middle Woodland ceramic treatment such as dentate stamping was observed on any of the ceramics, as was observed at other seasonal camps along West Beach. Late Woodland ceramics were generally characterized by thinner walls (except near the base and rim), fine grit or no discernible temper (possible leached shell), and incised decoration. Diagnostic Late Woodland ceramics were recovered from six of the nine features (66%) in the North and South areas that yielded cultural materials. The recovery of four Levanna projectile points also indicates the site was occupied primarily during the Late Woodland Period (Table 6-23; Figure 6-61).

Identified charred botanical remains included hazelnut, hickory nut, cornaceae seeds, polygonaceae seeds, bayberry, bulrush, dock, scleria, spurge, parenchyma tissue, a maize kernel, and 1,087 wood fragments (Table 6-29). The botanical assemblage is consistent with the contention that the site was occupied during the spring. With the exception of hazelnut, hickory nut, the single kernel of maize, and parenchyma tissue, all the remaining species are weedy plants that grow along beach areas and are of limited or no economic value. These plants are likely background noise from the area surrounding the occupation and are considered accidental inclusions, accidently charred by virtue of their proximity to cooking activities. Hazel and hickory nut and maize are often and readily stored for use in the winter and spring after fall harvest. Although unidentified, the parenchyma tissue (roots and tubers that store energy) is potentially a very important seasonal indicator. The roots and tubers of wetland plants are best obtained between late fall and early spring, and their presence, along with sturgeon remains, indicates a spring occupation.

A total of 381 faunal remains were recovered (not including shellfish), including 143 Atlantic Sturgeon (37.5%), obtained in April and May that were the most abundant species identified at the site. Lesser amounts of Tautog were recovered (n = 3; 0.7%) and were not considered a good seasonal indicator. Atlantic Sturgeon remains were identified in five of the nine features that contained faunal remains (55.5%), indicating it was the most important species acquired during the occupation of the site (Table 6-29). Surprisingly, very few shellfish were recovered (a pattern observed at all the spring seasonal sites), although

Figure 6-58. Net sinker, RI 2621.

Table 6-26. Lithic Material, RI 2621.

Material	Count	Percentage
Argillite	72	2.85
Basalt	11	0.44
Chalcedony	16	0.63
Chert	44	1.74
Gabbro	11	0.44
Garnet	1	0.04
Gneiss	43	1.70
Granite	4	0.16
Graphite	26	1.03
Jasper	3	0.12
Mica	1	0.04
Ochre	11	0.44
Quartz	1,736	68.75
Quartzite	290	11.49
Rhyolite	176	6.97
Sandstone	2	0.08
Siltstone	2	0.08
Slate	2	0.08
Steatite	1	0.04
Unidentified	73	2.89

Figure 6-59. Lithic sample 1, RI 2621.

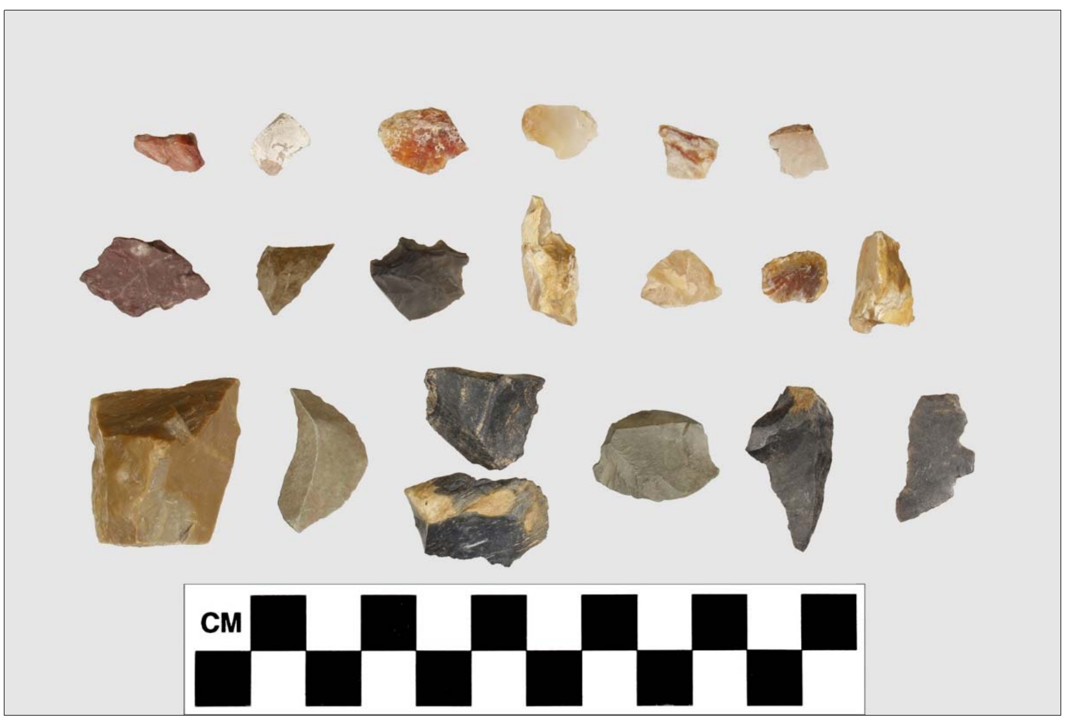

Figure 6-60. Lithic sample 2, RI 2621.

Figure 6-61. Lithic tools, RI 2621.

Table 6-27. Lithic Type, RI 2621.

Type	Count	Percentage
Abrader	1	0.04
Angular Debris	303	12.00
Biface	21	0.83
Chopper	4	0.16
Core	17	0.67
Crystal	1	0.04
Fire Cracked Rock	72	2.85
Hammerstone	3	0.12
Hoe	1	0.04
Knife	1	0.04
Net sinker	1	0.04
Primary Reduction Flake /Debris	770	30.50
Projectile Point	11	0.44
Scraper	3	0.12
Secondary Flake	863	34.18
Split Cobble	17	0.67
Tertiary Flake	379	15.01
Uniface	8	0.32
Untyped	46	1.82
Utilized Flake	3	0.12

Figure 6-62. Late Woodland ceramics, RI 2621.

Table 6-28. Aboriginal Ceramics, RI 2621.

Count	Temper	Description	Thickness (mm)	Time Period
4	Medium grit	Unknown	n/a	Unknown
10	Not discernible	Unknown	n/a	Unknown
30	Medium grit	Unknown	n/a	Middle Woodland
93	Fine grit	Unknown	n/a	Late Woodland
66	Fine grit	Unknown	6.5, 7.2, 8.0, 8.5, 9.0, 9.8, 10.0	Late Woodland
8	Fine grit	Incised	7.75, 9.0	Late Woodland
1	Fine grit	Rim sherd	7.5	Late Woodland
7	Fine grit	Cord-marked, possible rim	6.0	Late Woodland
5	Medium grit	Unknown	7.2	Late Woodland
2	Medium grit	Incised, rim sherd	n/a	Late Woodland
178	Not discernible	Unknown	n/a	Late Woodland
198	Not discernible	Unknown	4.75, 6.25, 7.3, 8.6, 9.1, 9.3, 9.4, 10.3, 10.6, 12.1	Late Woodland
61	Not discernible	Interior/exterior: smooth	6.8, 10.3	Late Woodland
33	Not discernible	Possibly incised	5.7, 5.8, 10.0	Late Woodland
29	Not discernible	Incised	9.8	Late Woodland
3	Not discernible	Incised, rim sherd	n/a	Late Woodland
2	Not discernible	Niantic incised, rim sherd	9.74 (rim) 11.6 (body)	Late Woodland

they could easily have been easily obtained from the Great Salt Pond located a short distance away. The relative absence of shellfish contrasts sharply with the large permanent or semi-permanent villages located around the Great Salt Pond, where shellfish were recovered from almost every feature, including those that yielded seal and sturgeon (Tveskov 1997). It appears that shellfish collecting was not an important activity during the occupation of the spring fishing camps, although it continued to be so at the village sites.

North Area

Thirty-three sq m exposed in the North Area was subsequently identified as a refuse area associated with the occupation area to the south. The recovery of diagnostic Late Woodland ceramics from multiple features in both areas indicates the two areas were contemporaneous. Three refuse pits (Features 9, 10, and 33) (Figures 6-54 to 6-56) were identified in the north area overlain by a homogeneous layer of organically enriched sands containing food refuse, wood charcoal, and discarded tools and lithic debris. Feature 1 appeared to have beach sands from a storm event roughly contemporaneous with the Late Woodland occupation incorporated in the matrix. Features 1, 10, and 33 yielded a fairly high density and diversity of food remains compared to the features in the South Area, indicating the features in the North Area were used for refuse disposal (Table 6-29).

RI 2621 is identified as a seasonal spring fishing camp and has the potential to provide additional information about Woodland Period settlement and subsistence patterns on Block Island. Complex seasonal spring fishing camps of this nature may be unique to Block Island as none have yet been identified on the mainland. Locations of spring fishing camps on the lower elevations along the east and west coasts provided easy access to the 10–15 m deep waters that sturgeon prefer. Another important aspect influencing site location is access to large, open wetlands to acquire the roots and tubers of wetland plants and perhaps migratory waterfowl.

Site Condition, Future Threats, and Significance

RI 2621, like other spring fishing camps along the coast, is increasingly at great risk from major storm events. Continued tidal and storm erosion poses a serious threat to the integrity and long-term stability of RI 2621 (Figure 6-63). Additional erosion is clearly evident since the completion of the Phase II testing. Recent data suggest that the rate of shoreline loss from 1952 through 2013 occurred at the rate of 0.44 m/yr (1.4 ft/yr). An estimated 26.89 m (88.2 ft) of shoreline has been lost from this site in the last 60 years.

The unique and complex nature of this site can yield additional information on Woodland Period (ca. 2700–450 B.P.) land use and settlement patterns on Block Island within the broader context of a developing maritime-focused economy. Although an unknown portion of the site has been impacted, it still retains sufficient integrity and information potential to be eligible for listing in the National Register under Criterion D.

RI 2622 (HDAD 3)

Site Setting and Description

RI 2622 (HDAD 3) is a multicomponent Early and Middle Woodland seasonal spring fishing camp located along West Beach, the northernmost of three other spring fishing camps situated along West Beach (Figure 6-64). All three sites are located adjacent to a 1,200-m-long stretch of freshwater wetlands that was likely an important criterion in site location. The site is situated on the beach within the high water tide zone (Figure 6-65). The soils are classified as a beach and cobbly surface. The tested area lies at an average elevation of 0.6 m (2 ft) amsl (Figure 6-66). Approximately 43 sq m of exposed paleosol was scraped to

Table 6-29. Features and Associated Materials, RI 2621.

Feature #	**1**	**3**	**4**	**4/6**	**7**	**8**	**10**	**27**	**33**	**N/A**
Feature Type	Midden	Unknown	Hearth	Unknown	Large Post	Refuse Pit	Refuse Pit	Large Post	Unknown	Non-Feature
Botanicals										
Bayberry Seed							2		5	
Bulrush Seed	1									
Comaceae Seed	8				1				17	
Dock Seed	1									
Hazelnut	1					1	3			
Hickory Nut	1								3	
Parenchyma Tissue	7								2	6
Polygonacea Seed	3									
Scleria Seed							4			
Spurge Seed									2	
Maize									1	
Wood	357	22	44		10	40			446	168
Fish										
Atlantic Sturgeon	30	3	3			2			34	71
Tautog	1									2
Shellfish										
Atlantic Bay Scallop			1		18					
Common Periwinkle	1									
Northern Quahog	1				123					
Unidentified	2		43		348		1		2	9
Faunal										
Unidentified	47	61	1		15		6		81	34
Aboriginal Ceramics										
Middle Woodland		2								28
Late Woodland	550		4	3	69			3	126	179
Unidentified	4						4			6
Lithics										
Brewerton Point									1	1
Net Sinker	1									
Levanna Point										

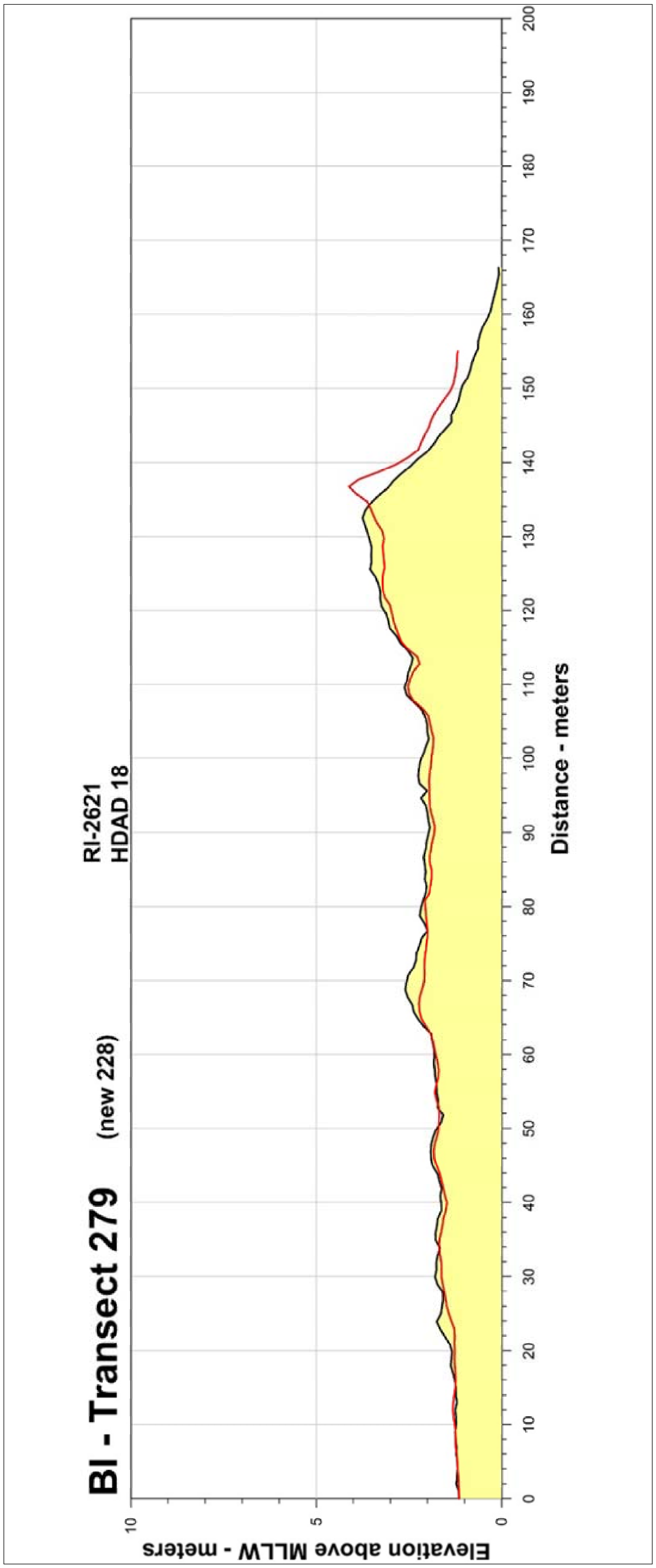

Figure 6-63. Bluff Erosion Profile, RI 2621.

Figure 6-64. Sites and associated wetlands, RI 2621, RI 2622, RI 2623, and RI 2630.

Figure 6-65. Phase II testing, RI 2622.

Figure 6-66. View of eroded site facing east, RI 2622.

expose potential features. The paleosol is recognizable as a very dark brown to black sand that represents an ancient surface exposed after the overlying dunes were stripped away during the storm event. The site has also been impacted by activities associated with Town of New Shoreham land fill. Almost 5–7 m of refuse caps the site, protecting it from some storm erosion.

Phase II Summary

The Phase II survey initially consisted of scraping a thin layer of sand off the exposed paleosol. The exposed surface was then scraped by flat shovel and trowel to the B_1, upper subsoil horizon to identify any features (Figure 6-67). All soil was screened using ¼-inch hardware cloth. Identified features were given a number, mapped in plan, and photographed. Each feature was then bisected and all feature matrixes saved for flotation analysis. Bisected features were drawn and photographed in plan (Figures 6-68 to 6-72). Soil from the remaining feature was collected for flotation. Flotation (water separation) was done in the field using the adjacent waters to remove the sediment. The remaining heavy fraction was collected in the screens while the light fraction was scooped in nets fitted with nylon mesh. After drying, all samples were sorted to recover any cultural material from both the light and heavy fractions.

Over 1,300 lithics were recovered, the majority consisting of quartz (94%) followed by quartzite (4%) and lesser amounts of argillite, basalt, and chalcedony (Table 6-30; Figure 6-73). Only 0.2 percent of the assemblage consisted of high-quality lithic materials such as chalcedony. This pattern is in sharp contrast with the lithic assemblage at RI 2621, which consisted of 69 percent quartz and 2.5 percent high-quality lithic materials. These differences suggest that during the Late Woodland Period there was a preference for higher quality lithic materials. A number of tools were identified in the assemblage, including an Early Woodland Rossville projectile point, bifaces, unifaces, chopper, scrapers, a hammerstone and cores (Table 6-31; Figure 6-74). The highest lithic density was in the northern and eastern portions of the stripped area associated with hearths (Features 1 and 5) (Figures 6-68, 6-72, and 6-75).

Figure 6-67. Block plan facing north; flags identify feature locations, RI 2622.

Figure 6-68. Feature 1 (hearth) and Feature 1A (post), RI 2622.

Figure 6-68. Feature 1 (hearth) and Feature 1A (post), RI 2622.

Figure 6-70. Feature 1A profile, RI 2622.

Figure 6-71. Feature 9 profile, RI 2622.

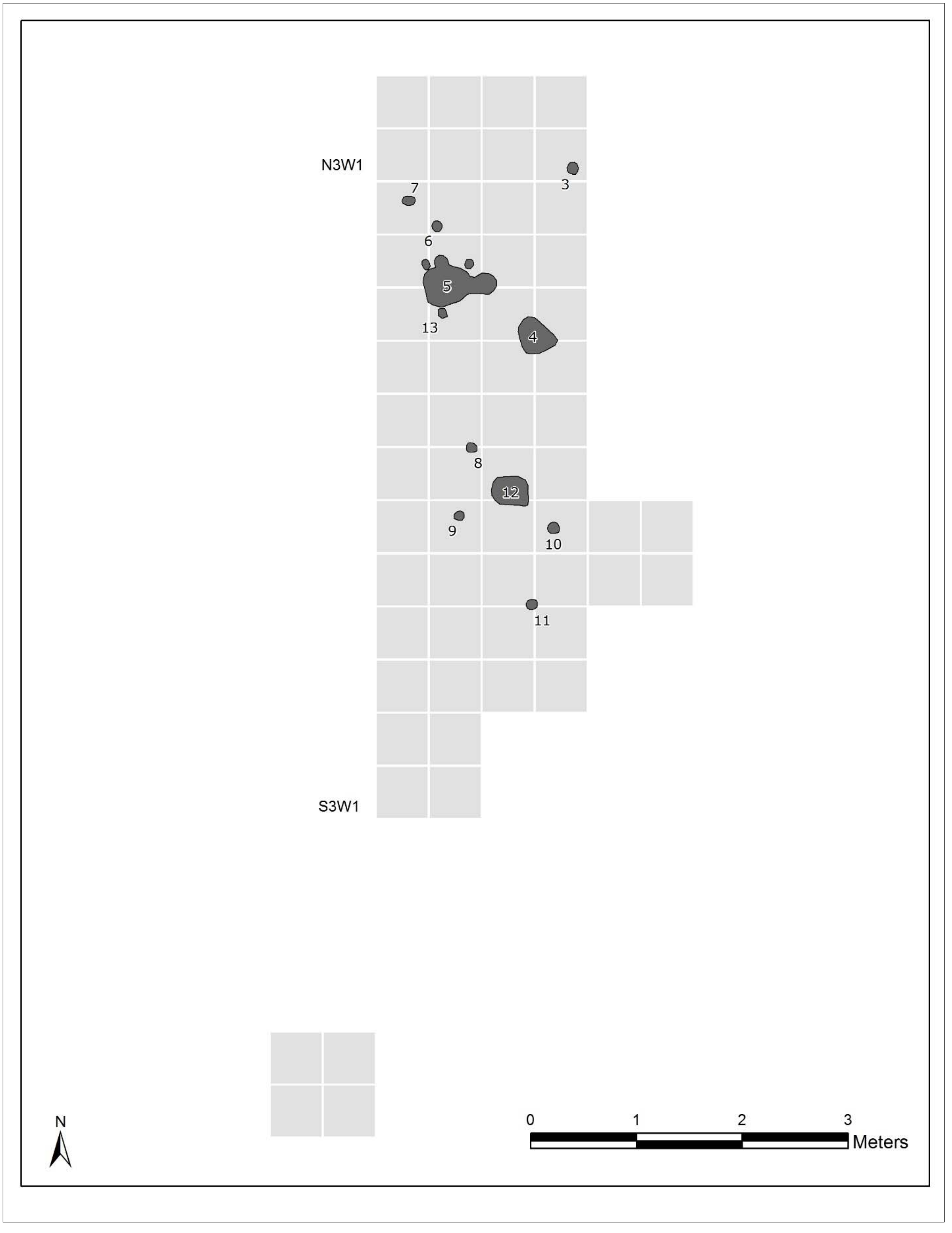

Figure 6-72. Block plan and features, RI 2622.

Table 6-30. Lithic Material, RI 2622.

Material	Count	Percentage
Argillite	4	0.30
Basalt	1	0.08
Chalcedony	3	0.23
Graphite	9	0.68
Quartz	1,236	93.78
Quartzite	52	3.95
Rhyolite	5	0.38
Schist	1	0.08
Unidentified	7	0.53

Figure 6-73. Lithic sample, RI 2622.

Table 6-31. Lithic Type, RI 2622.

Type	Count	Percentage
Angular Debris	621	47.12
Biface	4	0.30
Chopper	1	0.08
Core	9	0.68
End Scraper	2	0.15
Gizzard Stone	1	0.08
Hammerstone	1	0.08
Paint Pot	5	0.38
Primary Reduction Flake/Debris	109	8.27
Projectile Point	1	0.08
Rod	2	0.15
Scraper	2	0.15
Secondary Flake	300	22.76
Split Cobble	15	1.14
Tablet	1	0.08
Tertiary Flake	231	17.53
Uniface	2	0.15
Untyped	11	0.83

Figure 6-74. Lithic tools, RI 2622.

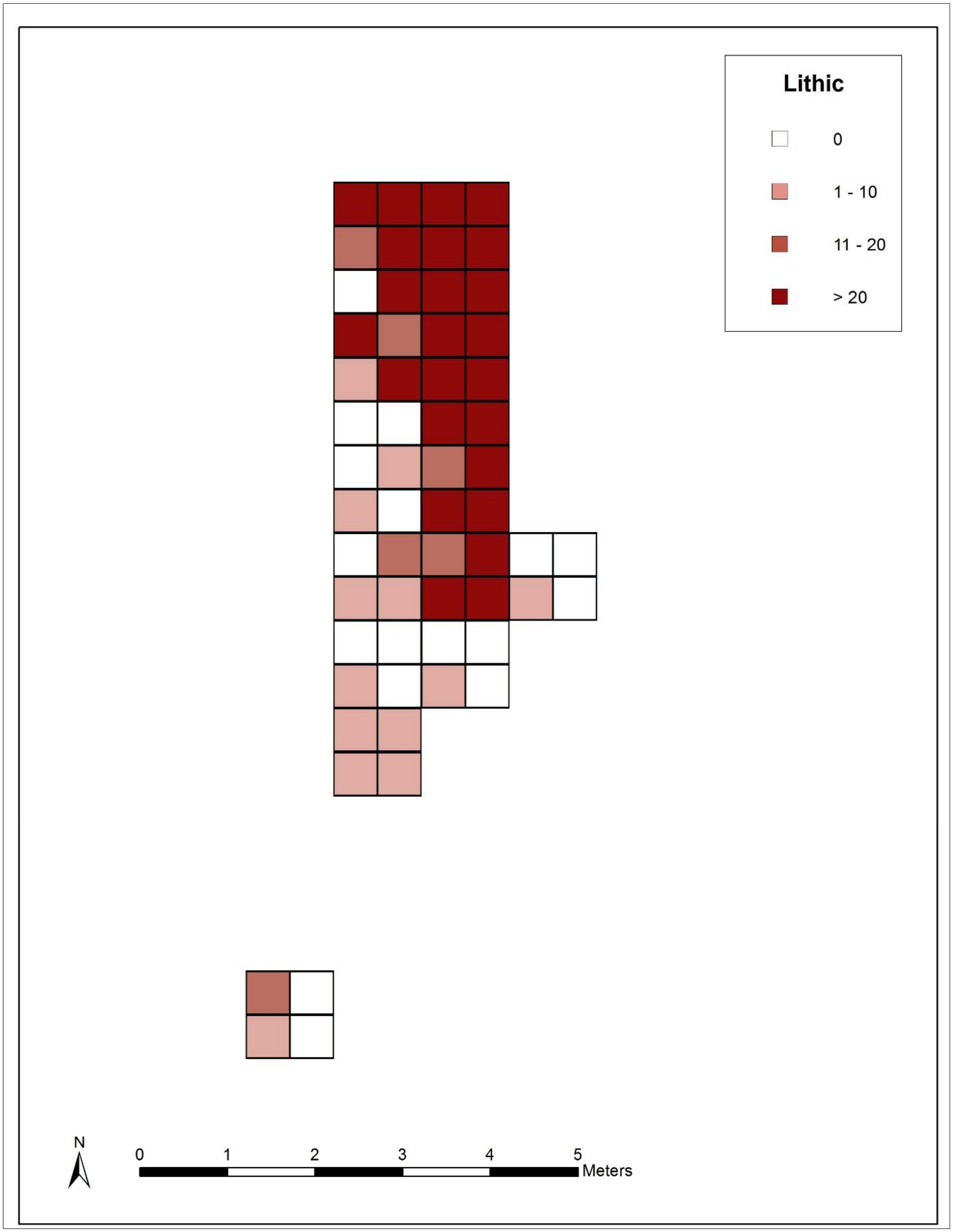

Figure 6-75. Lithic density, RI 2622.

Fourteen features were identified within the 43-sq m site, with several eroding from the bluff edge. Ten features were identified as posts, two as hearths and two were basin-shaped features of unknown function. Although there was no clear pattern in the arrangement of posts, the presence of large and small posts suggests the presence of domestic structures. Eleven of the 14 features yielded plant and animal remains (Table 6-32). Six of the recovered faunal remains were identified as Atlantic Sturgeon, indicating the site was likely occupied in April and May. As with RI 2621 and the other sites identified as seasonal spring fishing camps, very little shellfish was recovered from RI 2622.

Charred botanicals included unidentified nutmeat, hazelnut, hickory, unidentified nutshell, acorn shell, bayberry, gallium, blueberry, butter-and-eggs, goosefoot, *polygonacea* (knotweed/smartweed), raspberry, *scleria* (nutrush), sedge, *betulaceae*, buttercup, *cornaceae* (dogwood), *gaylussicia* (huckleberry/whortleberry) seed, huckleberry, and 80 parenchymous tissue fragments (Table 6-32).

The botanical assemblage is consistent with the contention that the site was occupied during the spring. With the exception of hazelnut, hickory nut, and parenchyma tissue, the remaining plants were mostly species of weedy plants that grow along beach areas and were of limited or no economic value. The only exception is the presence of one blueberry, three raspberries, and two huckleberry seeds that were present in such low numbers they made up only 1.8 percent of the recovered plant assemblage (not including wood). Conversely, nuts (hickory, hazelnut, and acorn) make up 52 percent of the recovered assemblage (n = 172) and parenchyma 21 percent (n = 70). The remaining assemblage, consisting of weedy plants of little or no economic value, constituted 26 percent (n = 87) of the recovered plant assemblage. The contrast between nuts and parenchyma (72% of the recovered plant assemblage) and the low numbers and high diversity of the remaining plant assemblage with little or no economic value, suggests that the few blueberry, huckleberry, and raspberry seeds were accidental inclusions with seeds that may have been present in the area. Hazelnut, hickory nut, and acorn were often and readily stored for use in the winter and spring after fall harvest. Parenchyma does not store well and was usually processed and eaten soon after harvest in the spring or fall. Although unidentified, the parenchyma tissue (roots and tubers that store energy) is potentially a very important seasonal indicator. The roots and tubers of wetland plants are best obtained between late fall and early spring, and their presence, along with sturgeon remains, indicate spring occupation.

A total of 161 sherds of mineral-tempered aboriginal ceramics were recovered that date to the Early and Middle Woodland periods (Table 6-33; Figure 6-76) and suggest that RI 2622 was occupied one or more times between 2700 and 1200 B.P. The presence of multiple features such as hearths and large and small post molds suggests that the site was more complex than a temporary camp and is interpreted as a seasonal spring fishing camp. The presence of sturgeon and parenchyma support the contention the site was likely occupied in the spring.

Site Condition, Future Threats, and Significance

RI 2622, like other spring fishing camps along the coast, is at increasing risk from major storm events. Continued tidal and storm erosion poses a serious threat to the integrity and long-term stability of the site (Figure 6-77). Additional erosion is clearly evident since the completion of the Phase II testing. Recent data suggest that the rate of shoreline loss in this section of the west coast from 1952 through 2013 has occurred at the rate of 0.6 m/yr (1.97 ft/yr), the highest rate recorded on the island. An estimated 36.61 m (120.1 ft) of shoreline has been lost from this site in the last 60 years.

The surviving paleosols and associated archaeological deposits exposed by Hurricane Sandy are highly vulnerable to erosion, particularly in the event of another large coastal storm. The landward sections of the site remain buried under sand dunes and are at a lower risk of loss from coastal erosion.

Table 6-32. Features and Associated Materials, RI 2622.

200 - 2622	Feature #											
	1	1A	2	3	4	5	9	10	11	12	13	N/A
Feature Type	**Hearth**	**Post**	**Unknown**	**Post**	**Unknown**	**Hearth**	**Post**	**Post**	**Post**	**Post**	**Post**	**Non-Feature**
Botanicals												
Bayberry Seed		2				7						
Betulaceae Seed						1						
Blueberry Seed		1										
Butter-and-Eggs Seed						2						
Buttercup Seed						1						
Cornaceae Seed		2			3	2			1			
Euphorbiaceae Seed							2					
Galium Seed						8						
Gaylussica Seed		1										
Goosefoot Seed							2					
Hazelnut Nutshell					1	2						
Hickory Nutshell	19			12		100	11	2	2			
Huckleberry Seed		2										
Nutmeat	3					18	1					
Oak Nutshell							2					
Parenchymous Tissue		4			10	23	1			42		
Polygonaceae Seed							1					
Raspberry Seed	1					1	1					
Scleria Seed						12						
Sedge Seed						1						
Spurge Seed						49	9					
Wood	303	225	88	17	163	1,796	304		89	200	33	38
Fish												
Atlantic Sturgeon												6
Unidentified	2					2						
Shellfish												
Northern Quahog												4

Table 6-32 (cont'd). Features and Associated Materials, RI 2622.

200 - 2622	Feature #											
	1	1A	2	3	4	5	9	10	11	12	13	N/A
Feature Type	**Hearth**	**Post**	**Unknown**	**Post**	**Unknown**	**Hearth**	**Post**	**Post**	**Post**	**Post**	**Post**	**Non-Feature**
Unidentified	1	5		10		1	4					3
Faunal												
Unidentified Bird						1						
Unidentified Mammal						2						
Unidentified												2
Aboriginal Ceramic												
Early Woodland										119		40
Middle Woodland				1				1				
Lithic												
Rossville Projectile Point												1

Tables 6-33. Aboriginal Ceramics, RI 2622.

Count	Temper	Description	Thickness (mm)	Time Period
23	Coarse grit	2 or 3 rim fragments, one sherd has residue	11.25, 10.0	Early Woodland
15	Coarse grit	One sherd has residue	12.0, 7.25	Early Woodland
60	Coarse grit	Exterior: cord-marked	n/a	Early Woodland
61	Coarse grit	Unknown	n/a	Early Woodland
1	Coarse grit	Interior/exterior: smooth	9.3	Middle Woodland
1	Medium grit	Unknown	n/a	Middle Woodland

Figure 6-76. Early Woodland Vinette I cord-marked ceramic, RI 2622.

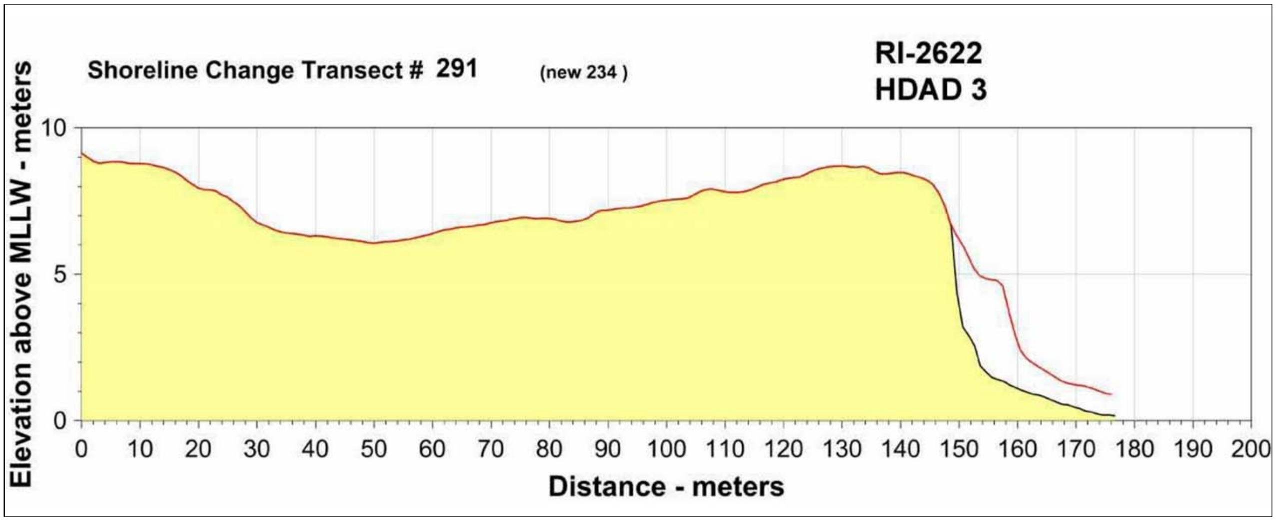

Figure 6-77. Bluff Erosion Profile, RI 2622.

The unique and complex nature of RI 2622 can yield additional information on Early and Late Woodland (ca. 2700–1200 B.P.) land use and settlement patterns on Block Island within the broader context of a developing maritime-focused economy. Although an unknown portion of the site has been impacted, it still retains sufficient integrity and information potential for listing in the National Register.

RI 2623 (formerly HDADs 4 and 17)

Site Setting and Description

RI 2623 is a Middle Woodland site located along West Beach approximately 1,200 m north of the breachway. The site was identified as HDADs 4 and 7 during the Phase I survey. RI 2623 is the third in a group of four potential spring fishing camps located along West Beach (Figure 6-78). RI 2621, RI 2622, RI 2623, and RI 2630 are located between the shoreline and a 1,200-m-long stretch of freshwater wetlands. The frequency with which pre-contact artifacts and features were identified along this specific segment of the Block Island coastline suggests that the wetlands were likely an important criterion in site location.

RI 2623 is situated on a bluff edge along the beach between the 3-ft and 6-ft elevation (Figures 6-79 and 6-80). Soils are classified as beaches, cobbly surface with Hooksan sand, with a slope of 3 to 8 percent. The site extends for approximately 90 m along the beach and is separated into a northern area, approximately 30 m in length, and a southern area of approximately 15 m in length (Figure 6-81). The site likely extends toward the wetlands to the east, but the intervening area was not tested to avoid any disturbance to the dunes and vegetation. The site extent was defined by the presence of approximately 100 sq m of exposed paleosols and associated lithic debitage.

Phase II Summary

MPMRC scraped and cleaned the exposed paleosols in the northern and southern areas to assess the associated archaeological deposits.

Figure 6-78. Sites and associated wetlands, RI 2621, RI 2622, RI 2623, and RI 2630.

Figure 6-79. Northern area, RI 2623.

Figure 6-80. Southern area, RI 2623.

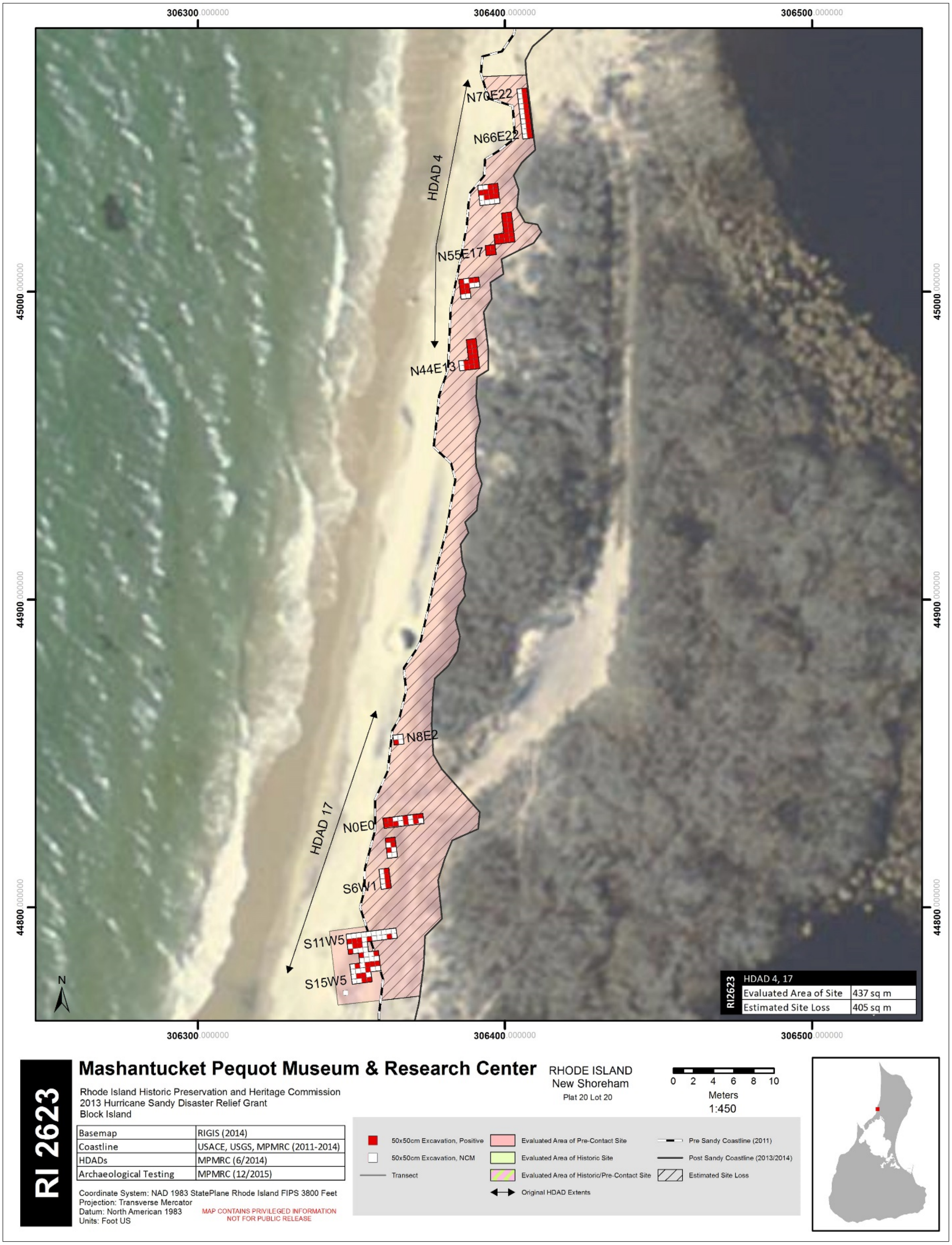

Figure 6-81. Phase II testing, RI 2623.

Northern Area

Five features were observed in profile along the eroded dune face in the northern area during the initial Phase I walkover survey and were scraped, mapped, and photographed during the Phase II survey. Three posts were identified as part of a post-contact fence line (Figure 6-82). Excavation units were placed on top of the bluff feature in areas where the paleosol was exposed and scraped to the B horizon to look for additional features (Figure 6-83). Nine additional features were found: five possible posts, three hearths, and one unknown feature (Figures 6-84 to 6-87). The stratigraphy in the northernmost units of the northern area indicates the site was situated adjacent to a large kettle hole. A second area of exposed paleosol 36 m to the south was scraped to the B horizon to look for features; 23 m were cleared in this area. One hearth feature and two remnant plow scars were found.

Southern Area

A total of 94 sq m were exposed in the southern area by scraping and the placement of several small trenches. The southern area was at a lower elevation than the northern area and therefore subjected to horizontal and vertical erosion, providing additional opportunity to examine the exposed paleosol for features (Figure 6-80). The only features identified were a possible hearth and a historic plow scar (Figures 6-88 and 6-89). A rim sherd of a Middle Woodland dentate ceramic was recovered but not associated with a feature (Figure 6-90).

Recovered artifacts from the northern and southern areas included 1,894 lithics consisting of quartz (86%), quartzite (5.5%), argillite (2%) and less than 1 percent each of basalt, graphite, ochre, and rhyolite and shale (Table 6-34; Figure 6-91). Tools include an abrader, bifaces, choppers, cores, hammerstones, projectile points, scrapers, and utilized flakes. Of the three projectile points one is identified as an untyped Narrow Stem, one is a Wading River, and the third is unidentified (Table 6-35; Figure 6-92). The density of lithic artifacts was generally higher in the northern area and often exceeded 20 artifacts/50-x-50-cm quadrat ("quad") (Figure 6-93). Six aboriginal ceramics were recovered: five dating to the Middle Woodland Period, three of which are dentate stamped (Table 6-36).

Identified faunal remains included Atlantic Sturgeon, sea scallop, and unidentified shell. Charred botanical remains included hickory and acorn nut, and bayberry, butter-and-eggs, copperleaf, elderberry, polygonum, hypericaceae, spurge, arrow-wood, bulrush, vetch, and cornaceae seeds, and 6 parenchymous tissue (Table 6-37). Charred wood and C-14 samples were also collected. The botanical assemblage is consistent with the contention that the site was occupied during the spring. With the exception of hickory nut, acorn, and parenchyma tissue, all the remaining species are weedy plants that grow along beach areas and are of limited or no economic value. These plants are likely background noise from the area surrounding the occupation and are considered accidental inclusions, accidently charred by virtue of their proximity to cooking activities. Hickory nut and acorn were readily stored for use in the winter and spring after fall harvest. Although unidentified, the parenchyma tissue (roots and tubers that store energy) is potentially a very important seasonal indicator. The roots and tubers of wetland plants are best obtained between late fall and early spring, and their presence, along with sturgeon remains, indicates a spring occupation. The presence of a single bulrush seed is interesting. It could have found its way into the site fairly easily as an accidental inclusion, as bulrush seeds are dispersed by wind and the wetland is only 75 m to the east. Alternatively, it could have been brought to the site from the wetland where bulrush roots were harvested. Either way, even the single presence of a bulrush seed indicates that bulrushes were likely growing in the wetland at the time the site was occupied, and it may indicate that at least some of the charred parenchyma was bulrush.

Figure 6-82. Modern fence line, RI 2623.

Figure 6-83. Site in plan, facing north, RI 2623.

Figure 6-84. Feature 11, RI 2623.

Figure 6-85. Feature 14, RI 2623.

Figure 6-86. Feature 18, RI 2623.

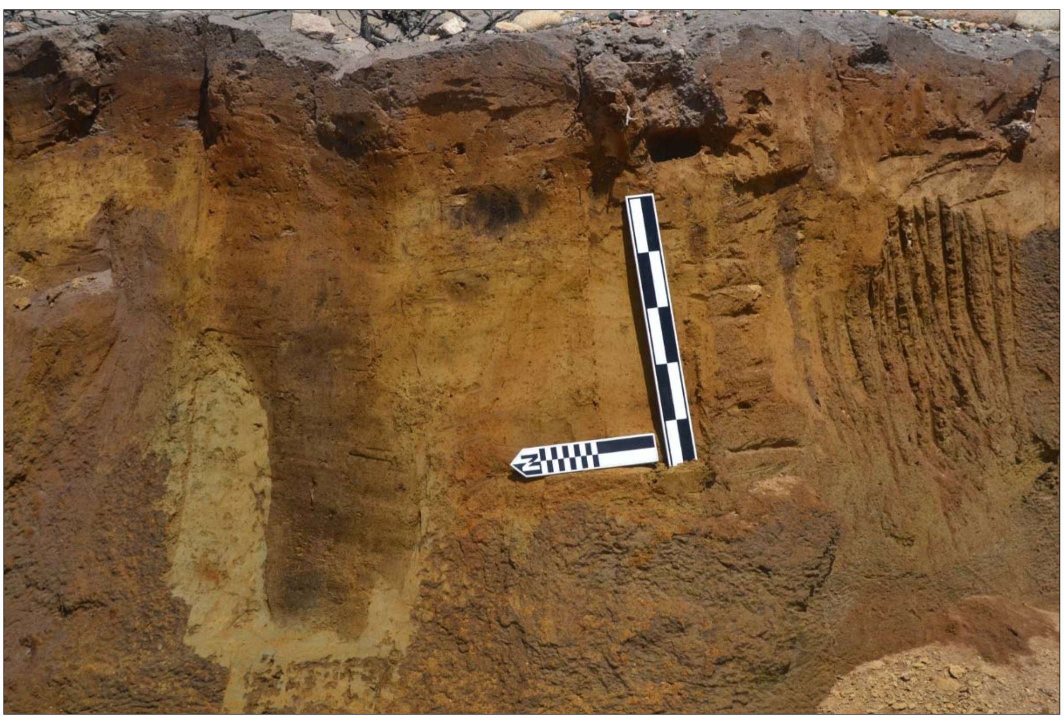

Figure 6-87. Feature 11 (left) and 12 (right), RI 2623.

Figure 6-88. Block excavation in southern area; plow scar in foreground, Feature 7 (hearth) in background.

Figure 6-89. Feature 7, southern area, RI 2623.

Figure 6-90. Middle Woodland dentate-stamped rim sherd from southern area, RI 2623.

Table 6-34. Lithic Material, RI 2623.

Material	Count	Percentage
Argillite	43	2.27
Basalt	5	0.26
Gneiss	3	0.16
Graphite	12	0.63
Ochre	13	0.69
Quartz	1,633	86.22
Quartzite	103	5.44
Rhyolite	17	0.90
Shale	1	0.05
Unidentified	64	3.38

Figure 6-91. Lithic sample, RI 2623.

Table 6-35. Lithic Type, RI 2623.

Type	Count	Percentage
Abrader	1	0.05
Angular Debris	466	24.60
Biface	21	1.11
Chopper	2	0.11
Core	9	0.48
Fire-Cracked Rock	109	5.76
Hammerstone	2	0.11
Primary Reduction Flake/Debris	270	14.26
Projectile Points	3	0.16
Scraper	1	0.05
Secondary Flake	826	43.61
Split Cobble	3	0.16
Tertiary Flake	130	6.86
Untyped	3	0.16
Utilized Flake	5	0.26
End Scraper	2	0.11
Non-Cultural	4	0.21
Modified Cobble	1	0.05
Tablet	1	0.05
Unknown	35	1.85

Figure 6-92. Lithic tools, RI 2623.

Table 6-36. Aboriginal Ceramics, RI 2623.

Count	Temper	Description	Thickness (mm)	Time Period
1	Medium grit	Interior: smooth	n/a	Middle Woodland
3	Coarse grit	Dentate stamped, rim	7.0, 8.0	Middle Woodland
1	Coarse grit	Interior/exterior: smooth	7.3	Middle Woodland
1	Not discernible	Unknown	n/a	Unknown

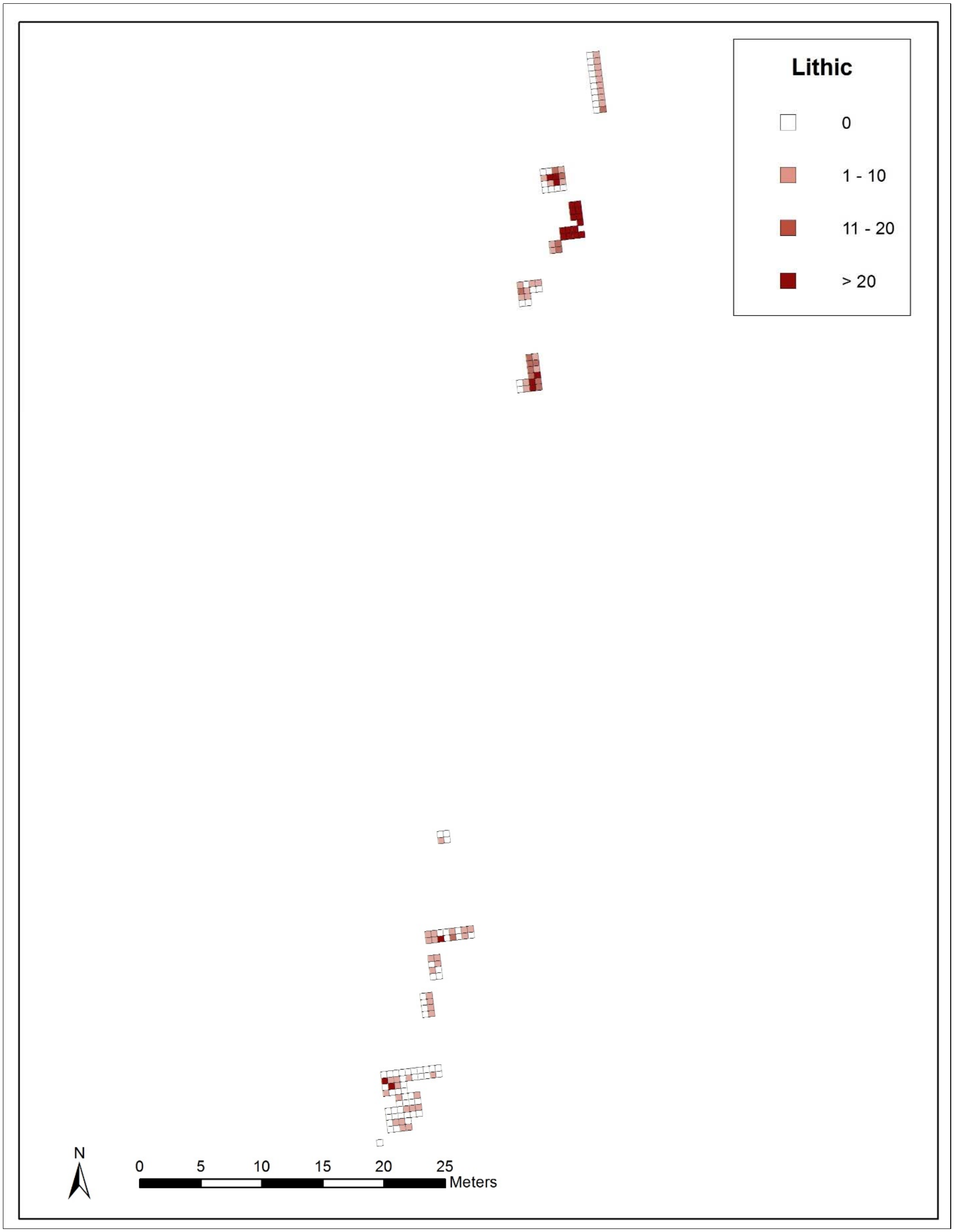

Figure 6-93. Lithic density, RI 2623.

RI 2623 is tentatively interpreted as a Middle Woodland seasonal spring fishing camp based on the presence of sturgeon and the similarity of location and lithic and botanical assemblages with similar sites along West Beach. Many of the tasks at the site were likely associated with procuring and processing resources obtained from the waters and adjacent coastline.

Site Condition and Future Threats

Due to the heavy and continuous erosion along the dunes from both tidal and storm driven events, RI 2623 is in danger of being lost. Evidence of additional erosion was observed by MPMRC staff several months after the Phase II survey work was completed, suggesting that the destabilized bluff is continuing to retreat landward. Recent data suggest that the rate of shoreline loss from 1952 through 2013 was 0.72 m/yr (2.4 ft/yr). An estimated 44.07 m (144.6 ft) of shoreline has been lost from this site in the last 60 years (Figure 6-94).

RI 2623 has the potential to yield significant information regarding pre-contact land use on Block Island. The presence of numerous pre-contact cultural features, a substantial lithic assemblage, and ceramics indicate a high degree of complexity associated with many different types of pre-contact activity. Although erosion has damaged this site, it is MPMRC's opinion that RI 2623 is eligible for listing in the National Register under Criterion D.

RI 2624 (formerly HDAD 125)

Site Setting and Description

RI 2624 is located along the eastern shore of Block Island, 550 m south of Mansion Beach. It lies approximately 150 m south of RI 2643, both of which are considered possible seasonal fishing camps based on their location and setting adjacent to freshwater wetlands (Figures 6-95 and 6-96). RI 2624 lies at an average elevation of 0.9 m (3 ft) amsl. The site was identified by the presence of an exposed paleosol accompanied by lithics (Figure 6-97). The soils within the adjacent field are described as Gloucester-Hinckley very stony sandy loams, rolling. A large inland wetland is located 400 m west of the site.

Phase II Summary

The Phase II testing for RI 2624 consisted of shovel scraping and troweling the exposed paleosol to the B horizon to identify any extant cultural features (Figures 6-96 to 6-98). Approximately 40 sq m were scraped in two separate areas (Figure 6-99). All artifacts were collected while scraping the paleosol. Features were drawn and photographed in plan, then bisected. Soil samples were collected for flotation. The bisected features were drawn and photographed in profile. Five of the identified features were posts and the fifth was untyped. Two features contained cultural material (Table 6-38).

Only 14 lithic artifacts were recovered consisting of quartz (57%), rhyolite (21.5%), and other lithic material (21.5%). The assemblage consisted of primary, secondary, and tertiary flakes associated with lithic manufacture (Table 6-39, 2; Figure 6-100). No diagnostic artifacts or tools were recovered (Table 6-40). Only one calcined bone fragment was recovered. Charred plant remains recovered consisted of cornaceae, spurge and leguminosae seeds, and 6 parenchymous tissue. Charred wood was also recovered. Post-contact artifacts included 2 pearlware rim sherd fragments, 1 iron fragment, and 1 medicine bottle fragment.

Although no diagnostic artifacts or sturgeon remains were recovered, the site is tentatively identified as a spring seasonal camp based on its similar setting and location compared to other sites identified as seasonal spring fishing camps and the presence of 16 parenchyma tissue (76% of the recovered plant assemblage).

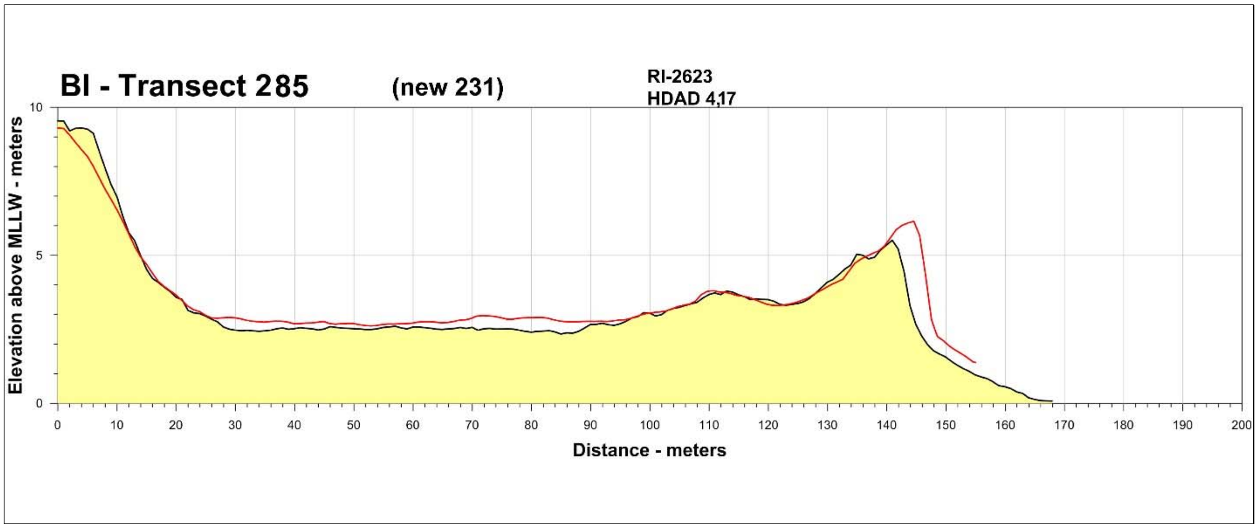

Figure 6-94. Bluff Erosion Profile, RI 2623.

Figure 6-95. Sites and associated wetlands, RI 2624 and RI 2643.

Figure 6-96. View of site facing north, RI 2624.

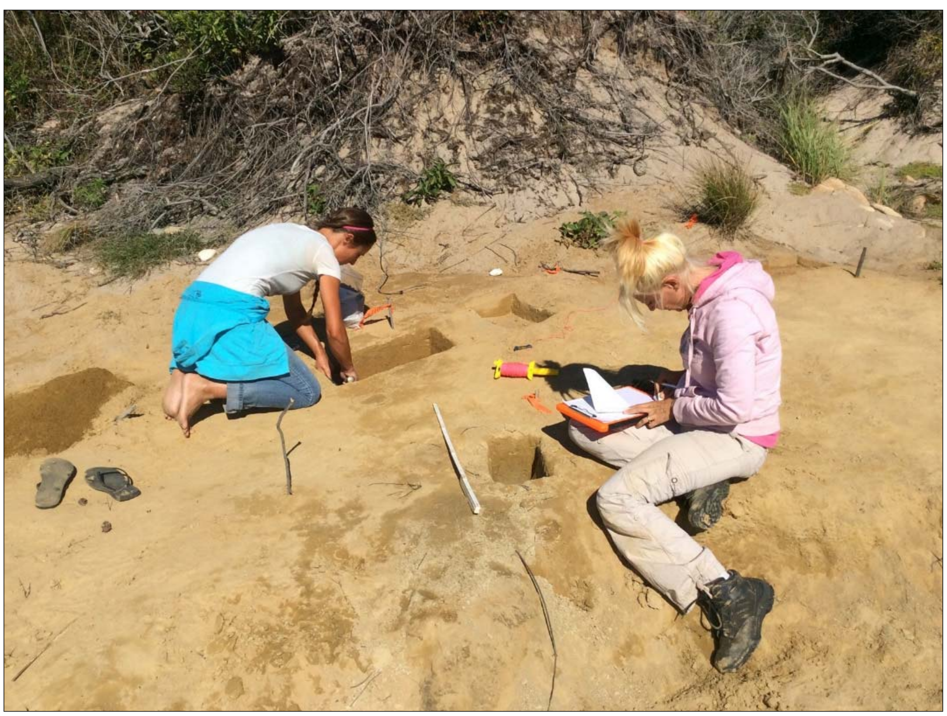

Figure 6-97. Exposed paleosol, RI 2624.

Figure 6-98. Feature 5, RI 2624.

Figure 6-99. Phase II testing, RI 2624.

Table 6-37. Features Containing Identified Material, RI 2623.

Feature #	**4**	**7**	**10**	**11**	**12**	**14**	**15**	**16**	**17**	**19**	**N/A**
Feature Type	Post	Hearth	Unknown	Hearth	Post	Post	Post	Post	Post	Post	Non-Feature
Botanicals											
Arrow-Wood Seed						1					
Bayberry Seed										1	2
Bulrush Seed								1			
Butter-and-Eggs Seed		1						1			
Copperleaf Seed								1			
Cornaceae Seed		3				1		8			4
Elderberry Seed						1					
Hickory Nutshell		1						3			
Hypericacease Seed			2								
Oak Nutshell						1					
Parenchymous Tissue						2					4
Polygonaceae Seed								1			
Spurge Seed	1	3				2		7		1	
Vetch Seed						1					
Wood	31	125	24	300	200	70	32	527	885	1	237
Fish											
Atlantic Sturgeon											9
Shellfish											
Sea Scallop											1
Unidentified											2
Faunal											
Unidentified Calcined					1						2
Aboriginal Ceramic											
Middle Woodland											5
Unidentified											1
Lithic											
Argillite Wading River											1

Table 6-38. Features and Associated Material, RI 2624.

Feature #	3	4	N/A
Feature Type	Post	Post	Non-Feature
Botanicals			
Cornaceae Seed			1
Leguminosae Seed	2		2
Parenchymous Tissue	6		10
Spurge Seed			2
Wood	100		65
Fish			
Shellfish			
Faunal			
Unidentified Calcined		1	
Aboriginal Ceramic			

Table 6-39. Lithic Material, RI 2624.

Material	Count	Percentage
Quartz	8	57.14
Rhyolite	3	21.43
Unidentified	3	21.43

Table 6-40. Lithic Type, RI 2624.

Type	Count	Percentage
Angular Debris	3	21.43
Primary Reduction Flake/Debris	2	14.29
Secondary Flake	3	21.43
Tertiary Flake	3	21.43
Unknown	3	21.43

Figure 6-100. Lithic sample, RI 2624.

Site Condition and Future Threats

Tidal erosion at this site is significant. Recent data suggest that the rate of shoreline loss from 1952 through 2013 was 0.15 m/yr (0.5 ft/yr). Approximately 8.85 m (29 ft) of shoreline has been lost from this site in the last 60 years.

The presence of features within a remnant paleosol indicates intact archaeological remains at this site. The site likely extends to the west under the protective dunes and vegetation. The results of the Phase II testing suggest that RI 2624 contains intact pre-contact cultural features and associated lithic artifacts. The site may yield important new information on the seasonal use of Block Island's seaward shorelines during the Pre-Contact Period. It is MPMRC's opinion that RI 2624 is eligible for listing in the National Register under Criterion D.

RI 2625 (formerly HDAD 145)

Site Setting and Description

RI 2625 is located on the west coast of Block Island at Grace Point. The site was identified during the Phase I survey based on the presence of an exposed paleosol that resulted when the dune and vegetation were stripped from a 14-x-3-m area (Figure 6-101). The site is in proximity to a large inland wetland located 50 m to the east (Figure 6-102). Soils are characterized as Gloucester-Bridgehampton complex, rolling. The tested area lies at an average elevation of approximately 0.9 m (3 ft) amsl (Figure 6-103).

One of the more interesting aspects of the site was a deposit of beach sand that separated Early and Late Woodland components (Figure 6-104). The sand layer is interpreted as resulting from a major storm event

Figure 6-101. Paleosol, RI 2625.

Figure 6-102. Site and associated wetlands, RI 2625.

Figure 6-103. View of site facing south, RI 2625.

Figure 6-104. Storm event sand horizon, RI 2625.

that may have occurred at some time during or just before the Late Woodland Period. It may be no coincidence that a similar event was inferred from the stratigraphy in the North Area at site RI 2621, which also dates to the Woodland Period. Diagnostic Early Woodland ceramics were recovered just below the sand horizon and Late Woodland ceramics just above it. The sand horizon stretches for several hundred meters along that section of the beach.

Phase II Summary

A 40-sq m area where the paleosol was exposed was scraped to identify potential features. Within this area, 9 sq m were excavated where there was no sand dune or vegetation cover (Figure 6-105). Excavations produced pre-contact and post-contact artifacts. Pre-contact artifacts include 38 Early Woodland and 5 Late Woodland aboriginal ceramics (Table 6-41). Only 8 lithic artifacts were recovered: 7 quartz and 1 quartzite (Tables 6-42 and 6-43; Figure 6-106), and 1 mammal bone. Charred wood, C-14, and soil samples for flotation were also collected.

The recovered post-contact artifacts include 15 whiteware, 7 ironstone, 1 creamware, and 3 red earthenware. The majority of the small ceramic assemblage dates between the late nineteenth and early twentieth centuries; however, the creamware hints at an earlier eighteenth-century occupation. No foundations or other direct evidence of a house or other building was identified during the Phase I or II surveys at the site. In addition to the small post-contact assemblage, RI 2625 contained a wide range of pre-contact artifacts. The identified pre-contact ceramics suggest the site was used throughout the Woodland Period. RI 2625 is comparable to sites along West Beach that are tentatively interpreted as spring fishing camps. No pre- or post-contact features were identified during the Phase II testing.

Site Condition and Future Threats

The presence of the exposed paleosol indicates that the extant archaeological deposits are threatened by continued erosion from tides and, particularly, coastal storms. Recent data suggest that the rate of shoreline loss from 1952 through 2013 was 0.18 m/yr (0.6 ft/yr) per year. An estimated 11.25 m (36.9 ft) of shoreline has been lost from this site in the last 60 years (Figure 6-107). The density and diversity of the excavated artifacts, along with the presence of an intact paleosol, give this site good archaeological integrity with considerable archaeological potential, and RI 2625 is potentially eligible for listing in the National Register.

RI 2626 (formerly HDAD 1)

Site Setting and Description

RI 2626 is a multicomponent pre-contact and post-contact site located on high bluffs, adjacent to a kettle hole along the south shore of Block Island. The soils are described as Gloucester-Hinckley very stony sandy loams, 5 to 15 percent slope. The tested area lies at an elevation of 12.5 m (41 ft) amsl and is characterized by gently rolling hills with narrow swales and kettle holes. The field is bounded by low stone fences. The predominating types of vegetation on this site are grassy fields occasionally dotted with small trees (Figure 6-108).

Phase II Summary

Phase II testing consisted of thirty-nine 50-x-50-cm STPs. Test pits were excavated at 5-m intervals to maximum depths of 35–100 cmbs (Figure 6-109). Post-contact artifacts were found in the plow zone and fill to 30 cmbs, while pre-contact artifacts were recovered from both the plow zone and subsoil to 57 cmbs.

Figure 6-105. Phase II testing, RI 2625.

Table 6-41. Aboriginal Ceramics, RI 2625.

Count	Temper	Description	Thickness (mm)	Time Period
4	Coarse grit	Interior/exterior: smooth	10.5	Early Woodland
3	Coarse grit	Interior/exterior: smooth	11	Early Woodland
5	Not discernible	Unknown	8.7, 7.3	Late Woodland
31	Coarse grit	Unknown	n/a	Early Woodland

Table 6-42. Lithic Material, RI 2625.

Material	Count	Percentage
Quartz	7	87.5
Quartzite	1	12.5

Table 6-43. Lithic Type, RI 2625.

Type	Count	Percentage
Primary Reduction Flake/Debris	2	25.0
Angular Debris	5	62.5
Chunk	1	12.5

Figure 6-106. Lithic sample, RI 2625.

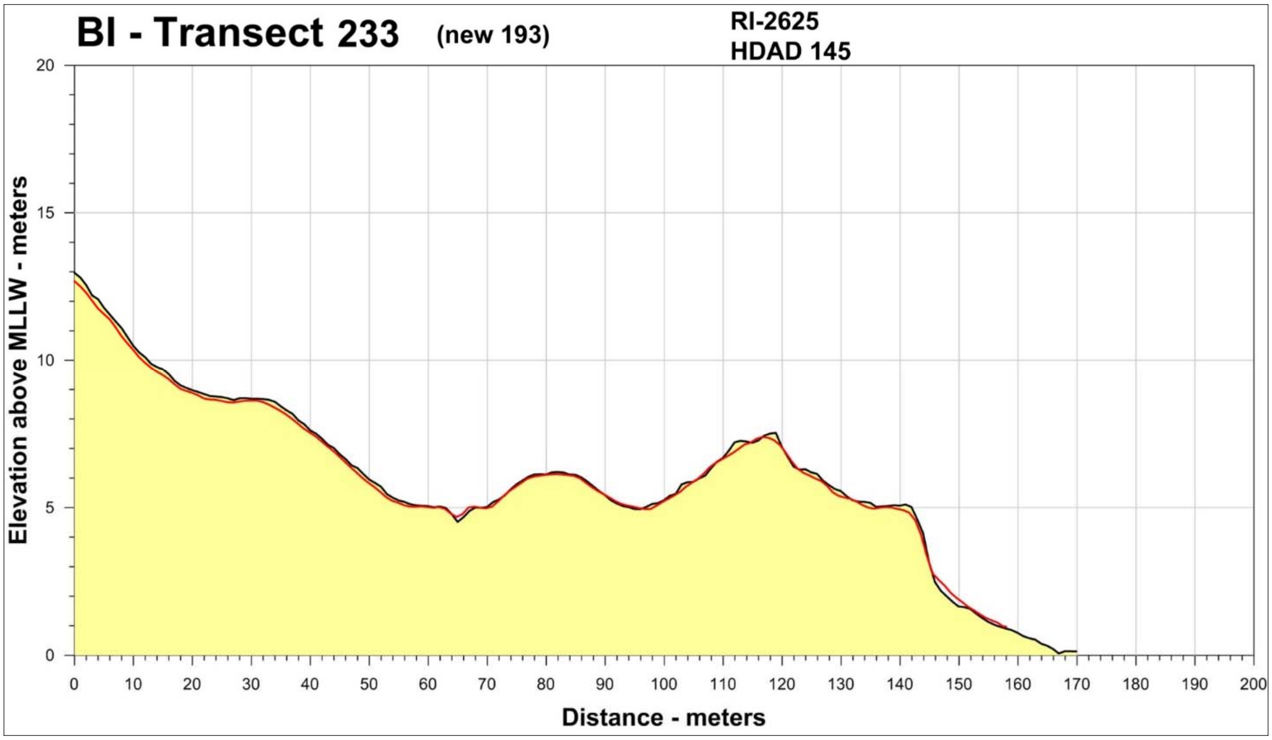

Figure 6-107. Bluff Erosion Profile, RI 2625.

Figure 6-108. View of site, RI 2626.

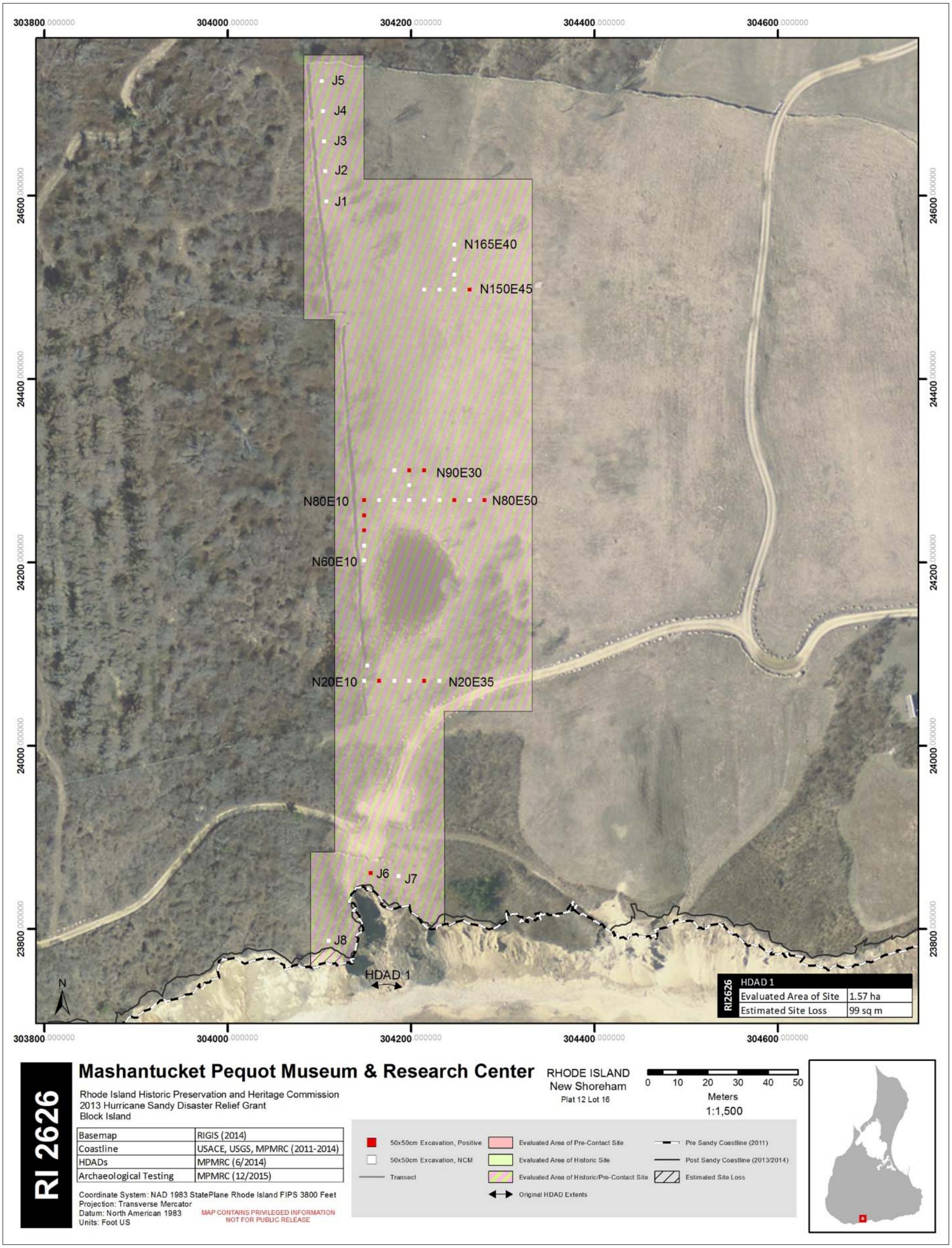

Figure 6-109. Phase II testing, RI 2626.

Two judgmentally placed test pits were excavated approximately 10 m north of the unstable bluff edge (Figure 6-110) near a series of stonewalls. One test pit contained only post-contact material; however, these were in fill and therefore in a disturbed context. This pit contained 14 iron nails, 2 iron fragments, 1 iron spike, 8 container glass fragments, 14 refined earthenware sherds, and 9 shell fragments. Due to disturbance and heavy erosion along the bluff, no additional testing was conducted.

MPMRC evaluated potential erosion from Hurricane Sandy along the inland margins of the landform and within the anticipated area of pre-contact occupations of RI 2626. Twenty-four STPs were excavated around a kettle hole approximately 100 m north of the eroded bluff margin. Minor erosion and gullying was noted on the steeper margins of the kettle hole, likely caused or exacerbated by precipitation during Hurricane Sandy. Pits were placed on the north, west, and south sides of the kettle hole to assess whether archaeological deposits were present along the periphery of the pond. Nine of these pits contained pre-contact artifacts with only one pit containing the post-contact ceramics. Seven additional STPs 60 m to the north contained only two lithics. In the far northwest edge of the property, a transect consisting of five judgmental pits, placed at 10-m intervals, contained no cultural material.

Of the 39 test pits that were excavated during the Phase II at RI 2626, 28 (72%) contained no cultural material. Nine test pits contained only pre-contact materials; one contained both post-contact and pre-contact material. Post-contact artifacts in undisturbed context were limited to two untyped creamware sherds and one hand-painted polychrome underglaze creamware rim sherd. The pre-contact materials recovered during the Phase II testing included 18 quartz debitage representing primary, secondary and tertiary lithic manufacture. One rhyolite flake was also recovered (Table 6-44). In addition, one bifacially worked quartzite chopping tool was recovered (Table 6-45). All pre-contact artifacts were recovered from the inland section of the site, adjacent to the kettle hole.

Due to the small sample size of the assemblage recovered from the Phase II excavations at RI 2626, it is difficult to draw conclusions about the function of this site. Because no diagnostic pre-contact artifacts were recovered, no time period can be assigned. The lithic debitage indicates that stone tools were being produced predominantly from locally obtained quartz. The presence of the quartzite chopping tool may indicate there was short-term use of the area, perhaps for resource extraction related to the kettle hole.

The presence of the three creamware sherds indicates domestic use during the late eighteenth century, while the ironstone sherds recovered from the Phase I survey push the occupation range into the nineteenth and twentieth centuries. No conclusions can be drawn regarding the nails and glass found in the fill due to the disturbed context. No features were found in any of the shovel test pits.

Site Condition and Future Threats

Recent data suggest that the rate of shoreline loss from 1952 through 2013 was 0.27 m/yr (0.9 ft/yr), with 16.28 m (53.4 ft) of shoreline lost from this site in the last 60 years (Figure 6-111). The southern portion of this site closest to the edge of the bluff is in danger of significant erosion, though subsurface testing indicates any extant archaeological deposits in this area may be disturbed. The northern portion of the site tested during the Phase II is protected from large-scale erosion. Minor gullying from surface water runoff is largely confined to the immediate pond margins. While the artifact density was low, limited testing did recover an array of both pre-contact and post-contact artifacts in undisturbed contexts. It is MPMRC's opinion that RI 2625 may yield new information about the use of kettle holes during the Pre-Contact Period and be eligible for listing in the National Register under Criterion D.

Figure 6-110. View of site facing west, RI 2626.

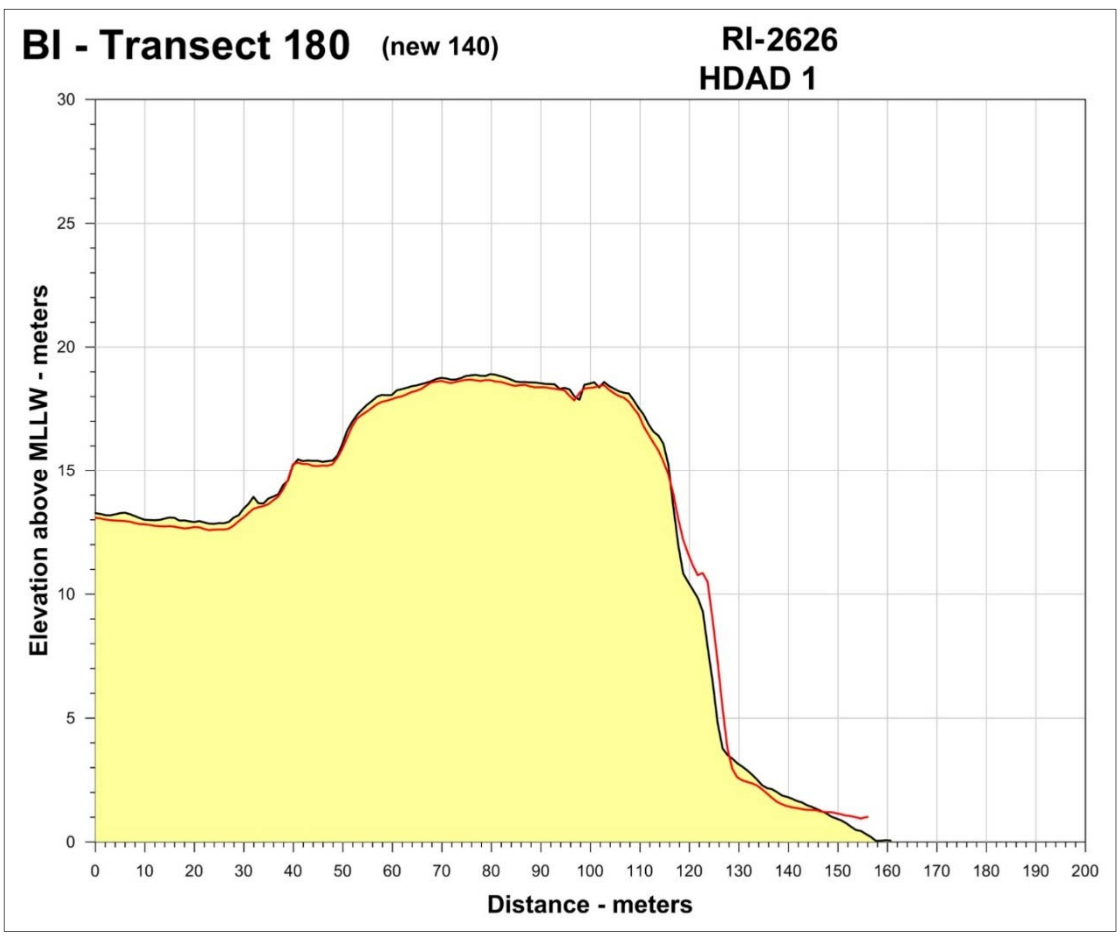

Figure 6-111. Bluff Erosion Profile, RI 2626.

Table 6-44. Lithic Material, RI 2626.

Material	Count	Percentage
Quartz	18	90
Quartzite	1	5
Rhyolite	1	5

Table 6-45. Lithic Type, RI 2626.

Type	Count	Percentage
Angular Debris	8	40.0
Primary Reduction Flake/Debris	6	30.0
Secondary Flake	3	15.0
Tertiary Flake	2	10.0
Chopper	1	5.0

RI 2627 (formerly HDAD 81)

Site Setting and Description

RI 2627 is located on the south shore of Block Island, west of Barlows Point, and lies along the steep and heavily eroded cliff face. The soils are described as Gloucester-Bridgehampton complex, rolling. The tested area lies at an average elevation of 30 m (98.5 ft) amsl (Figure 6-112). A kettle pond is approximately 250 m east of the site. The quartz and quartzite debitage recorded during the Phase I walkover survey eroded from a very active erosional slope and appeared to have been recently uncovered, indicating that additional intact archaeological deposits likely remain on top of the bluff (Figure 6-113).

Phase II Summary

The Phase II testing consisted of 13 test pits parallel to the edge of the bluff placed approximately 10 m north of the edge with two additional test pits placed north of the road. A total of fifteen 50-x-50-cm STPs were excavated at 5-m intervals (Figure 6-114). Five STPs (33%) contained no cultural material. This site was capped by a thick overburden that extended to a maximum of 80 cmbs. The other ten test pits contained a large number of post-contact artifacts, predominantly metal, including 1 bar iron, 15 nails, 1 iron wire fragment, and 30 unidentified iron fragments. Five bottle glass, 1 automobile glass, 1 pearlware sherd, 1 quahog shell, and 73 unidentified fragments were also recovered. Pre-contact artifacts included 24 quartz and 2 quartzite debitage (Tables 6-46 and 6-47; Figure 6-115). No features were identified in the Phase II survey.

No diagnostic artifacts were recovered and MPMRC cannot assign this site to any specific functional or temporal type. The post-contact artifacts are a mix of modern artifacts and the pearlware sherd and hand-wrought and machine-cut nails, which suggest nineteenth-century use as well. No further conclusions can be drawn based on the limited results of the Phase II testing.

Figure 6-112. View of excavation area facing north, RI 2627.

Figure 6-113. View of site from below, facing west, RI 2627.

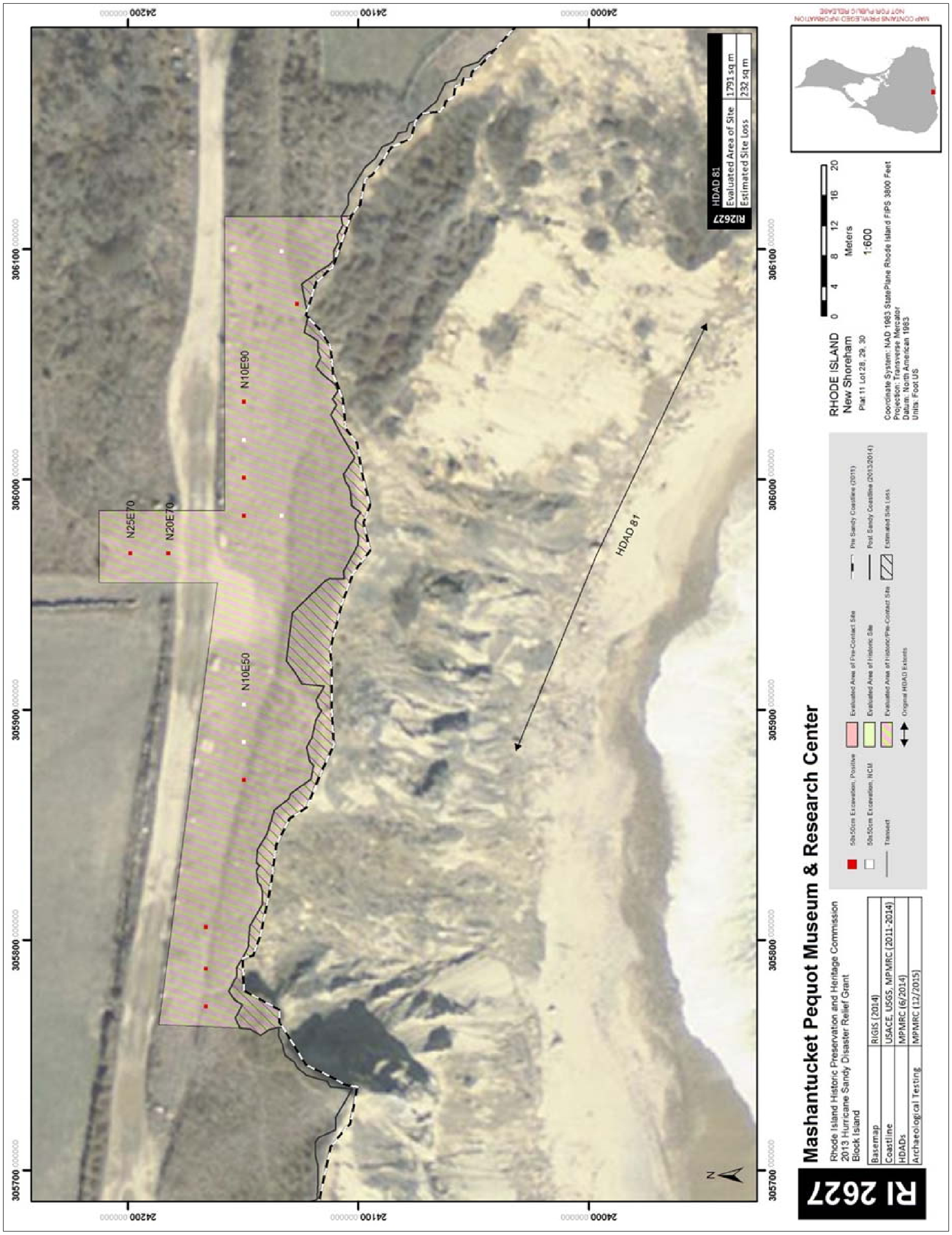

Figure 6-114. Phase II testing, RI 2627.

Table 6-46. Lithic Material, RI 2627.

Material	Count	Percentage
Quartz	24	92.31
Quartzite	2	7.69

Table 6-47. Lithic Type, RI 2627.

Material	Count	Percentage
Argillite	5	0.30
Basalt	2	0.12
Gneiss	5	0.30
Granite	4	0.24
Graphite	4	0.24
Quartz	1,495	89.36
Quartzite	84	5.02
Rhyolite	67	4.00
Schist	1	0.06
Unknown	6	0.36

Figure 6-115. Lithic sample, RI 2627.

Site Condition and Future Threats

RI 2627 continues to be threatened by active erosion along the bluff edge and is in danger from continued bluff face erosion (Figure 6-113). Recent data suggest that the shoreline loss from 1952 through 2013 was 0.39 m/yr (1.3 ft/yr). An estimated 24 m (78.7 ft) of shoreline has been lost from this site in the last 60 years (Figure 6-116).

RI 2628 (formerly HDAD 66)

Site Setting and Description

RI 2628 lies just 100 m south of RI 2632 on the southwest coast of Block Island along a heavily eroded bluff. The site was identified as HDAD 66 during the Phase I survey. The property, belonging to the Audubon Society, is characterized by mown field and pastures divided by stone fences. USDA-NRCS classifies the soils at higher elevations as Gloucester-Bridgehampton complex, hilly. The eroded bluff margins mark an abrupt transition to Udorthents on the very steep soils descending toward the water (Figure 6-117). The tested area lies at an average elevation of 15.7 m (51.5 ft) amsl and is approximately 10 m (30 ft) east of the bluff edge (Figure 6-118).

Phase II Summary

MPMRC placed a transect 10 m from the edge of the bluff and excavated nineteen 50-x-50-cm STPs at 5-m intervals. MPMRC conducted additional testing with both EUs and test pits to assess an apparent concentration of pre-contact artifacts in the northwestern section of the site. In total, 35 STPs and 10 EUs were excavated during the Phase II survey (Figure 6-119 and 120). Thirteen of the test pits (37%) and all of the EUs contained pre-contact cultural material. A very thick plow zone extending to a maximum of 50 cmbs was present across the majority of the site area. A layer of coal and coal ash was encountered at 40–47 cmbs in test pits on the southeastern end of the transect. MPMRC recovered artifacts from the plow zone and upper 10 cm of the B_1 subsoil horizon.

The Phase II assemblage includes a modest number of post-contact artifacts (1 bottle glass, 47 nail fragments, and 38 other iron fragments). The majority of the recovered artifacts were pre-contact, including 1,673 lithics. Eighty-nine percent of the lithic assemblage is quartz, 5 percent quartzite, and 4 percent rhyolite. Argillite, basalt, gneiss, granite, graphite, and schist each make up less than 1 percent of all lithic artifacts (Table 6-48). The lithics represent all stages of lithic manufacture (Figure 6-121; Table 6-49). While no diagnostic lithics were recovered, tools include 1 anvil stone, 5 bifaces, 12 cores, 3 hammerstones, and 6 scrapers (Figure 6-122). Recovered faunal remains include 5 unidentified calcined bone. A total of 384 aboriginal ceramic sherds were recovered during the Phase II survey of RI 2628. One sherd is from the Late Woodland Period, 4 are from the Middle Woodland Period, and the remaining 379 are from the Early Woodland Period (Table 6-50). Three charred cornaceae, 4 spurge seeds, 1 hickory nutshell fragment, and a C-14 sample were collected.

Lithic artifacts were strongly concentrated in the northwestern sections of the site (Figure 6-123); a spatial pattern broadly mirrored in the distributions of ceramics and both botanical and faunal remains (Figures 6-124 to 6-126).

The only feature identified during the Phase II survey was an amorphous stain. Bisection of the anomaly showed a roughly basin-shaped stain that extended from 44–59 cmbs. MPMRC documented the feature and collected the matrix for flotation. The feature contained lithics and some charcoal (collected for potential future radiometric or AMS dating) (Table 6-51).

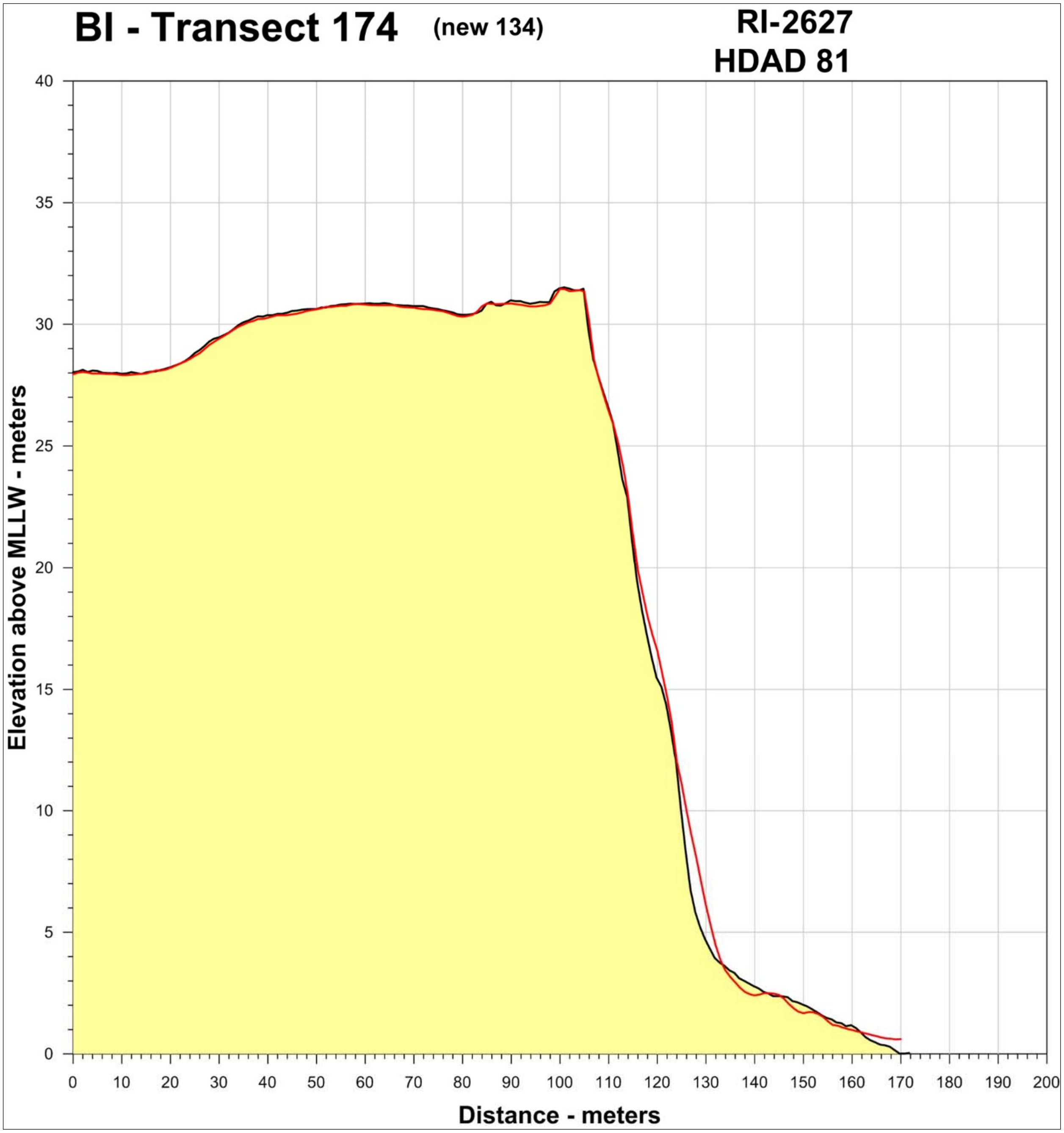

Figure 6-116. Bluff Erosion Profile, RI 2627.

Figure 6-117. View of site from below, facing northeast, RI 2628.

Figure 6-118. Excavation area facing southwest, RI 2628.

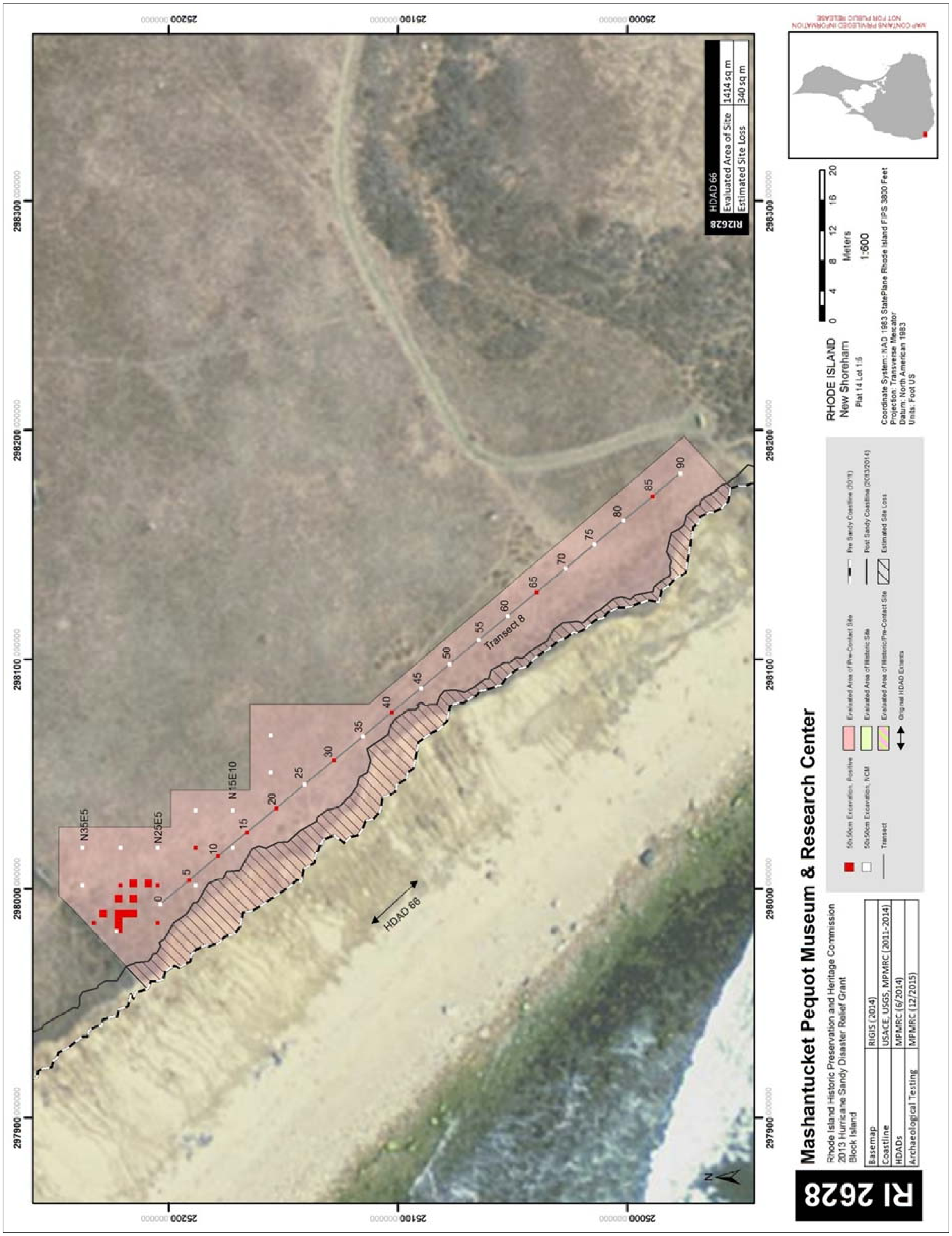

Figure 6-119. Phase II testing, RI 2628.

Figure 6-120. View of site facing northwest, RI 2628.

Table 6-48. Lithic Material, RI 2628.

Type	Count	Percentage
Angular Debris	18	69.23
Primary Reduction Flake/Debris	1	3.85
Secondary Flake	5	19.23
Tertiary Flake	2	7.69

Figure 6-121. Lithic sample, RI 2628.

Table 6-49. Lithic Type, RI 2628.

Type	Count	Percentage
Angular Debris	272	16.26
Anvil Stone	1	0.06
Biface	5	0.30
Core	12	0.72
Fire-Cracked Rock	1	0.06
Hammerstone	3	0.18
Scraper	6	0.36
Primary Reduction Flake/Debris	360	21.52
Unknown	26	1.55
Secondary Flake	634	37.90
Split Cobble	19	1.14
Tertiary Flake	334	19.96

Figure 6-122. Lithic tools, RI 2628.

Table 6-50. Aboriginal Ceramics, RI 2628.

Count	Temper	Description	Thickness (mm)	Time Period
16	Medium grit	Cord-marked	n/a	Early Woodland
328	Medium grit	Cord-marked	8.0, 8.2, 8.5, 8.6, 8.7, 9.0, 9.4, 9.8, 10.0, 10.2, 10.7, 10.8, 11.0	Early Woodland
9	Medium grit	Cord-marked; one sherd has residue	10.6	Early Woodland
2	Medium grit	Interior/exterior: smooth	6.45, 7.2	Early Woodland
1	Medium grit	Rim, cord-marked	7.6	Early Woodland
28	Medium grit	Unknown	n/a	Early Woodland
1	Not discernible	Unknown	8	Late Woodland

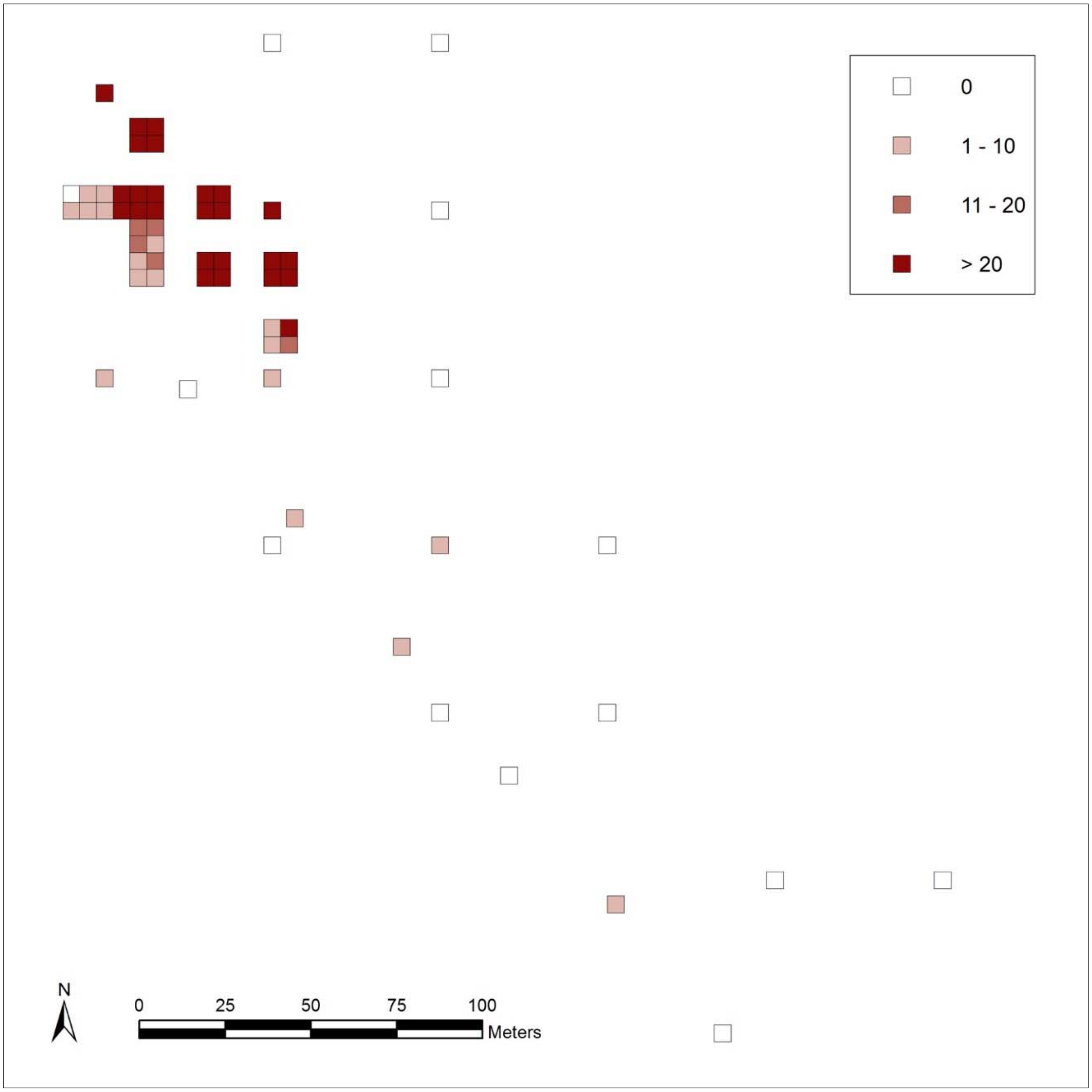

Figure 6-123. Distribution of lithics, RI 2628.

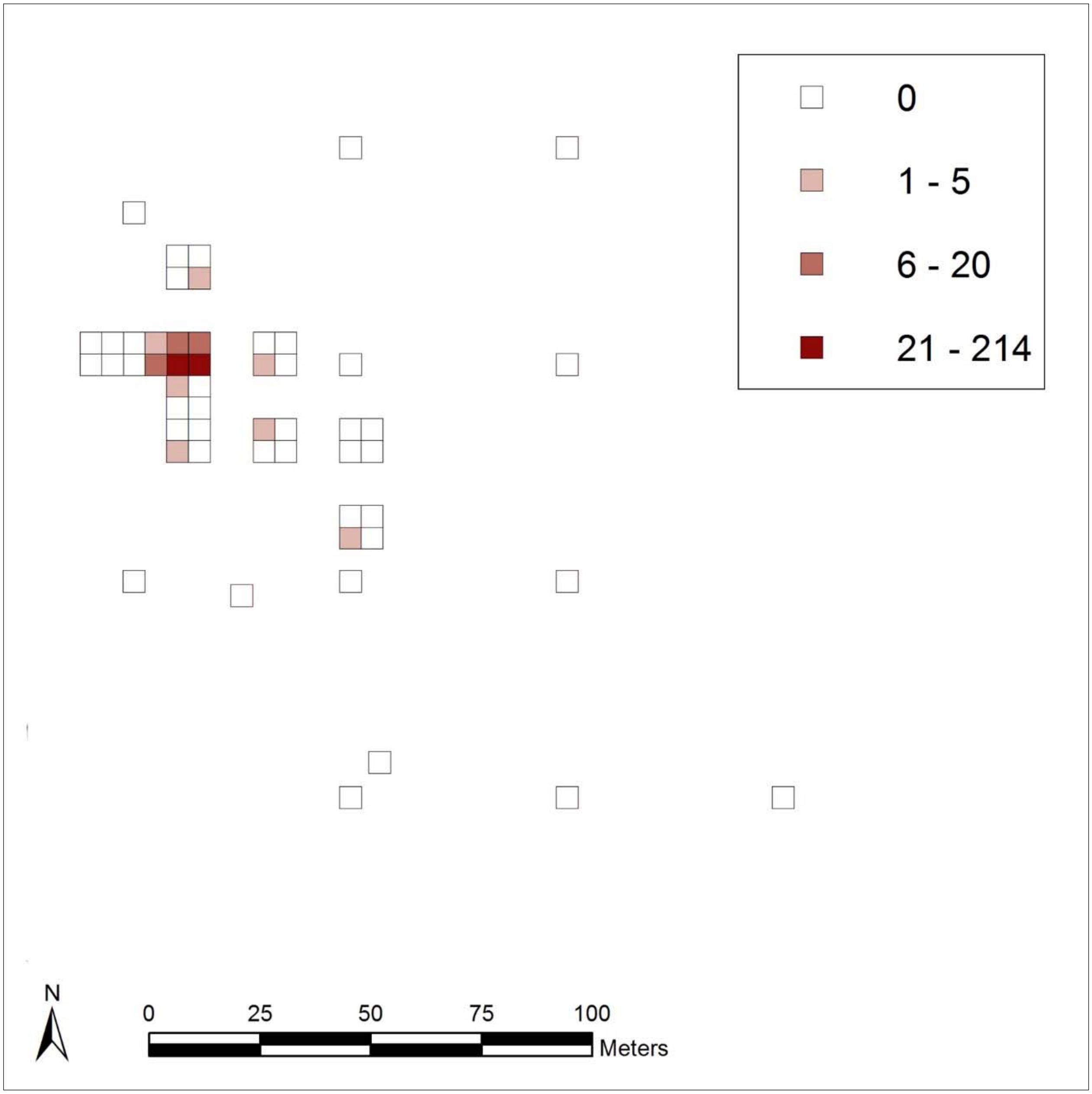

Figure 6-124. Distribution of ceramics, RI 2628.

Table 6-51. Features Containing Identified Material, RI 2628.

Feature #	**1**	**N/A**
Feature Type	Unknown	Non-Feature
Botanicals		
Cornaceae Seed		3
Hickory Nutshell		1
Spurge Seed		4
Wood		379
Fish		
Shellfish		
Unidentified Gastropod	1	
Unidentified		1
Faunal		
Unidentified Calcined		5
Aboriginal Ceramic		
Early Woodland		379
Middle Woodland		4
Late Woodland		1
Unidentified		1

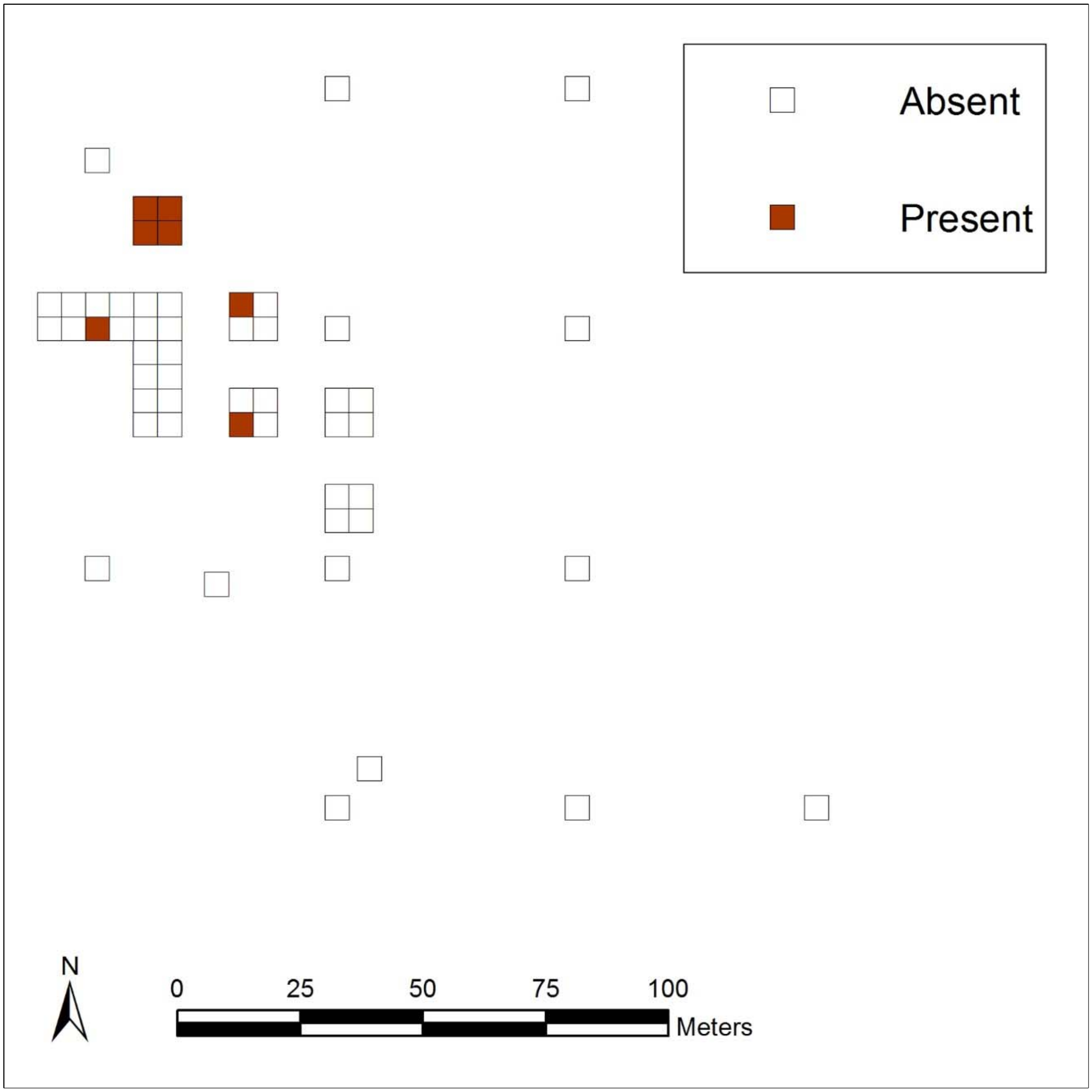

Figure 6-125. Distribution of botanical remains, RI 2628.

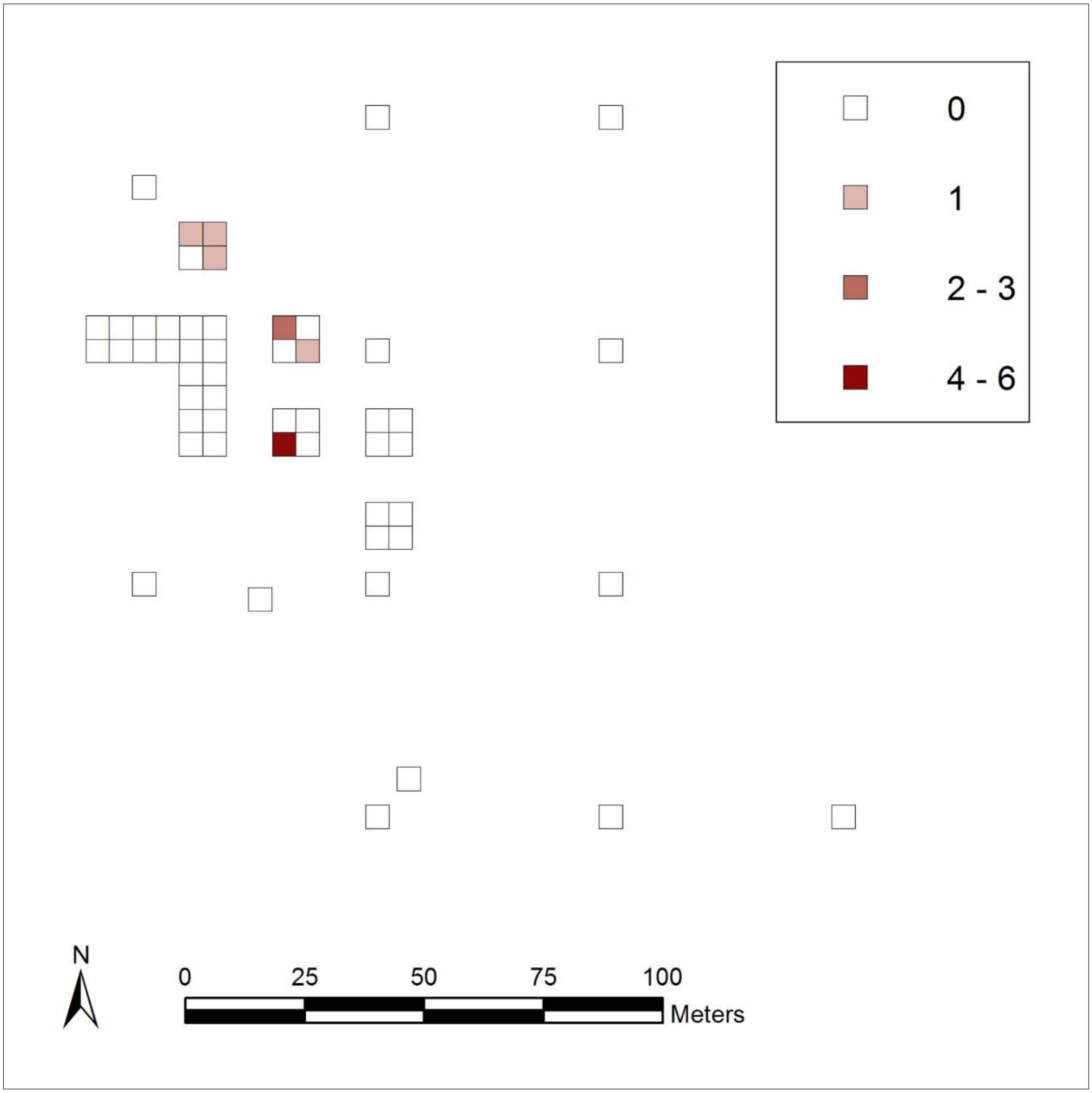

Figure 6-126. Distribution of faunal remains, RI 2628.

RI 2628 appears to be a multicomponent temporary camp used during the Early and Late Woodland periods. The wide variety of lithics suggests that this site was used for a variety of tasks, including manufacture and repair of lithic tools. The presence of bifacial and scraping tools, ceramics, and food (faunal and botanical) remains also suggest other activities related to resource procurement, processing, and consumption.

The site is tentatively identified as a small seasonal or temporary camp occupied by a small group of people on several different occasions for periods of a few weeks or less. The north–northeast orientation of the terrain suggests that the site may have been more attractive during the summer months. It is likely the site was situated to exploit resources associated with the nearby ponds and wetlands.

Site Condition and Future Threats

Shoreline erosion is the largest threat to the integrity of RI 2628, as its location within an Audubon Society preserve will help protect the site from development. Erosion of the bluff continues to threaten the integrity of the remaining archaeological deposits along the edge (Figure 6-127). Recent data suggest that the rate of shoreline loss from 1952 through 2013 was 0.03 m/yr (0.1 ft/yr). An estimated 2.1 m (6.8 ft) of shoreline has been lost from this site in the last 60 years.

RI 2628 has the potential to yield important new information on pre-contact land use on Block Island. The location of the site away from the salt ponds and major freshwater wetlands suggests that further studies may help address a gap in Block Island's archaeological record. The site has one of the densest and most variable lithic assemblages of any site documented during the Hurricane Sandy surveys. It is MPMRC's opinion that RI 2628 is eligible for listing in the National Register under Criterion D.

RI 2629 (formerly HDAD 157)

Site Setting and Description

RI 2629 is on the south side of Block Island. It was located during the Phase I walkover survey based on a single quartz find that had eroded from the steep bluff. The soils in this area are characterized as Hinckley loamy sand, 8 to 15 percent slopes. The tested area lies at an average elevation of 18 m (59 ft) amsl and is characterized by undulating terrain (Figure 6-128). A kettle hole is located 50 m north of the site and may have been a factor in the selection of the area for pre-contact use.

Phase II Summary

A total of thirty-six 50-x-50-cm STPs were excavated as part of the Phase II testing. Three parallel north–south oriented transects with adjacent array pits were placed in the field, northeast of a large kettle hole (Figure 6-129). Thirteen (36%) of the test pits contained pre-contact and/or post-contact cultural material. No cultural features were identified during Phase II testing.

The artifact assemblage includes 16 quartz chipping debris, 1 quartz biface, 3 rhyolite debitage, 1 rhyolite uniface, 1 gabbro flake, 1 gabbro chopping tool, 1 quartzite flake, and 1 schist flake (Tables 6-52 and 6-53; Figures 6-130 and 6-131). One machine-cut nail was recovered—the only post-contact artifact from the Phase II survey.

The Phase II survey suggests that intact archaeological deposits are present in the inland sections of the site. Severe erosion along the bluff face has likely substantially disturbed the archaeological deposits associated with the artifacts recovered during the Phase I survey (Figure 6-132). The functional and temporal nature of this site cannot be determined from the Phase II results; however, there is potential for

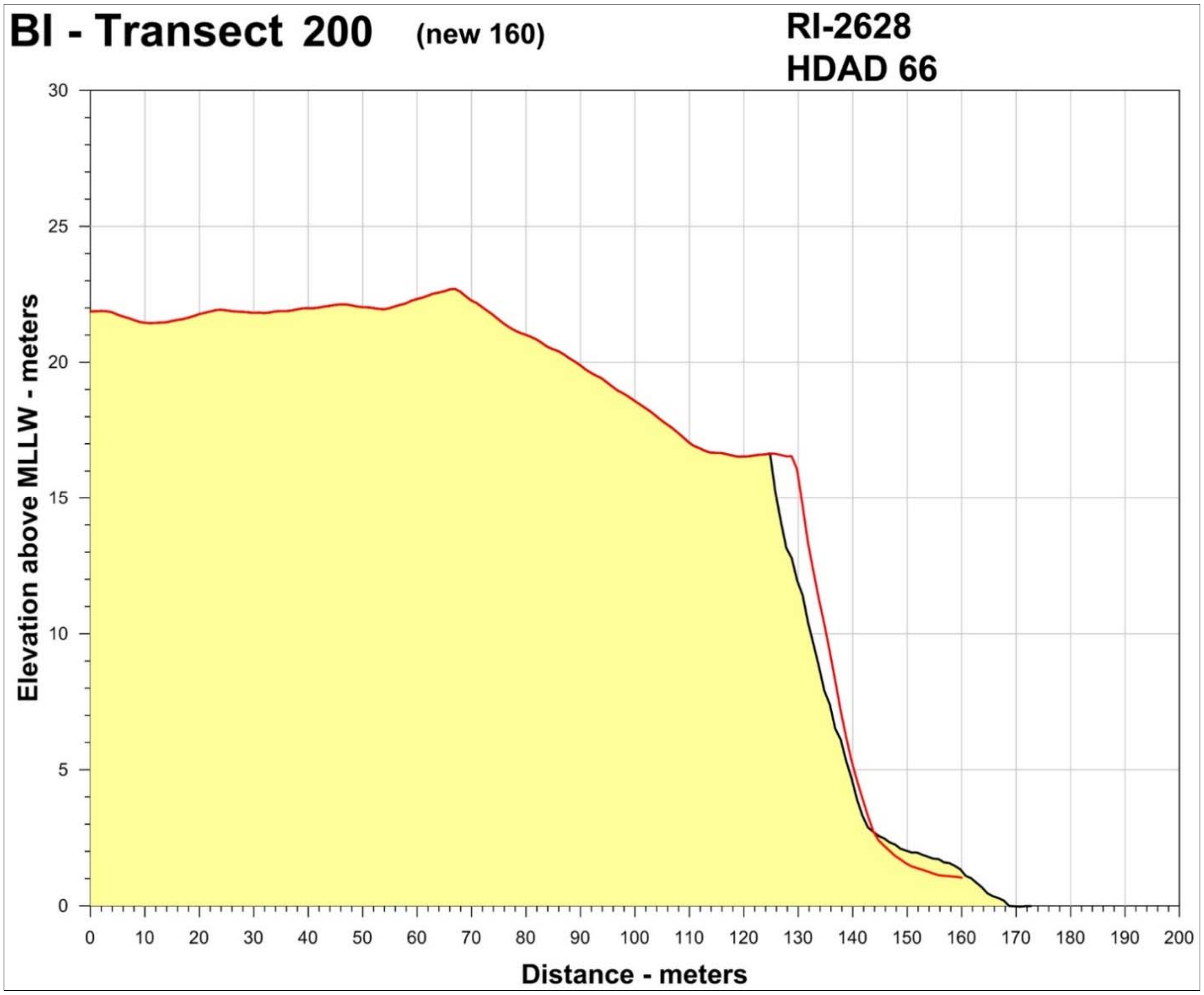

Figure 6-127. Bluff Erosion Profile, RI 2628.

Figure 6-128. Testing area facing northwest, RI 2629.

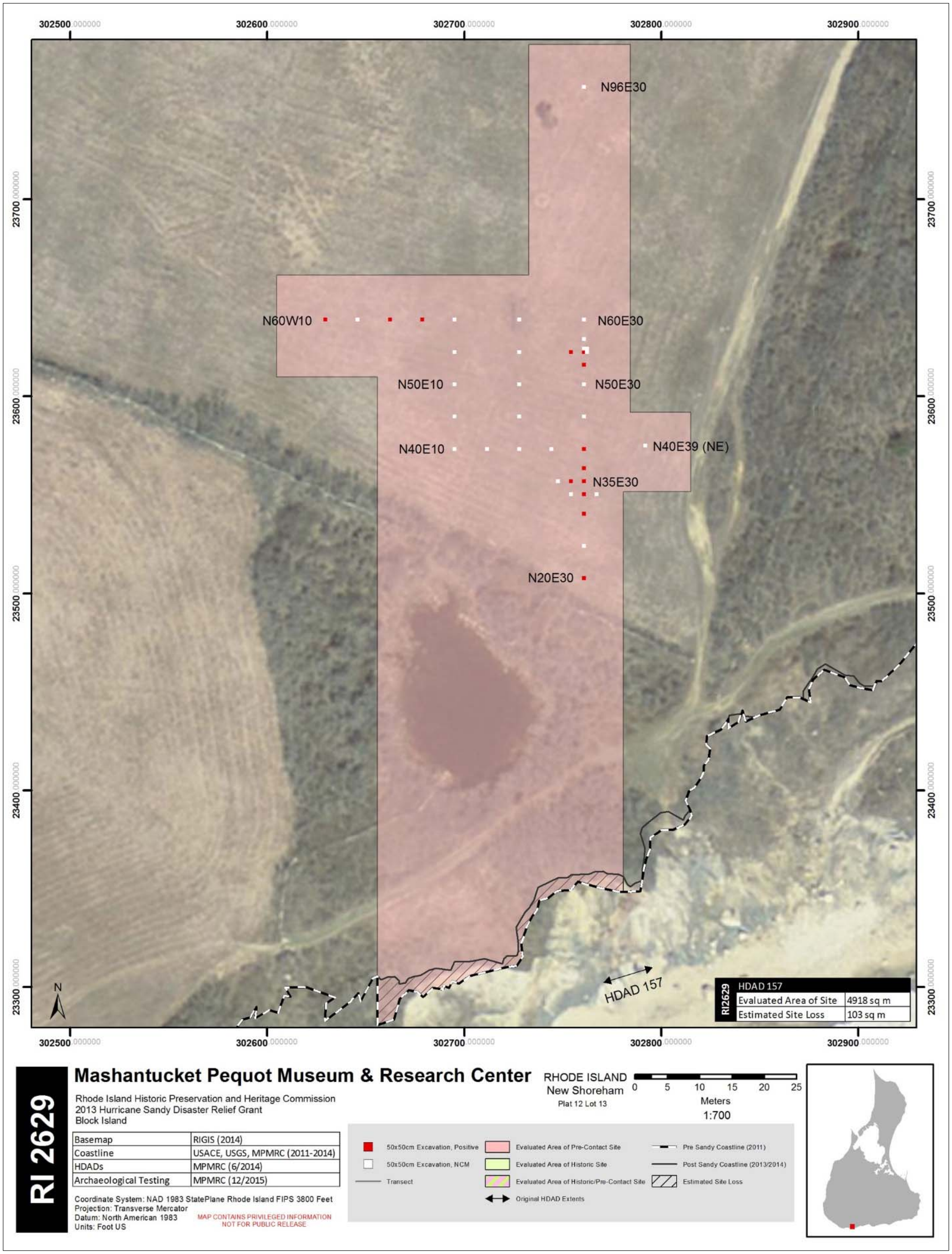

Figure 6-129. Phase II testing, RI 2629.

Figure 6-130. Lithic sample, RI 2629.

Figure 6-131. Rhyolite uniface, RI 2629.

Table 6-52. Lithic Material, RI 2629.

Material	Count	Percentage
Gabbro	2	8
Quartz	17	68
Quartzite	1	4
Rhyolite	4	16
Schist	1	4

Table 6-53. Lithic Type, RI 2629.

Type	Count	Percentage
Angular Debris	8	32
Primary Reduction Flake/Debris	5	20
Secondary Flake	4	16
Tertiary Flake	4	16
Crystal	1	4
Biface	1	4
Chopper	1	4
Uniface	1	4

Figure 6-132. View of site from below, facing northwest, RI 2629.

this site to yield significant information regarding the pre-contact use of the south coast of the island. The variety of lithic materials represented in the assemblage is similar to other coastal sites tentatively identified as small seasonal camps, including RI 2628.

Site Condition and Future Threats

Recent data suggest that the rate of shoreline loss from 1952 through 2013 was 0.35 m/yr (1.1 ft/yr). An estimated 21.32 m (69.9 ft) of shoreline has been lost from this site in the last 60 years (Figure 6-133). Inland sections of RI 2926 contain intact archaeological deposits that are likely to contribute significantly to the understanding of the pre-contact use and settlement of Block Island. It is MPMRC's opinion that RI 2629 may be eligible for listing in the National Register under Criterion D.

RI 2630 (formerly HDAD 5)

Site Setting and Description

RI 2630 is a pre-contact site located approximately 220 m south of site RI 2623 and is the fourth of four sites located between the existing shoreline and a large freshwater wetlands complex on the west coast of Block Island. The site is situated on the encroaching beach and appears to extend beneath the adjacent sand dunes to the east. USDA-NRCS classifies the soils in the western section as Beaches, cobbly surface. The eastern sections comprising the adjacent dunes are mantled in Hooksan sand with 3 to 8 percent slopes. The site extends for approximately 20 m along the beach and is just 60 m from a kettle hole. The tested area lies at an average elevation of 1.8 m (6 ft) amsl. The site extent was defined by the presence of exposed paleosol and associated lithic debitage (Figure 6-134).

Phase II Summary

The Phase II testing for site RI 2630 consisted of shovel scraping and troweling the exposed paleosol to the B horizon to identify any extant cultural features (Figure 6-135). Artifacts were collected while scraping the paleosol. Four features were exposed beneath the upper paleosol deposits. MPMRC drew and photographed each feature in plan, then bisected each to expose a profile. Soil samples were collected for flotation. Bisection revealed that two of the features were pre-contact post molds, one feature was of undetermined type or function, and one feature was of modern origins.

Artifacts recovered from RI 2630 include 196 lithics: 166 (85%) quartz; 20 (10%) argillite; 8 (4%) quartzite; and less than 1 percent gneiss and rhyolite (Table 6-54; Figure 6-136). Identified stone tools include 2 bifaces and 1 Levanna projectile point (Table 6-55; Figure 6-137). There are nine aboriginal ceramic sherds from the Early and Middle Woodland periods (Table 6-56) and one unidentified shell fragment. Botanical remains include 1 hickory nutshell fragment fragments, 1 spurge seed, and charred wood (Table 6-57).

Based on the limited testing completed during the Phase II survey, MPMRC believes RI 2630 was likely a spring fishing camp. The ceramic assemblage suggests the site was occupied several times between the Early and Middle Woodland periods. Similar to RI 2621, RI 2622, and RI 2623, also located along this section of the western shorelines, the repetitive pre-contact use of RI 2630 suggests that spring fishing camps were concentrated in coastal areas near freshwater wetlands.

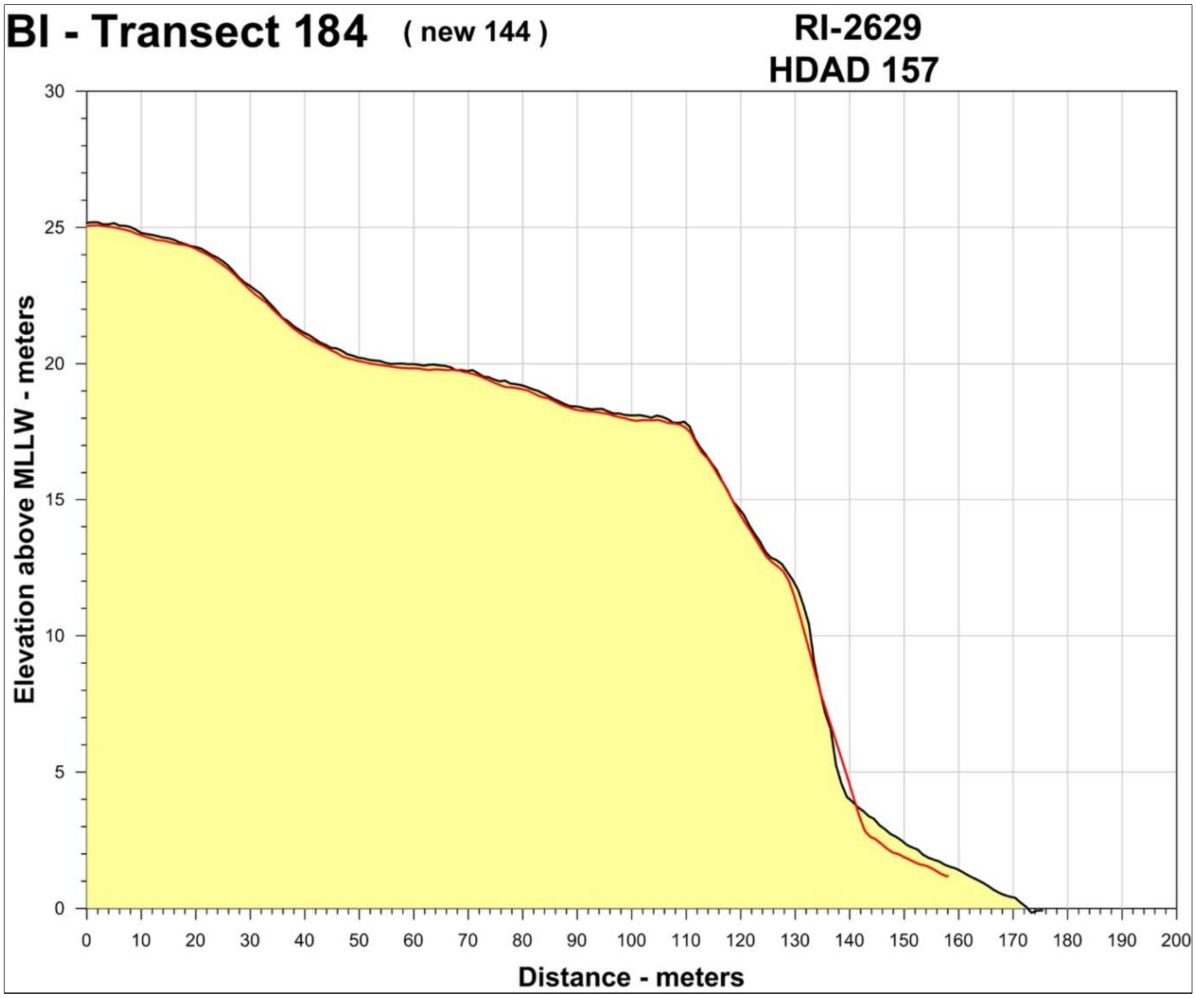

Figure 6-133. Bluff Erosion Profile, RI 2629.

Figure 6-134. View of site facing north, RI 2630.

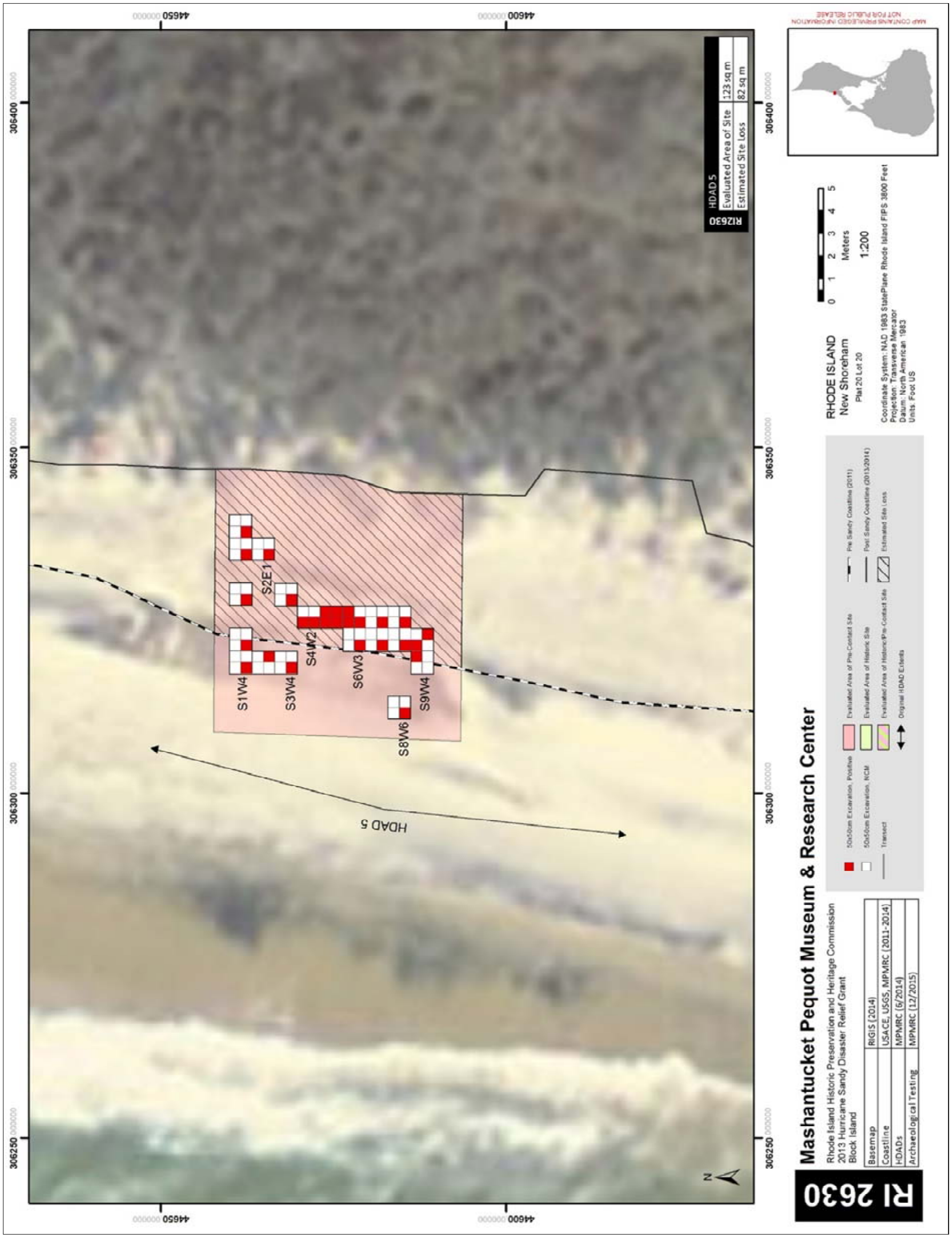

Figure 6-135. Phase II testing, RI 2630.

Table 6-54. Lithic Material, RI 2630.

Material	Count	Percentage
Argillite	20	10.20
Gneiss	1	0.51
Quartz	166	84.69
Quartzite	8	4.08
Rhyolite	1	0.51

Figure 6-136. Lithic sample, RI 2630.

Table 6-55. Lithic Type, RI 2630.

Type	Count	Percentage
Angular Debris	33	16.84
Biface	2	1.02
Crystal	1	0.51
Primary Reduction Flake/Debris	21	10.71
Projectile Point	1	0.51
Secondary Flake	120	61.22
Split Cobble	1	0.51
Tertiary Flake	17	8.67

Figure 6-137. Quartz projectile point, RI 2630.

Table 6-56. Aboriginal Ceramics, RI 2630.

Count	Temper	Description	Thickness (mm)	Time Period
7	Medium grit	Unknown	n/a	Unknown
1	Medium grit	Interior/exterior: smooth	n/a	Middle Woodland
1	Coarse grit	Interior/exterior: cord-marked	11.5	Early Woodland

Table 6-57. Features Containing Identified Material, RI 2630.

Feature #	1	2	4	N/A
Feature Type	Large Post	Large Post	Large Post	Non-Feature
Botanicals				
Hickory Nutshell		1		
Spurge Seed		1		
Wood	115	75	27	458
Fish				
Shellfish				
Unidentified		1		
Faunal				
Aboriginal Ceramic				
Early Woodland		1		
Middle Woodland				1
Unidentified		6		
Lithic				
Levanna Quartz Tip				1

Site Condition and Future Threats

Continued tidal and storm erosion pose a serious threat to the integrity of RI 2630. MPMRC field visits to the site months after the completion of Phase II fieldwork suggest that erosion of RI 2630's seaward margins is ongoing. Recent data suggest that shoreline loss from 1952 through 2013 was 0.69 m/yr (2.3 ft/yr (Figure 6-138). An estimated 42.2 m (138.4 ft) of shoreline has been lost in the last 60 years.

MPMRC believes RI 2630 has the potential to yield significant information regarding pre-contact land use on Block Island, particularly the seasonal use of the seaward shorelines for fishing. Although erosion continues to threaten this site, it is MPMRC's opinion that it is eligible for listing in the National Register under Criterion D.

RI 2632 (formerly HDAD 65)

Site Setting and Description

RI 2632 lies on the southwest coast of Block Island along the heavily eroded bluff. The property, belonging to the Audubon Society, is characterized by mown field and pastures that are divided by stone fences. USDA-NRCS classifies the soils on the bluff top as Gloucester-Bridgehampton complex, hilly. The steep, eroding bluffs are classified as Udorthents, very steep soils (Figure 6-139). The tested area lies at an average elevation of 18.3 m (60.1 ft) amsl, approximately 10 m east of the bluff edge.

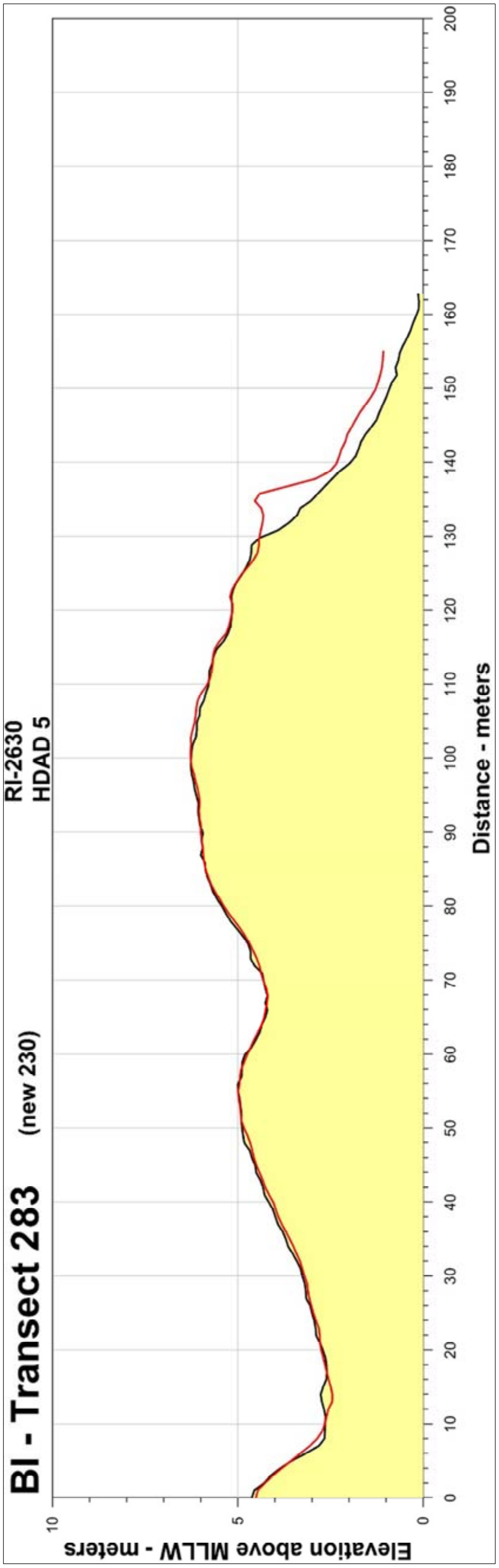

Figure 6-138. Bluff Erosion Profile, RI 2630.

Figure 6-139. View of site from below, facing southeast, RI 2632.

Phase II Summary

The Phase II testing consisted of two transects oriented parallel to the bluff edge. MPMRC excavated test pits at 5-m intervals along Transect 9 to the south and at 10-m intervals on Transect 10 to the north (Figure 6-140). A total of nineteen 50-x-50-cm STPs were excavated, 17 (89%) of which contained no cultural material. All artifacts were recovered from the plow zone, which extended to 25–40 cmbs. The two positive test pits collectively yielded 1 rhyolite flake (Figure 6-141) and 4 pearlware sherds. No features were identified during Phase II testing.

Site Condition and Future Threats

Erosion of the bluff continues to threaten the integrity of any remaining archaeological deposits along the edge. Recent data suggest that shoreline loss from 1952 through 2013 was 0.15 m/yr (0.5 ft/yr). An estimated 9.39 m (30.8 ft) of shoreline has been lost from this site in the last 60 years (Figure 6-142).

Although the Phase II testing yielded a low density of artifacts, testing confirmed the presence of intact archaeological deposits with the potential to contribute information to the understanding of post-contact and pre-contact land use. The location of the site within the Audubon Society preserve will protect the site from threats from modern development. This site may be eligible for listing in the National Register.

Figure 6-140. Phase II testing, RI 2632.

Figure 6-141. Rhyolite flake, RI 2632.

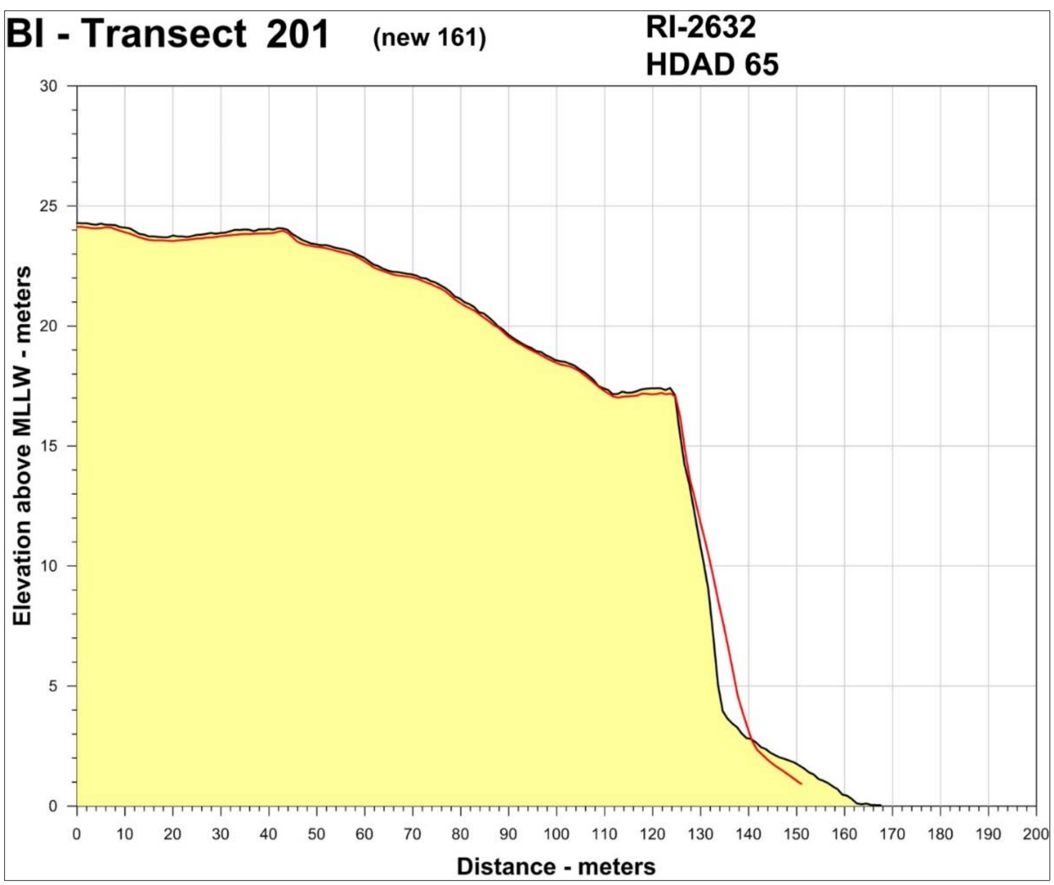

Figure 6-142. Bluff Erosion Profile, RI 2632.

RI 2633 (formerly HDAD 71)

Site Setting and Description

RI 2633 is located on the south shore of Block Island between Black Rock Point and Tom's Point. A single quartz primary reduction flake was identified in the initial Phase I walkover survey and was likely associated with archaeological deposits within the severely eroded cliff face above (Figure 6-143). RI 2633 lies just 35 m east of HDAD 156 and 180 m west of HDAD 70. The tested area lies at an average elevation of 22.6 m (74 ft) amsl. The soils are described as Gloucester-Bridgehampton complex, hilly with 3 to 8 percent slope (Figure 6-144).

Phase II Summary

The Phase II testing consisted of a total of thirty-five 50-x-50-cm STPs excavated at 5-m intervals and extending landward of the eroding bluff edge. Fifteen test pits (46%) yielded cultural material (Figure 6-145). Post-contact artifacts included 1 nail, 1 brick fragment, 1 creamware, and 2 red earthenware sherds. The 24 pre-contact lithic artifacts included 1 quartz biface, 1 core of an unidentified lithic material, quartz and quartzite debitage, and 3 flakes of an unidentified lithic material (Tables 6-58 and 6-59; Figure 6-146). A single unidentified shell fragment was the only non-lithic pre-contact find recovered from the site.

The low density of artifacts and the lack of diagnostics make it difficult to interpret the nature of the pre- and post-contact uses of RI 2633. The presence of a single creamware sherd, along with the two red earthenware sherds and the nail and brick artifacts, suggests a possible late eighteenth- or early nineteenth-century domestic occupation. No cultural features were identified in the Phase II STPs and no aboveground structural remains were evident. Similarly, there were no diagnostic artifacts to indicate the period of use for the pre-contact occupation(s). The core and debitage indicate that stone tools were made or modified at the site.

Site Condition and Future Threats

Erosion of the bluff continues to threaten the integrity of any remaining archaeological deposits along the edge. Recent data suggest that the rate of shoreline loss from 1952 through 2013 was 0.06 m/yr (0.19 ft/yr). An estimated 3.6 m (11.8 ft) of shoreline has been lost from this site in the last 60 years (Figure 6-147).

Although the artifact density was low, the Phase II testing indicates a potential for intact archaeological remains at this site. Pre-contact use of the high bluffs overlooking the seaward coasts of Block Island remains poorly documented. Further investigations of sites such as RI 2633 may provide important data to counterbalance the prevailing interpretation of Native American subsistence patterns as solely focused on salt pond environments. It is MPMRC's opinion that RI 2633 may be eligible for listing in the National Register under Criterion D.

RI 2634 (formerly HDAD 83)

Site Setting and Description

RI 2634 lies on the southeast side of the island on Old Harbor Point. The artifacts collected during the Phase I survey were identified on the beach and among the abundant boulders found along the shoreline. USDA-NRCS classifies the site soils as Paxton fine sandy loam, 8 to 15 percent slopes, very stony. The tested area lies at an average elevation of 7.3 m (23.8 ft) amsl. There are a number of sites identified during the Phase I walkover along this section of the coast. The nearest, RI 2641, is located just 50 m to the east. HDAD 88 lies 170 m to the northwest.

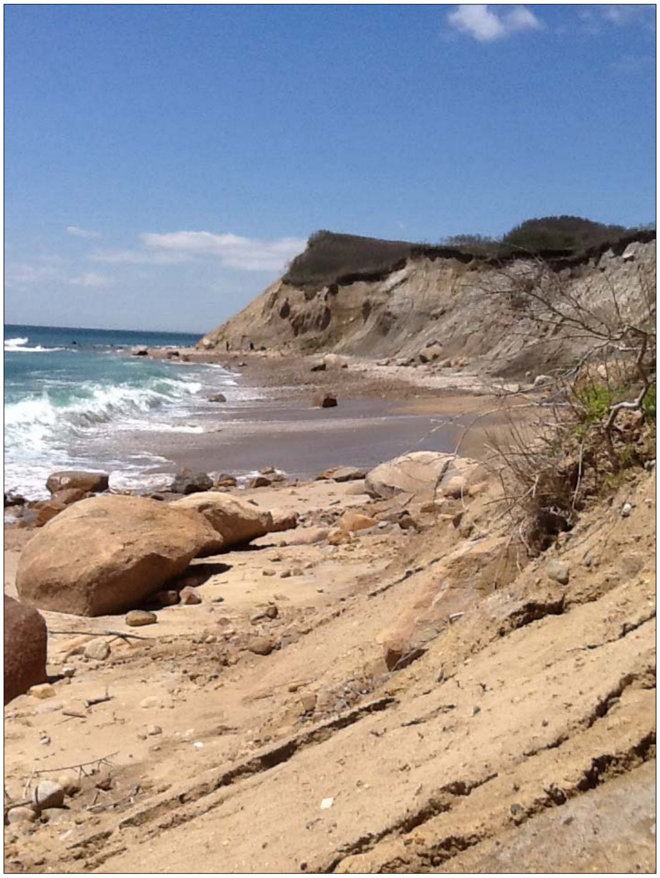

Figure 6-143. View of site facing west, RI 2633.

Figure 6-144. Tested area, RI 2633.

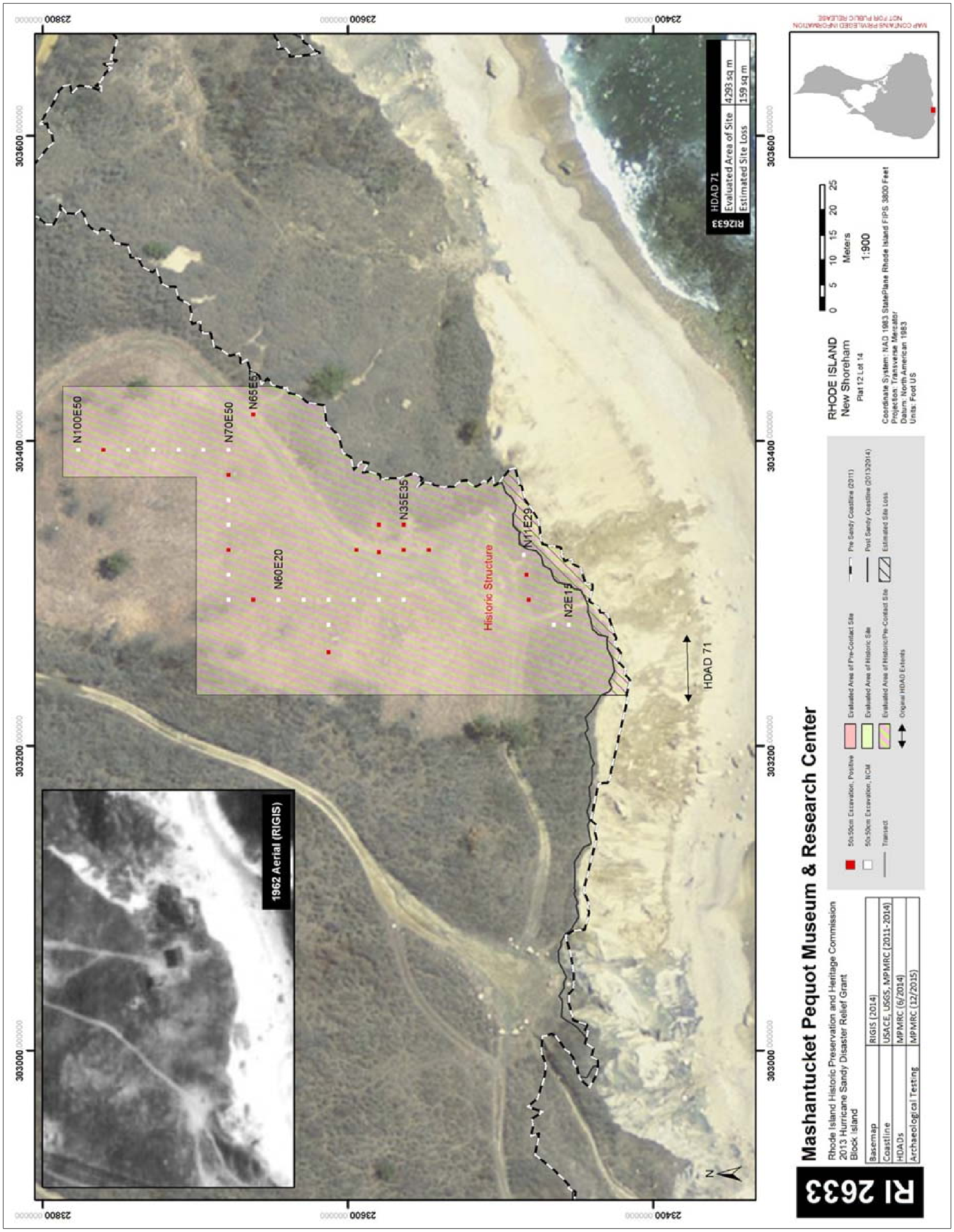

Figure 6-145. Phase II testing, RI 2633.

Table 6-58. Lithic Material, RI 2633.

Material	Count	Percentage
Quartz	17	70.83
Quartzite	4	16.67
Unidentified	3	12.50

Table 6-59. Lithic Type, RI 2633.

Type	Count	Percentage
Angular Debris	5	20.83
Secondary Flake	14	58.33
Core	1	4.17
Primary Reduction Flake/Debris	3	12.50
Biface	1	4.17

Figure 6-146. Lithic sample, RI 2633.

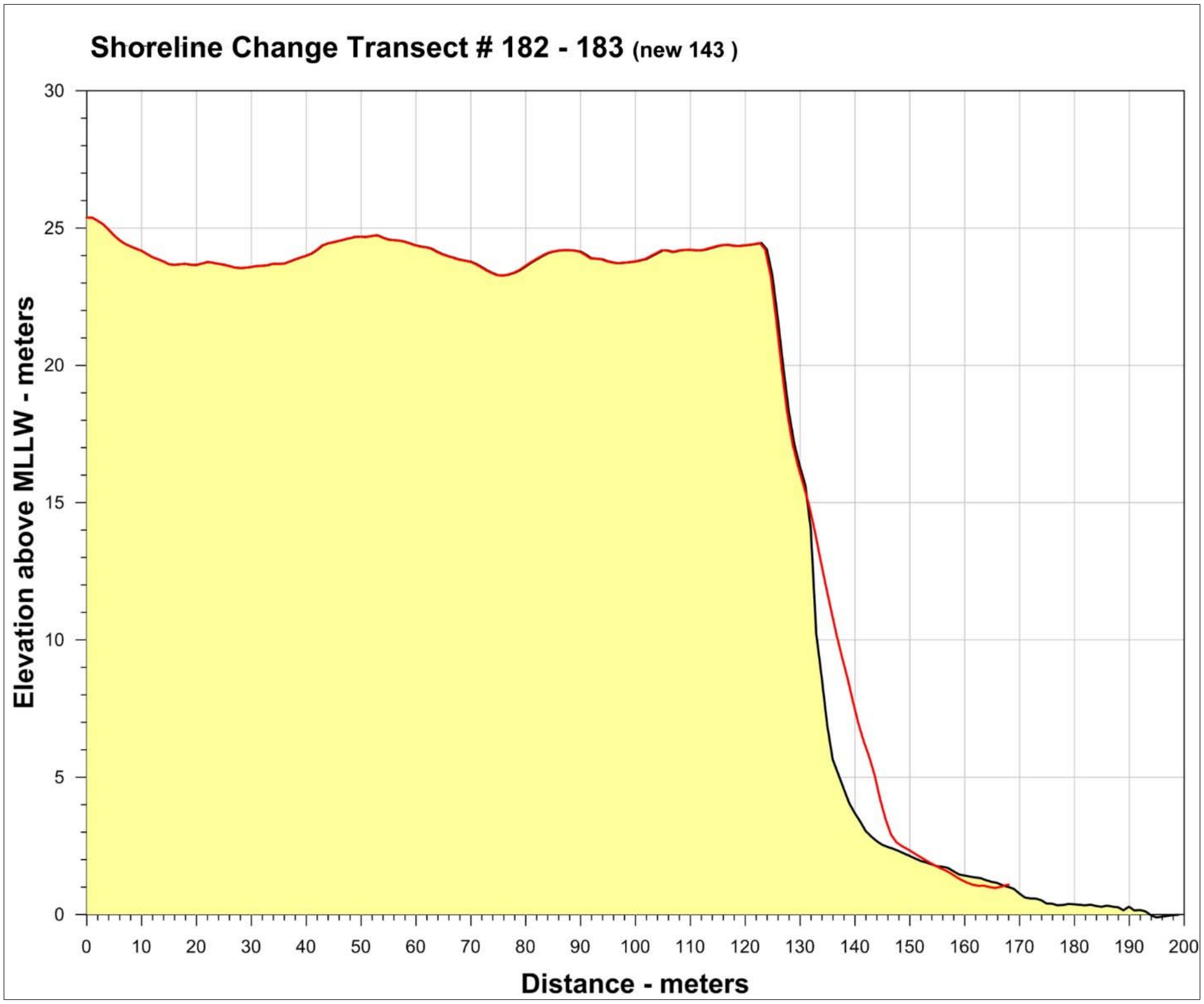

Figure 6-147. Bluff Erosion Profile, RI 2633.

Phase II Summary

The Phase II testing consisted of twenty-seven 50-x-50-cm STPs excavated at 5-m intervals along three transects. Transect 19 was placed near the eroding bluff margin in the northern section of the site (Figure 6-148). Transects 20 and 21 were oriented parallel to the bluff margins and inland of the existing coastal vegetation. Unlike the beach section below, the bluff top and landward sections of RI 2634 contained few surficial boulders (Figure 6-149). Seven of the test pits (26%) contained pre- or post-contact artifacts. Post-contact artifacts included ten glass fragments, one of which was identified as a medicine bottle fragment. Four iron wire fragments were also recovered. No diagnostic pre-contact artifacts were recovered; lithics included just four quartz debitage and one graphite fragment (Tables 6-60 and 6-61; Figure 6-150). Faunal remains were limited to four quahog fragments. No features were observed in the Phase II testing and few conclusions can be drawn from RI 2634's small artifact assemblage.

Site Condition and Future Threats

The site suffered moderate erosion from Hurricane Sandy and continues to be affected by tidal and erosional forces along the bluff face. However, recent data suggest a small seaward advancement of the shoreline from 1952 through Hurricane Sandy at the rate of 0.03 m/yr (0.1 ft/yr). The shoreline has aggraded seaward an estimated 1.8 m (5.8 ft) in the last 60 years (Figure 6-151). The presence of intact archaeological deposits suggests that this site could yield important information about Native American use of Block Island's southeastern coast, an area which has not been intensively studied. It is MPMRC's opinion that RI 2634 may be eligible for listing in the National Register.

RI 2635 (formerly HDAD 86)

Site Setting and Description

RI 2635 is located along the south shore of Block Island near the Southeast Lighthouse. Southeast Light was listed in the National Register in 1990 and designated a National Historic Landmark in 1997. The lighthouse was moved 300 ft landward from its original location near the margins of a high bluff in 1993. During the Phase I survey, MPMRC collected a single piece of quartz debitage from the base of the heavily eroded bluff (Figure 6-152). USDA-NRCS describes the collapsed bluff soils as Udorthents, very steep. USDA-NRCS classifies the soils at the top of the bluff as Bridgehampton silt loam, till substratum, 3 to 8 percent slopes. The tested area lies at an average elevation of 46 m (150 ft) amsl with a gentle, rolling topography (Figure 6-153). The site's western boundary was estimated at the edge of a collapsed kettle hole.

Phase II Summary

A total of nine STPs were excavated along the top of the bluff within 10 m of the edge of the bluff (Figures 6-154 and 6-155). The eastern edge of this site is capped by a thick overburden layer containing coal that reaches to a maximum of 78 cmbs. Eight of the nine Phase II test pits (89%) contained post-contact artifacts. The assemblage includes 11 container glass, 4 window glass, 1 glass button, 1 whiteware and 2 stoneware sherds, 8 iron nails, 5 unidentified iron fragments, 1 cuprous strip, 1 dime, and 1 penny. In addition, there were 17 brick fragments, 2 coal ash, 1 shell, and 1 unidentified post-contact artifact. The post-contact artifacts are likely associated with the late nineteenth- and twentieth-century activities near the former location of the Southeast Light. Pre-contact artifacts include just 3 quartz debitage, 1 argillite flake, and 2 slate fragments (Tables 6-62 and 6-63; Figure 6-156). No cultural features were identified during the Phase II survey.

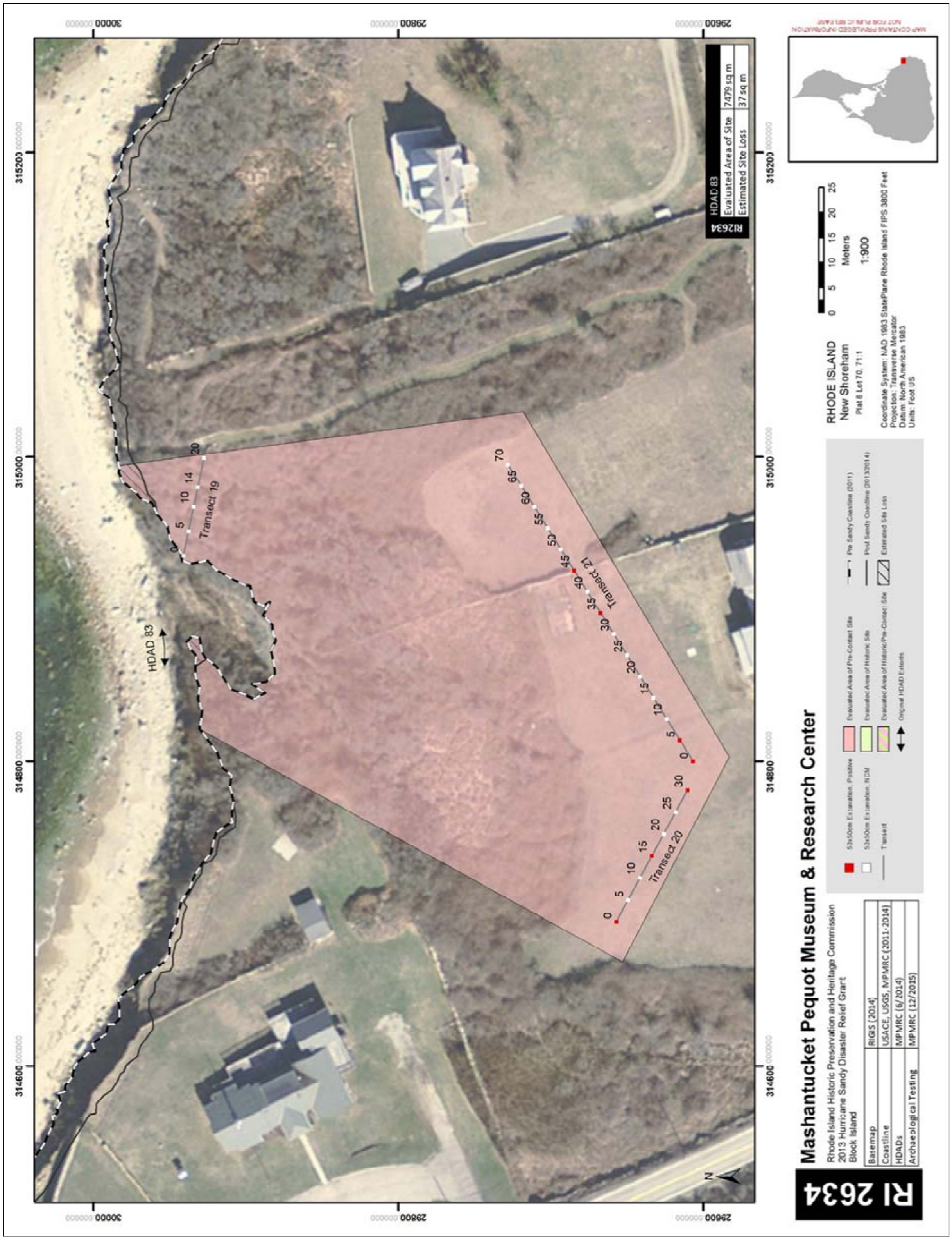

Figure 6-148. Phase II testing, RI 2634.

Figure 6-149. Testing area, RI 2634.

Table 6-60. Lithic Material, RI 2634.

Material	Count	Percentage
Graphite	1	20
Quartz	4	80

Table 6-61. Lithic Type, RI 2634.

Type	Count	Percentage
Secondary Flake	2	40
Angular Debris	1	20
Primary Reduction Flake/Debris	1	20
Untyped	1	20

Figure 6-150. Recovered lithics, RI 2634.

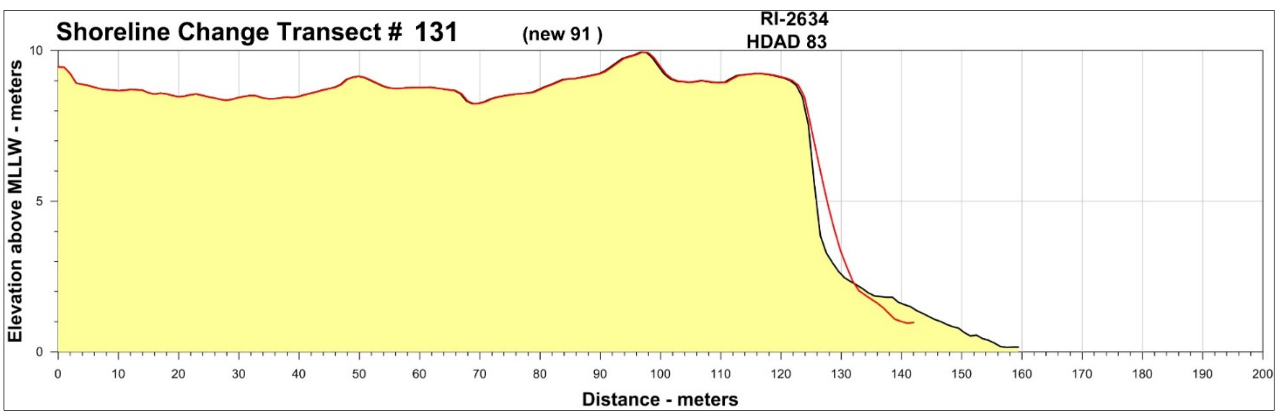

Figure 6-151. Bluff Erosion Profile, RI 2634.

Figure 6-152. View of site from below, facing north, RI 2635.

Figure 6-153. View of site facing north, RI 2635.

Figure 6-154. View of site facing east, RI 2635.

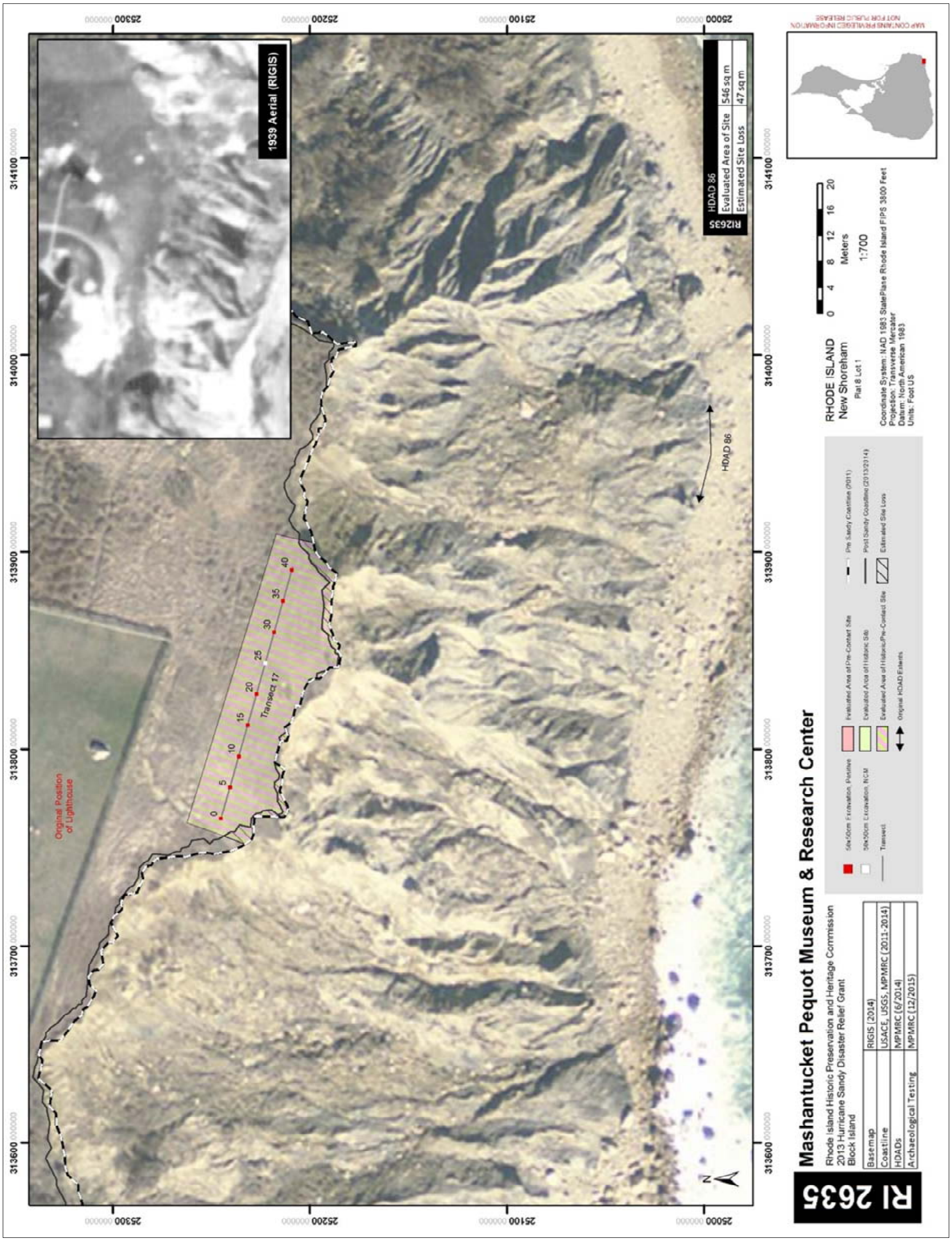

Figure 6-155. Phase II testing, RI 2635.

Table 6-62. Lithic Material, RI 2635.

Material	Count	Percentage
Argillite	1	16.7
Slate	2	33.3
Quartz	3	50.0

Table 6-63. Lithic Type, RI 2635.

Type	Count	Percentage
Angular Debris	2	33
Secondary Flake	2	33
Unknown	2	33

Figure 6-156. Recovered lithics, RI 2635.

Site Condition and Future Threats

RI 2635 has experienced significant ground disturbance, including the 1993 relocation of the lighthouse. The small lithic assemblage offers few clues from which to draw any conclusions. Although the collapsed bluff edge may obscure other finds, the results of the Phase II survey suggest that the integrity of RI 2635, at least within the testing corridor, has been substantially compromised.

Recent data suggest that the rate of shoreline loss from 1952 through 2013 was 0.36 m/yr (1.2 ft/yr). An estimated 22.16 m (72.7 ft) of shoreline has been lost from this site in the last 60 years. Although the LiDAR profiles suggest limited erosion of the bluff top occurred during Hurricane Sandy (Figure 6-157), MPMRC's observations indicate several areas of soil collapse have affected the archaeological deposits (Figure 6-154).

RI 2635 lacks integrity and is unlikely to yield substantive new information on either the pre-contact or post-contact periods. It is MPMRC's opinion that the site is ineligible for listing in the National Register.

RI 2636 (formerly HDAD 95)

Site Setting and Description

RI 2636 is located on the southwest coast of Block Island along the heavily eroded bluff (Figure 6-158). The property, belonging to the Audubon Society, is characterized by mown field and pastures, divided by stone fences. USDA-NRCS describe the soils on the bluff top as Gloucester-Bridgehampton complex, hilly. The eroding and collapsed soils below the bluff margins are mapped as Udorthents. The tested area lies at an average elevation of 20.1 m (66.1 ft) amsl. The tested area is approximately 10 m northeast of the bluff edge on undulating, low-relief terrain (Figures 6-159 and 6-160). There are several sites identified along this stretch of the coast. RI 2638 lies approximately 120 m to the southeast and site RI 2654 lies 160 m to the northwest.

Phase II Summary

Seventeen 50-x-50-cm STPs were excavated at 5-m intervals on a single transect during the Phase II survey. Only one test pit yielded any cultural material (Figure 6-159). The single artifact recovered during the Phase II survey was a quartz large angular debris or core fragment. The only other artifact from this site is a quartz primary reduction flake from the Phase I walkover survey (Figure 6-161). No features were found during the Phase II shovel testing. The low density of artifacts recovered during the Phase II testing and the lack of cultural features make it difficult to come to any conclusions about the nature of the pre-contact use of this site. It is likely that portions of RI 2636 have been lost to ongoing erosion of the bluff.

Site Condition and Future Threats

Continued erosion along the bluff remains a threat to this and other sites along the southwest coast of the island. Recent data suggest that the rate of shoreline loss from 1952 through 2013 was 0.13 m/yr (0.4 ft/yr) (Figure 6-162). An estimated 7.74 m (25.4 ft) of shoreline has been lost from this site in the last 60 years.

It is MPMRC's opinion that RI 2636 has a very limited potential to yield new information about pre-contact Native American use of Block Island's seaward shorelines and is ineligible for listing in the National Register.

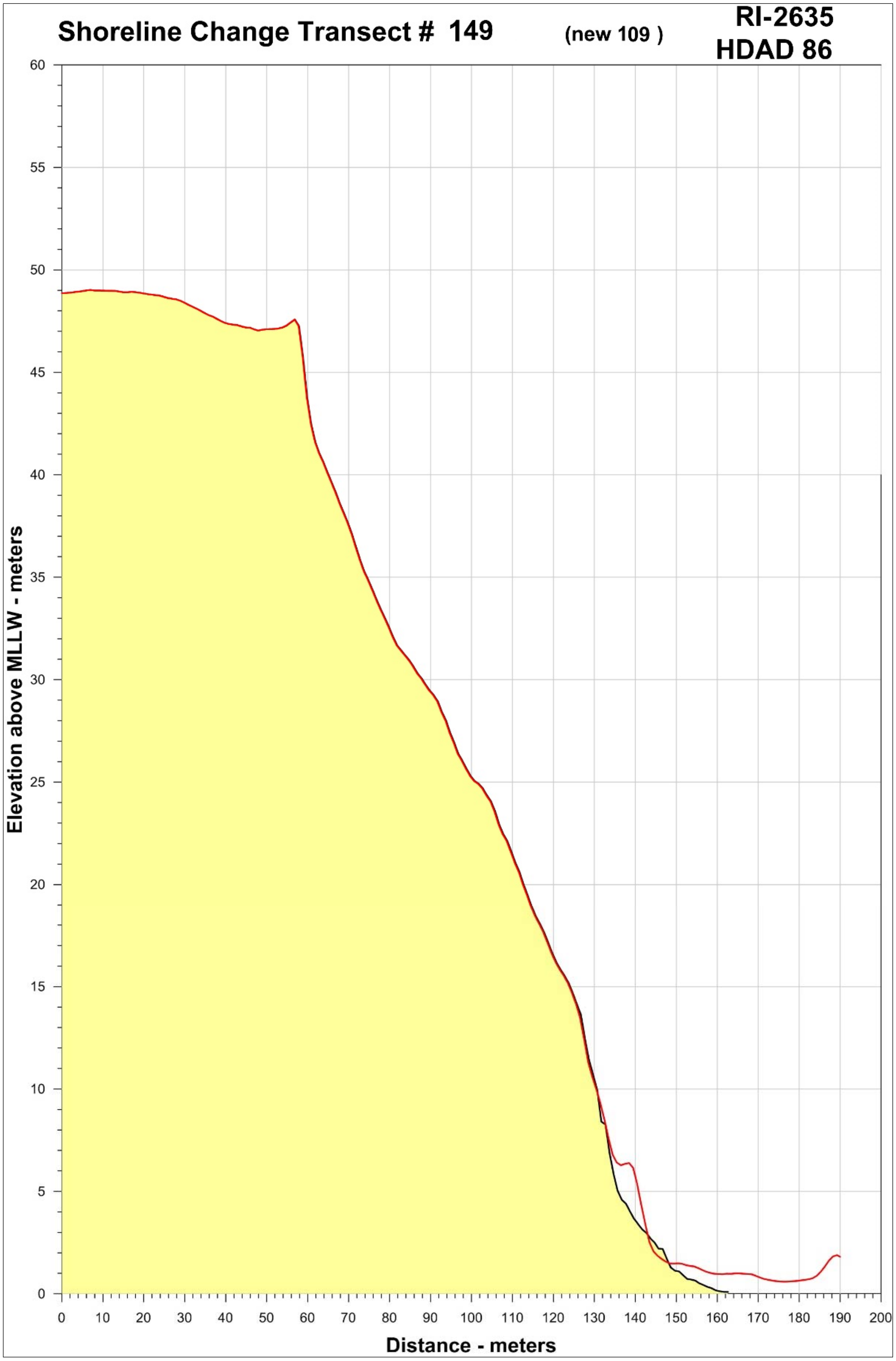

Figure 6-157. Bluff Erosion Profile, RI 2635.

Figure 6-158. View of site from below facing northeast, RI 2336.

Figure 6-159. Testing area, RI 2336.

Figure 6-160. Phase II testing, RI 2336.

Figure 6-161. Lithic sample, RI 2336.

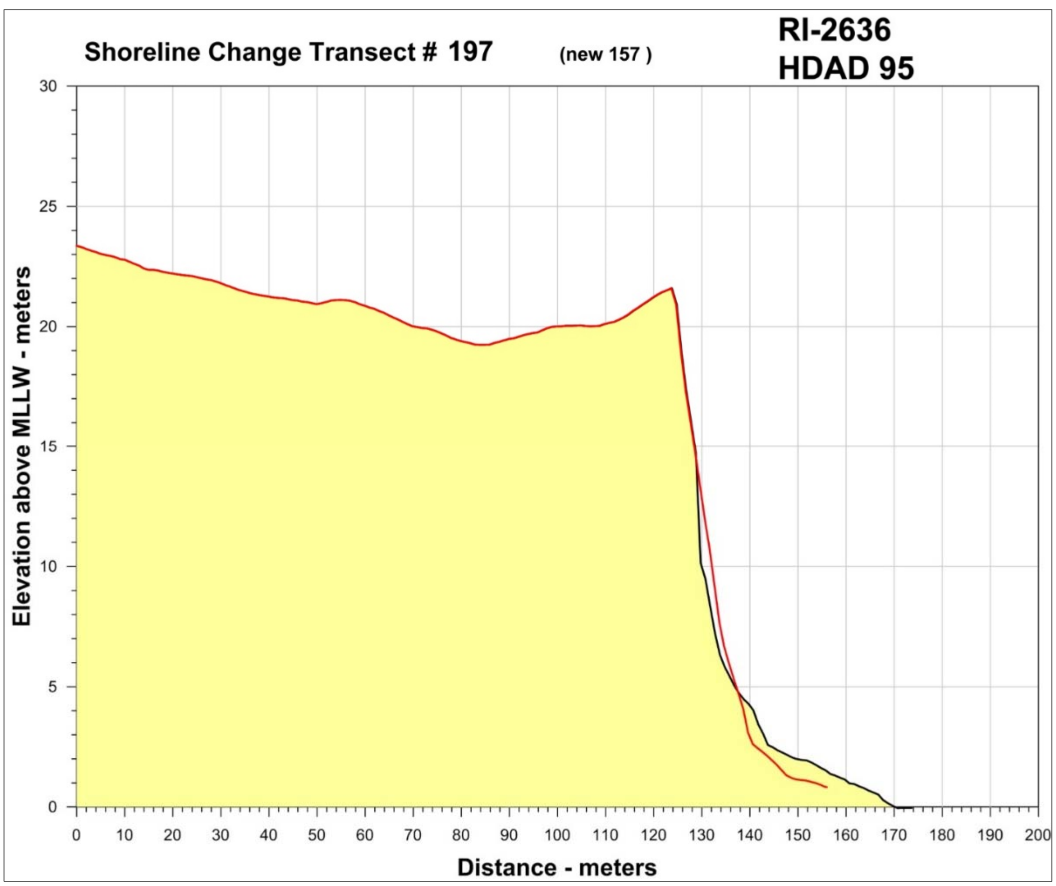

Figure 6-162. Bluff Erosion Profile, RI 2336.

RI 2637 (formerly HDAD 93)

Site Setting and Description

RI 2637 is located on the southwest coast of Block Island along a heavily eroded bluff. The property belongs to the Audubon Society and is characterized by mown fields and pastures divided by stone fences. USDA-NRCS describes the soils on the bluff top as Gloucester-Bridgehampton complex, hilly. The eroded and collapsed sediments sloping down to the shore are classified as Udorthents, very steep soils. The tested area lies at an average elevation of 26.8 m (87.8 ft) amsl on undulating, low relief terrain (Figure 6-163). There are a number of sites identified along this stretch of the coast; RI 2649 lies approximately 130 m to the southeast and RI 2639 is 50 m to the northwest.

Phase II Summary

The Phase II testing consisted of one transect oriented parallel to the shoreline and approximately 10 m northeast of the bluff edge. MPMRC excavated eleven 50-x-50-cm STPs at 5-m intervals (Figure 6-164). Three of the 11 (27%) test pits contained pre-contact artifacts. The assemblage includes 2 rhyolite chipping debris, 1 rhyolite biface, 1 argillite biface, 1 rhyolite flake, and 1 quartz split cobble (Tables 6-64 and 6-65; Figure 6-165). No features were identified during the Phase II survey.

While the Phase II survey indicates RI 2637 has a very low artifact density, two of the six artifacts are bifaces. The scope of erosion on the site's southern margins suggests that much of the site may already have been lost. If so, the remaining sections of RI 2637 may be near the landward boundary of the site, where different types of activities may have been undertaken when the site was occupied. The low artifact density may also indicate a single period of use or several very brief stays during the Pre-Contact Period.

Site Condition and Future Threats

It is likely that much of RI 2637 has already been lost to erosion. The bluff edge was heavily eroded at the time of the Phase I and II surveys and the archaeological deposits found near the edge are threatened by continued erosion and collapse. Recent data suggest only moderate rates of shoreline loss, i.e., 0.04 m/yr (0.01 ft/yr), from 1952 through 2013. An estimated 2.53 m (8.3 ft) of shoreline has been lost from this site in the last 60 years (Figure 6-166).

The presence of intact archaeological deposits and the relatively high proportion of tools recovered from the Phase II testing indicate that this site may yield new information on pre-contact land use patterns within the under-surveyed southern coastal context of Block Island. It is MPMRC's opinion that RI 2637 site may be eligible for listing in the National Register under Criterion D.

RI 2638 (formerly HDAD 96)

Site Setting and Description

RI 2638 is located on the southwest coast of Block Island along a heavily eroded bluff. The site is on Audubon Society property and is characterized by mown field and pastures divided by stone fences. USDA-NRCS describes the soils on the bluff top as Gloucester-Bridgehampton complex, hilly. The steep, eroding slope below the bluff coincides with a mapped unit of Udorthents, very steep soils (Figure 6-167). The tested area lies at an average elevation of 63 ft (19.2 m) amsl with similar undulating topography to other sections of the southeast coast. RI 2639 lies approximately 50 m to the southeast and RI 2636 is 120 m to the northwest.

Figure 6-163. View of site facing south, RI 2637.

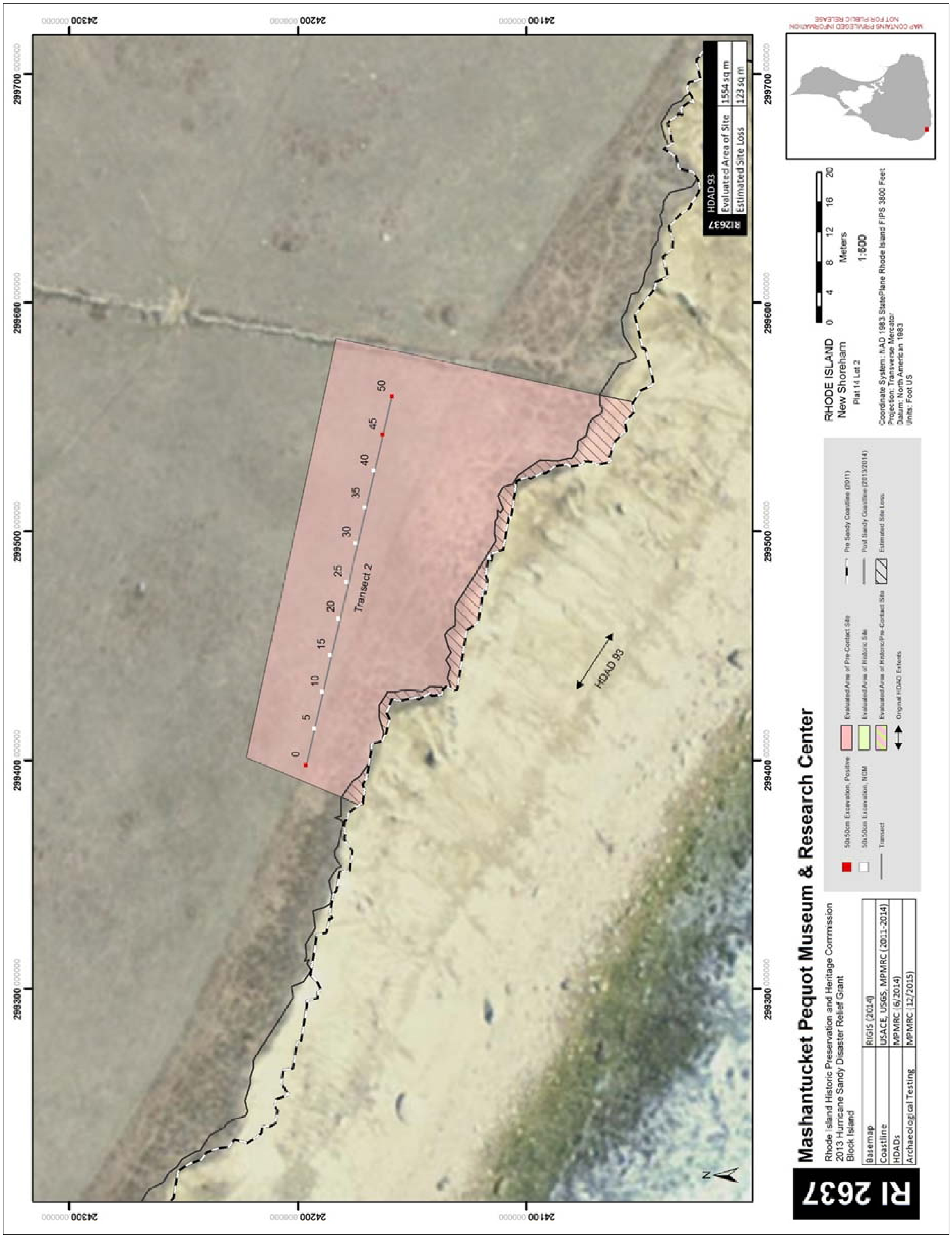

Figure 6-164. Phase II testing, RI 2637.

Table 6-64. Lithic Material, RI 2637.

Lithic Material	Count	Percentage
Argillite	1	25
Rhyolite	2	50
Quartz	1	25

Table 6-65. Lithic Type, RI 2637.

Type	Count	Percentage
Biface	2	50
Secondary Flake	1	25
Split Cobble	1	25

Figure 6-165. Recovered lithics, RI 2637.

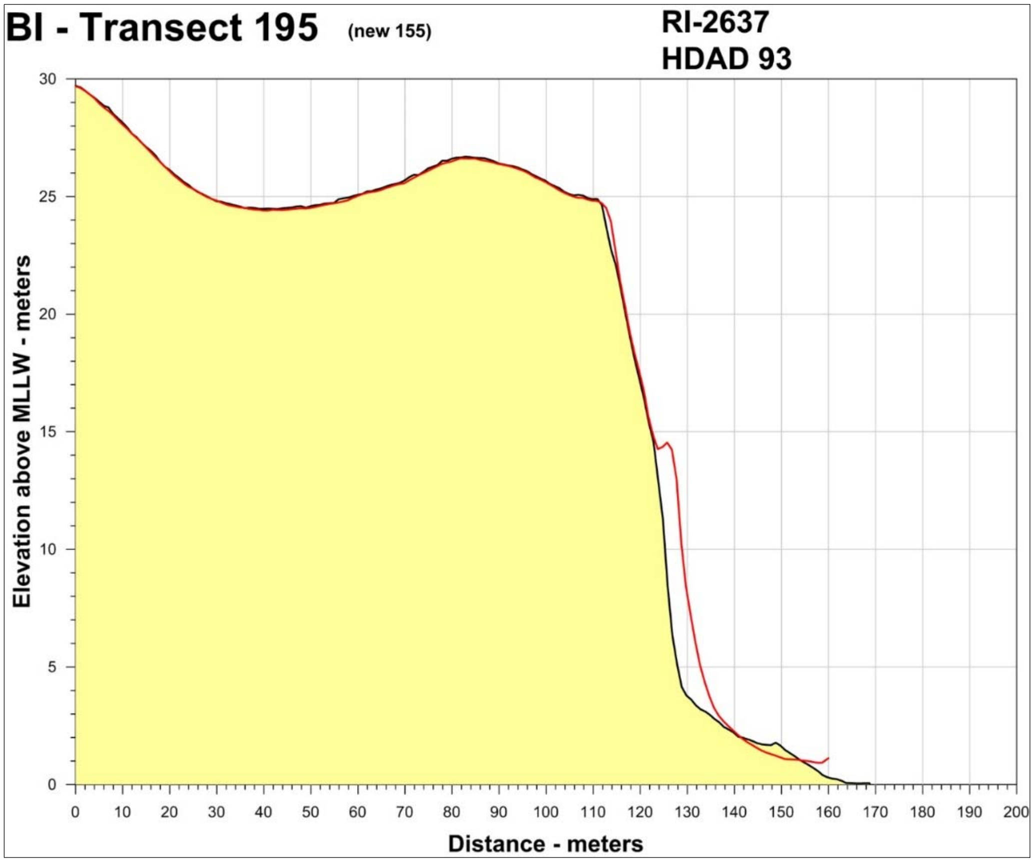

Figure 6-166. Bluff Erosion Profile, RI 2637.

Figure 6-167. View of site from below, facing east, RI 2638.

Phase II Summary

Phase II testing consisted of a single transect with eleven 50-x-50-cm STPs excavated at 5-m intervals supplemented with additional test pits in the northwestern sections (Figure 6-168). A total of 56 STPs were excavated, 33 of which (56%) contained no cultural material.

A total of 54 lithics were recovered during Phase II testing: 57 percent of these were rhyolite, 31 percent quartz, 6 percent quartzite, 4 percent granite, and 2 percent unidentified. Tools include one quartz core, one rhyolite core, one quartzite uniface, and two granite hammerstones (Tables 6-66 and 6-67; Figure 6-169). The only post-contact artifacts recovered were one green bottle glass, one red earthenware, and one untyped refined earthenware. No features were identified during the Phase II testing.

While no diagnostic artifacts were recovered, RI 2638 contains a higher density and diversity of artifacts than many of the other sites in this section of the island's shoreline. The tools suggest the site was used to obtain and process locally available resources. The presence of debitage and the hammerstones also suggests that tool manufacture and repair was a significant pre-contact activity at the site. RI 2638 may have been used as a temporary camp, similar to the other sites evaluated during the Hurricane Sandy surveys of the south coast.

Site Condition and Future Threats

It is likely that significant portions of this site have been lost to the collapsing bluff edge. Active erosion continues to threaten the site. Recent data suggest that the rate of shoreline loss from 1952 through 2013 was 0.12 m/yr (0.4 ft) (Figure 6-170). An estimated 7.0 m (23.2 ft) of shoreline has been lost from this site in the last 60 years.

Despite the losses to the seaward sections of RI 2638, the Phase II testing indicated that intact archaeological deposits remain. The site has the potential to yield important information regarding the pre-contact use of Block Island's south coast. The diverse lithic assemblage recovered from Phase II excavations suggests that the pre-contact use of the site may have included a wider range of activities than evidenced at nearby sites such as RI 2637, RI 2635, and RI 2634. It is MPMRC's opinion that RI 2638 may be eligible for listing in the National Register under Criterion D.

RI 2639 (formerly HDAD 97)

Site Setting and Description

RI 2639 also lies on the southwest coast of Block Island along the heavily eroded bluff, on property belonging to the Audubon Society that is characterized by mown field and pastures divided by stone fences. USDA-NRCS classifies the soils on the bluff top as Gloucester-Bridgehampton complex, hilly, bordered by Udorthents, very steep soils along the eroding bluffs (Figure 6-171). The tested area lies at an average elevation of 21.9 m (72 ft) amsl and is approximately 10 m northeast of the bluff edge (Figure 6-172). RI 2638 lies approximately 50 m to the northwest, and RI 2637 lies 60 m to the southeast.

Phase II Summary

Thirteen 50-x-50-cm STPs were excavated at 5-m intervals during Phase II testing (Figure 6-173). No artifacts were recovered during the Phase II survey and no cultural features were identified. The only artifacts associated with this site are three quartz primary reduction flakes found at the base of the eroded slope during the Phase I walkover survey.

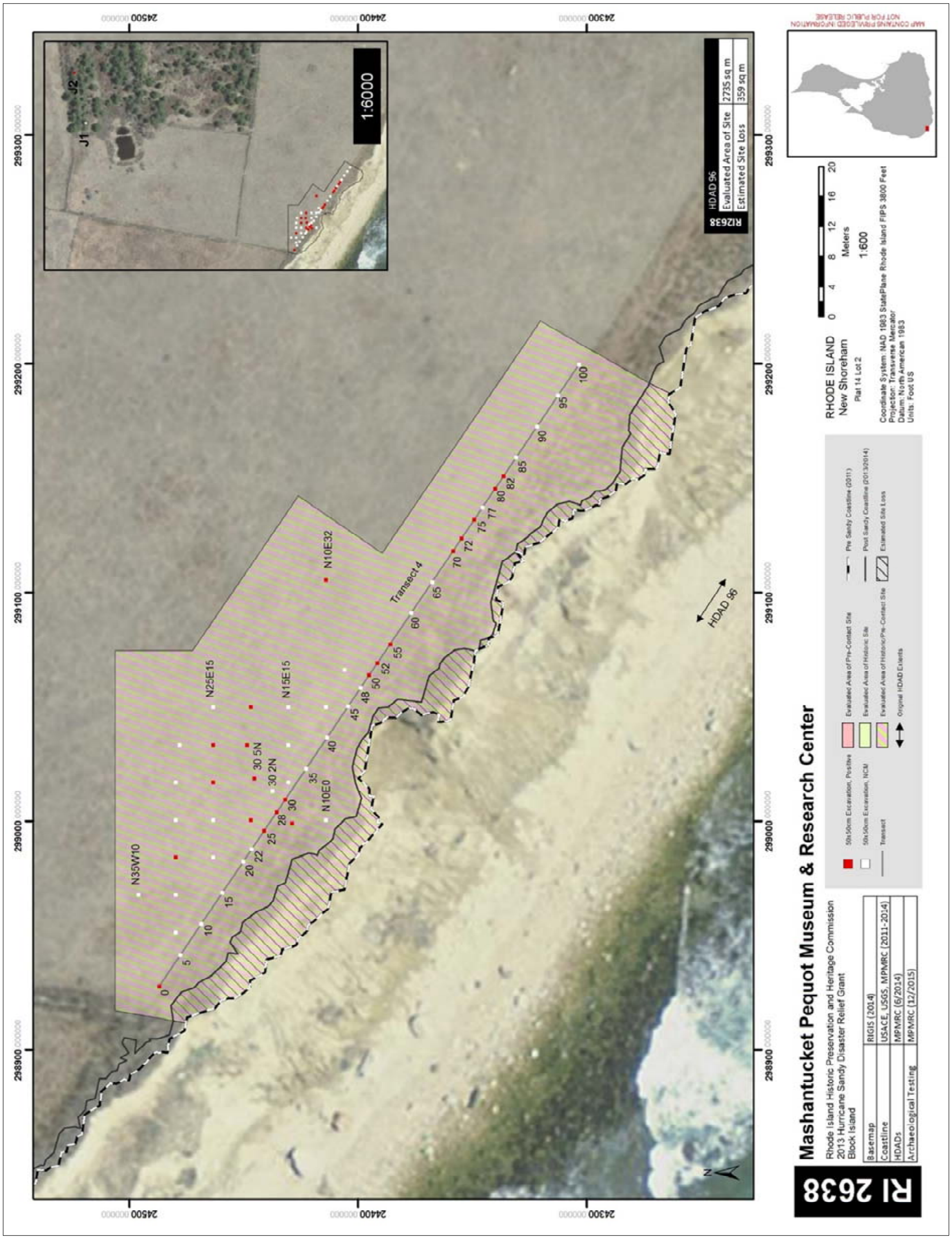

Figure 6-168. Phase II testing, RI 2638.

Table 6-66. Lithic Material, RI 2638.

Material	Count	Percentage
Granite	2	4
Quartz	17	31
Quartzite	3	6
Rhyolite	31	57
Unidentified	1	2

Table 6-67. Lithic Type, RI 2638.

Type	Count	Percentage
Angular Debris	9	17
Core	1	2
Hammerstone	2	4
Primary Reduction Flake/Debris	19	35
Secondary Flake	18	33
Split Cobble	4	7
Uniface	1	2

Figure 6-169. Lithic sample, RI 2638.

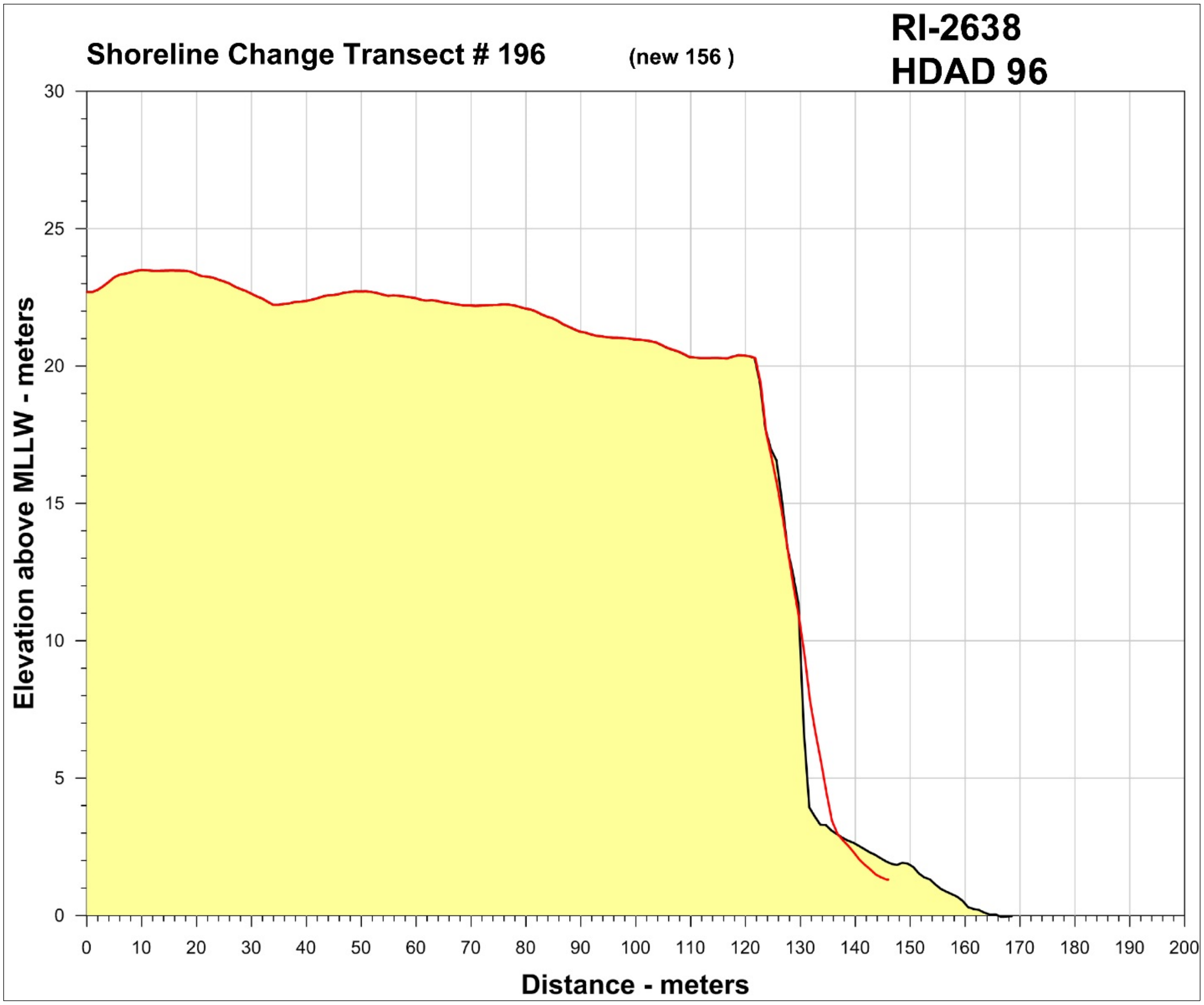

Figure 6-170. Bluff Erosion Profile, RI 2638.

Figure 6-171. View of site from below, facing west, RI 2639.

Figure 6-172. MPMRC crew testing Transect Three, RI 2639.

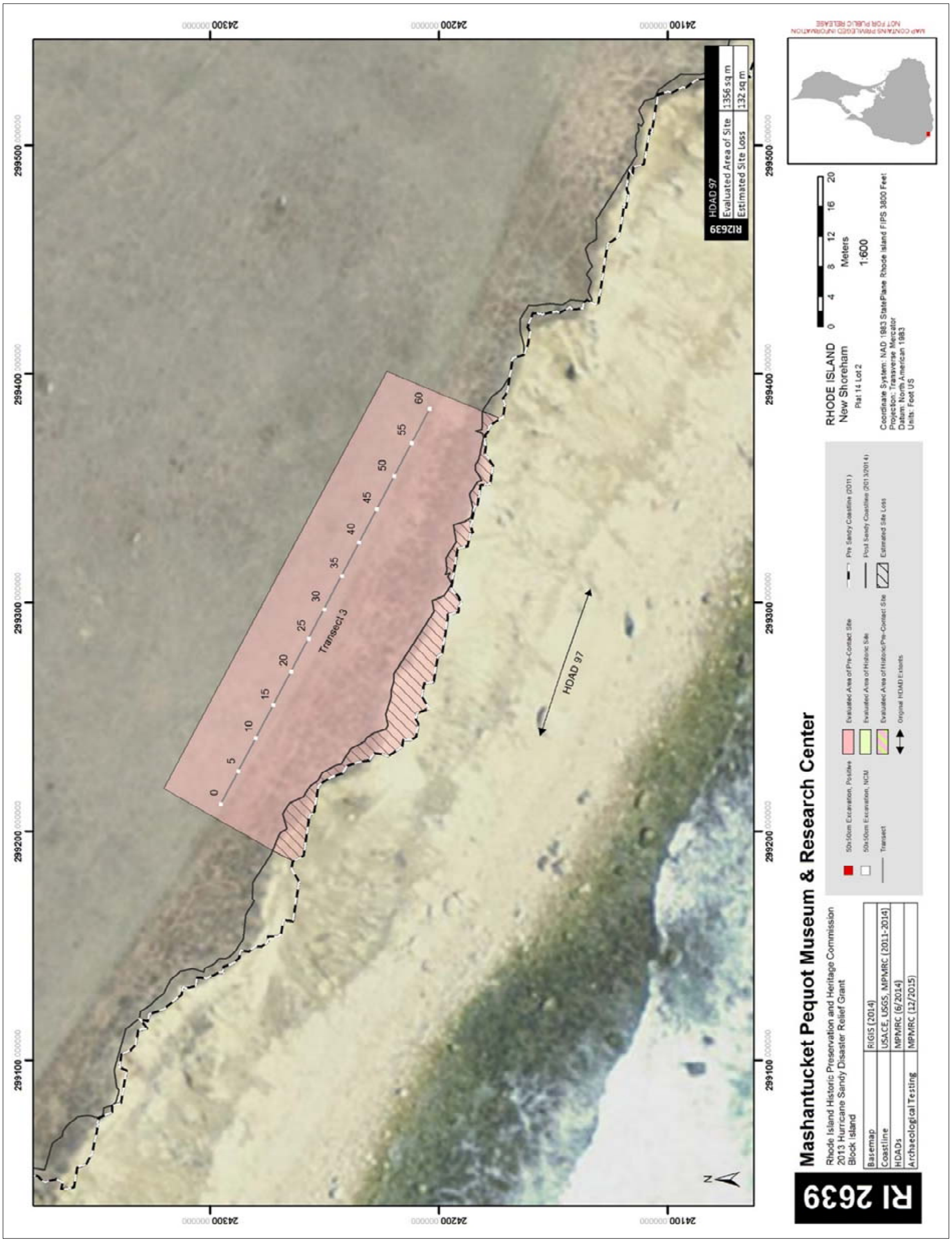

Figure 6-173. Phase II testing, RI 2639.

Site Condition and Future Threats

Active erosion was evident along the bluff face during the Hurricane Sandy surveys. Although recent data suggest that the rate of shoreline loss from 1952 through 2013 was only 0.04 m/yr (0.1 ft/yr), with 2.53 m (8.3 ft) of shoreline lost from this site in the last 60 years, the erosion along the bluff may have destroyed the site prior to the archaeological investigations (Figure 6-174). The low density of artifacts suggests it is unlikely that this site will yield significant new information on the Pre-Contact Period of Block Island. It is MPMRC's opinion that RI 2639 is not eligible for listing in the National Register.

RI 2640 (formerly HDAD 116)

Site Setting and Description

RI 2640 is located on the southeast coast of Block Island along the eroded Mohegan Bluffs (Figure 6-175). USDA-NRCS classifies the soils on the bluff top as Bridgehampton silt loam, till substratum, 3 to 8 percent slopes. The tested area lies at an average elevation of 47.7 m (156.5 ft) amsl. There is a kettle hole 80 m north of the site. RI 2635 lies approximately 170 m to the east.

Phase II Summary

The Phase II testing consisted of two transects with a total of twelve 50-x-50-cm STPs excavated at 5-m intervals. All test pits were located along the landward side of a wooden fence separating a mown field from irregular bluff top margins (Figures 6-176 and 6-177). Eleven of the twelve test pits (92%) contained artifacts in disturbed soils and/or fill deposits. Soil profiles indicate a layer of fill overlays the plow zone to a depth of 10–40 cmbs. The majority of the artifacts recovered were from the twentieth century. Post-contact artifacts included both domestic and architectural materials and a small number of faunal remains: 28 window and container glass, 9 shell, 6 bone, 14 pearlware sherds, 4 stoneware sherds, 1 whiteware sherd, and 26 unidentified refined earthenware sherds. In addition, there were 8 iron fragments, 1 hand-wrought nail, 4 machine-cut nails, 3 wire nails, 2 roofing nails, 11 unidentified nails, 1 iron wire fragment, 254 brick fragments, 4 mortar fragments, 10 sewer pipe fragments, 1 unidentified artifact, 2 asphalt shingle fragments, 9 shell fragments, 6 bone fragments (5 mammal and 1 unidentified), and 11 fragments of roofing slate.

MPMRC recovered a modest number of lithic artifacts during the Phase II survey, including 11 slate fragments that may be from post-contact roof shingles. The remaining lithics include 1 core and 1 possible lithic paint pot (Tables 6-68 and 6-69; Figure 6-178). No temporally diagnostic pre-contact artifacts were recovered from the site and the majority of the small assemblage was recovered from disturbed contexts. No features were identified during the Phase II survey.

Site Condition and Future Threats

The tested area is heavily disturbed by post-contact and modern activity. The research potential for this site is considered to be low. The bluff is heavily eroded, which may have impacted a significant portion of the site. Recent data suggest that the rate of shoreline loss from 1952 through 2013 was 0.07 m/yr (0.2 ft/yr) (Figure 6-179). An estimated 4.27 m (14 ft) of shoreline has been lost from this site in the last 60 years. It is MPMRC's opinion that RI 2640 is ineligible for listing in the National Register due to the poor integrity of the archaeological deposits.

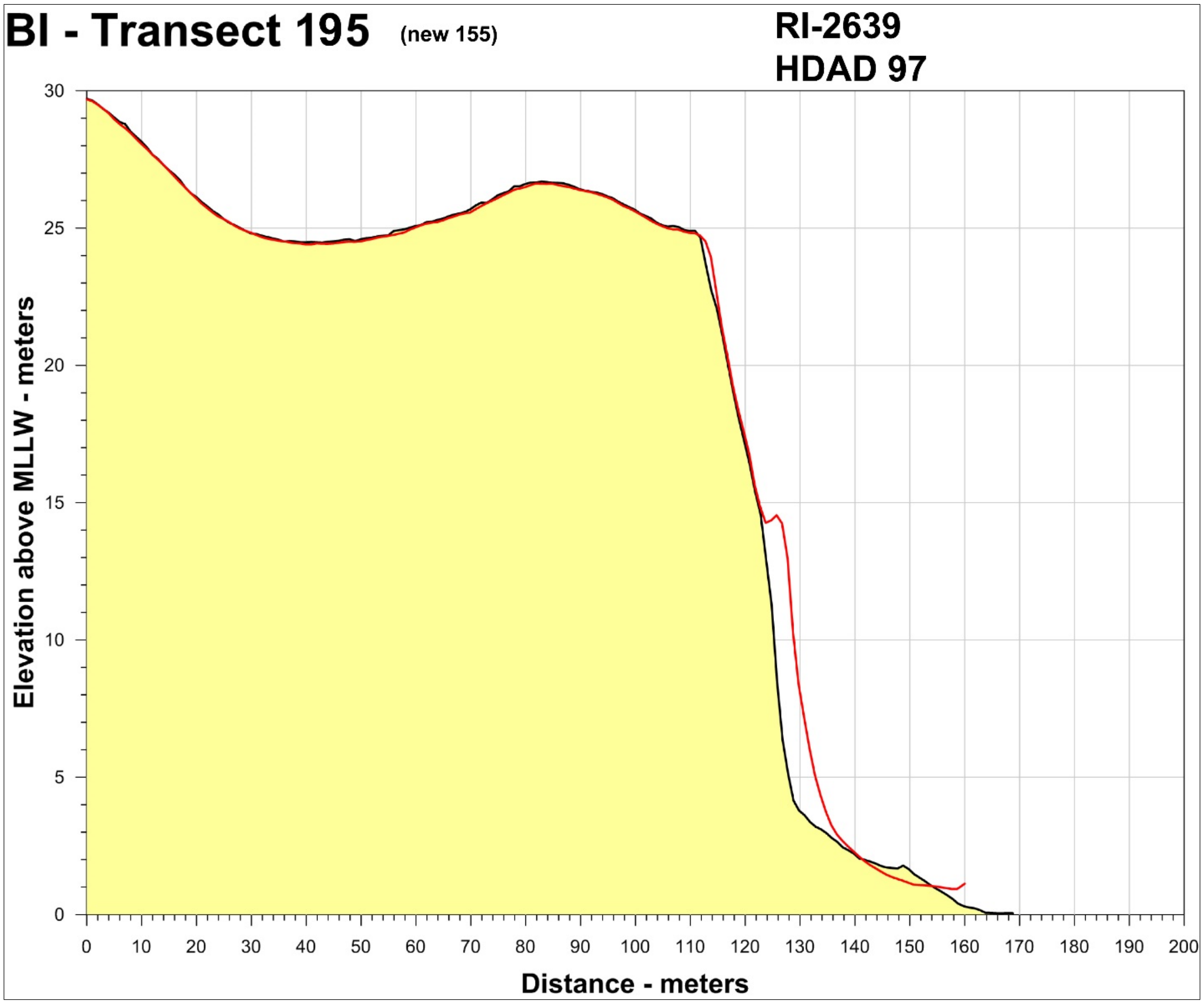

Figure 6-174. Bluff Erosion Profile, RI 2639.

Figure 6-175. View of site from below, facing northwest, RI 2640.

Figure 6-176. View of site facing south, RI 2640.

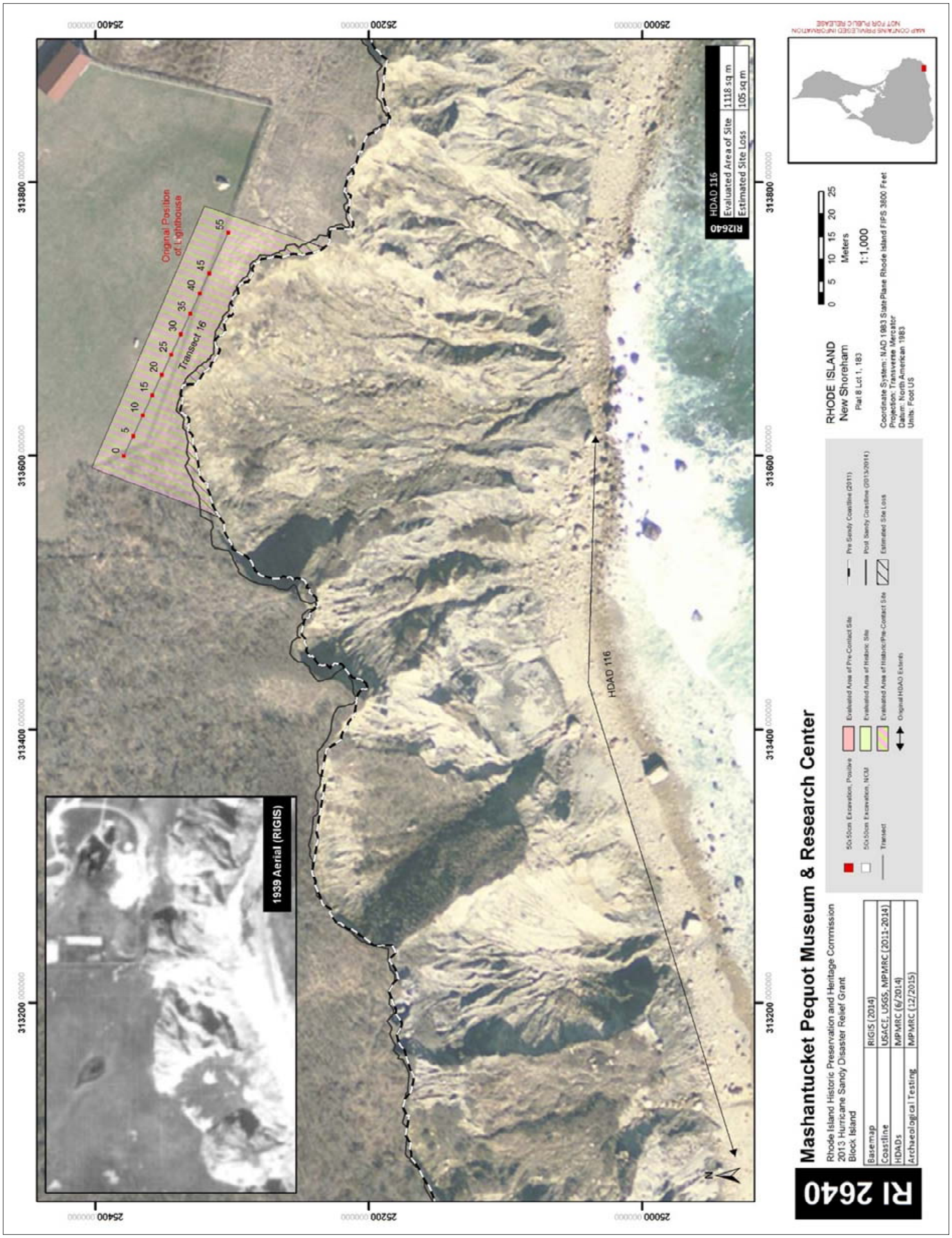

Figure 6-177. Phase II testing, RI 2640.

Table 6-68. Lithic Material, RI 2640.

Material	Count	Percentage
Argillite	2	10
Quartz	5	24
Schist	2	10
Slate	11	52
Unidentified	1	5

Table 6-69. Lithic Type, RI 2640.

Type	Count	Percentage
Core	1	5
Angular Debris	3	14
Paint Pot	1	5
Secondary Flake	1	5
Tablet	1	5
Tertiary Flake	2	10
Untyped	12	57

Figure 6-178. Lithic sample, RI 2640.

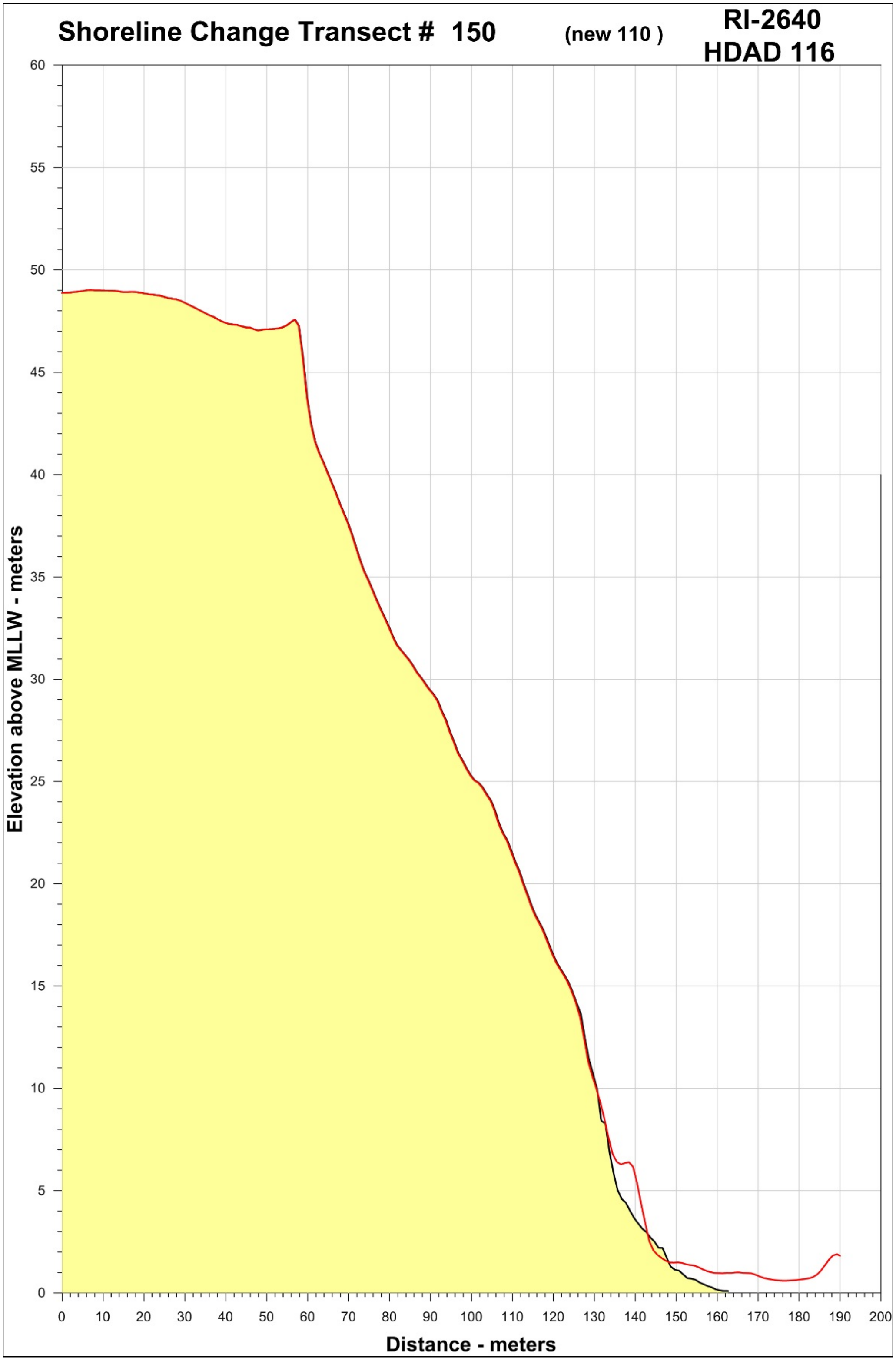

Figure 6-179. Bluff Erosion Profile, RI 2640.

RI 2641 (formerly HDAD 120)

Site Setting and Description

RI 2641 lies on the southeast side of the island, on Old Harbor Point. The surface-collected artifacts were recovered by MPMRC along the beach among the boulders exposed on the ground surface. USDA-NRCS classifies the soils in the area as Gloucester-Bridgehampton complex, rolling. The tested area lies at a lower elevation than the sites to the south, with an average elevation of 4.9 m (16 ft) amsl. A low, eroded scarp separates the intact terrestrial landform from the narrow beach below (Figure 6-180). There were several sites identified during the Phase I walkover along this stretch of the shoreline. RI 2634 is located just 50 m to the west. HDAD 119 lies 50 m to the east.

Phase II Summary

MPMRC excavated seven 50-x-50-cm STPs at 5-m intervals on a single north–south oriented transect (Figure 6-181). All of the test pits were sterile. No cultural materials were recovered during the Phase II survey and no features were identified during the subsurface testing. The only artifact from this site is a single quartz large angular debris collected during the Phase I walkover survey.

Site Condition and Future Threats

MPMRC's field observations suggest that RI 2641 experienced moderate erosion during Hurricane Sandy; however, recent data suggest that the shoreline has aggraded seaward at the rate of 0.03 m/yr (0.1 ft/yr) from 1952 through 2013 (Figure 6-182), and has advanced an estimated 1.91 m (6.3 ft) seaward in the last 60 years.

Based on the Phase II testing, it does not appear that information gained from this site is likely to contribute significantly to the understanding of the Pre-Contact Period of Block Island. It is MPMRC's opinion that RI 2641 is ineligible for listing in the National Register.

RI 2643 (formerly HDAD 127)

Site Setting and Description

RI 2643 is south of Mansion Beach, along the east shore of the island. An irregular wave-cut scarp marks the landward extent of erosion from Hurricane Sandy. USDA-NRCS describes the soils as Gloucester-Hinckley complex, very stony sandy loams, rolling. There is a kettle hole 270 m northwest of the site. The tested area lies at an average elevation of 2.5 m (8.2 ft) amsl. The site was identified during the Phase I walkover as an exposed paleosol. Erosion from Hurricane Sandy stripped the protective sand dunes from the immediate shoreline, exposing well-developed A and B horizon paleosols (Figure 6-183). It appears that the remaining dunes cover and protect the western (landward) extent of the paleosols in the immediate area.

Phase II Summary

An approximately 10-sq m area of paleosol along the eroded section of the shoreline was scraped to the B horizon to identify features (Figures 6-184 and 6-185). Six pre-contact cultural features were identified: four of unknown type and two of modern origin. Features were drawn and photographed in plan, then bisected (Figure 6-186). Soil samples were collected for flotation. The bisected features were drawn and photographed in profile.

Figure 6-180. View of site facing south, RI 2641.

Figure 6-181. Phase II testing, RI 2641.

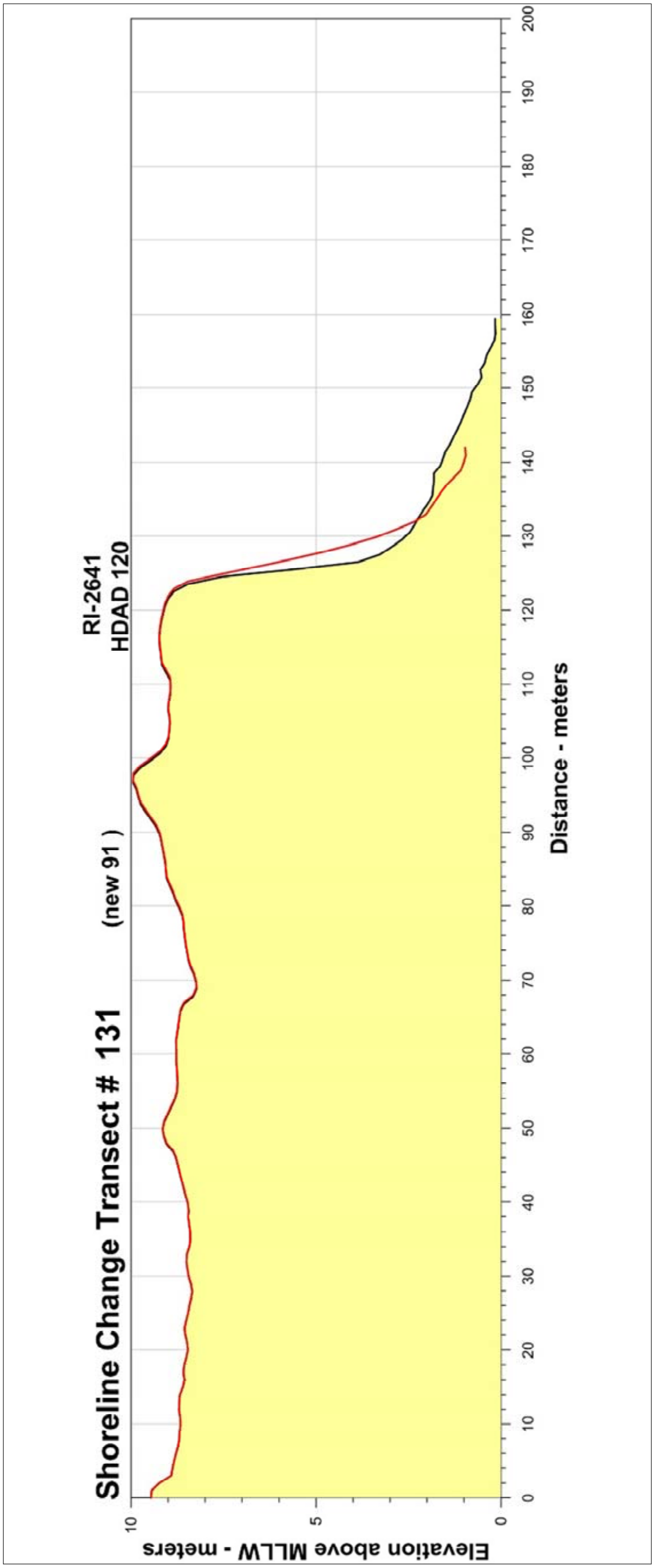

Figure 6-182. Bluff Erosion Profile, RI 2641.

Figure 6-183. View of site facing north, RI 2643.

Figure 6-184. View of site facing south, RI 2643

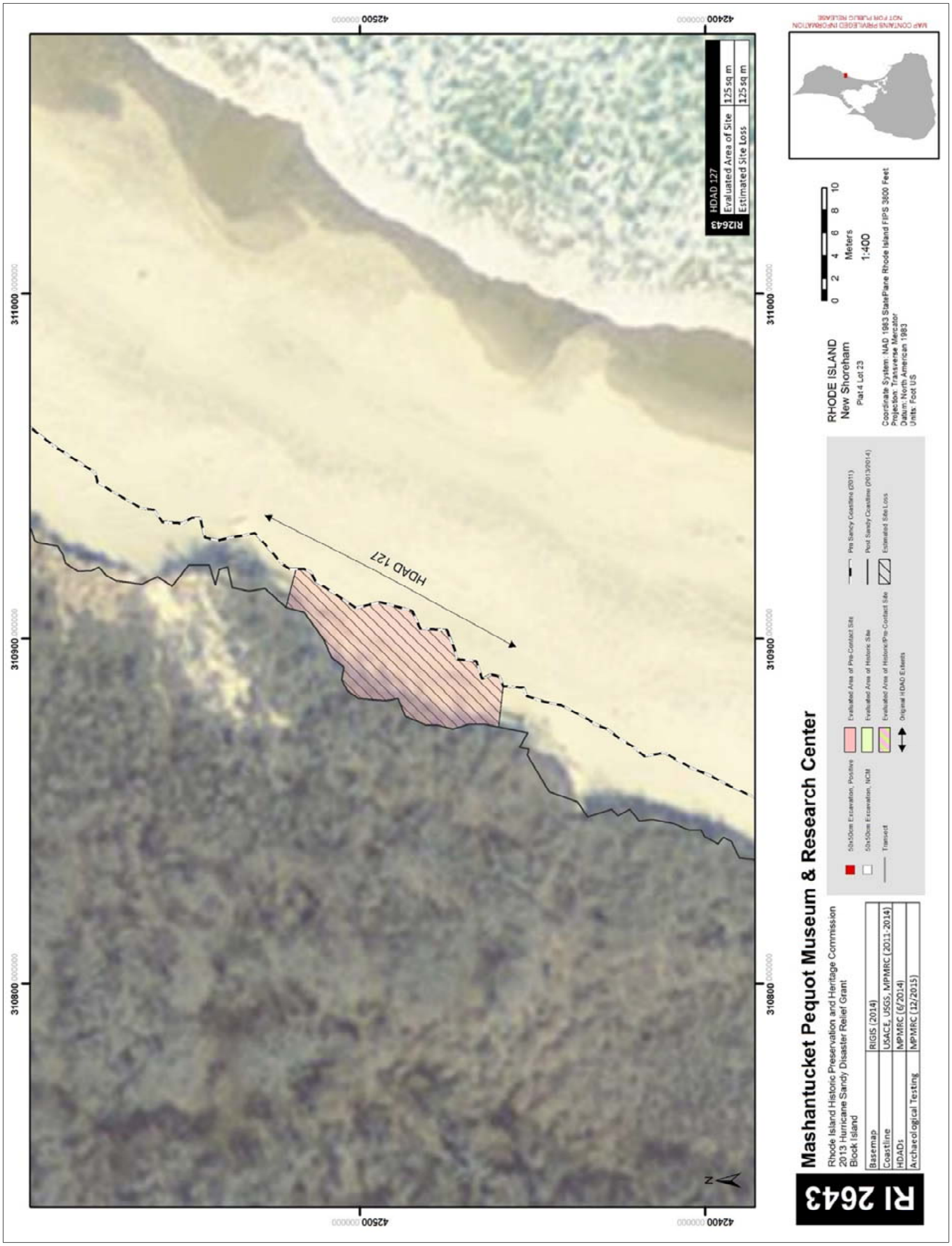

Figure 6-185. Phase II testing, RI 2643.

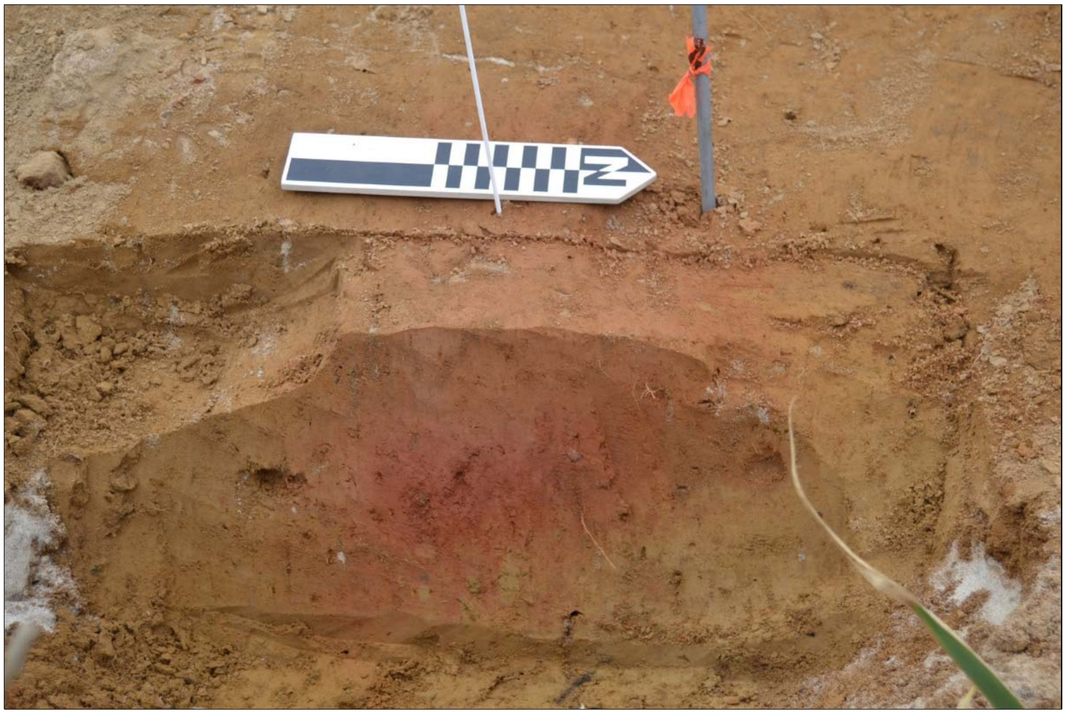

Figure 6-186. Feature 5, RI 2643.

Recovered artifacts included 107 quartz, 4 quartzite, and 4 gneiss (Table 6-70; Figure 6-187). The majority of lithics consisted of chipping debris with the exception of 2 bifaces, and 1 whetstone (Table 6-71). MPMRC also recovered 8 unidentified shell fragments. Charred botanicals include 4 hickory nutshells, 4 cornaceae seeds, 1 scleria seed, 4 spurge seeds, 1 parenchymous tissue, 1 viburnum seed and 8 unidentified seeds (Table 6-72). Several fragments of wood charcoal were collected during the Phase II survey.

Although no diagnostic artifacts were recovered, the variety of artifacts and features within the paleosols indicate that this site was likely used repeatedly during the Pre-Contact Period. The topographic setting of RI 2643 is consistent with other sites identified during the Hurricane Sandy surveys as pre-contact spring fishing camps, though the hickory nut remains may suggest at least some activity during the fall months, as well.

Table 6-70. Lithic Material, RI 2643.

Material	Count	Percentage
Gneiss	4	3
Quartz	107	91
Quartzite	4	3
Unidentified	2	2

Site Condition and Future Threats

Continued tidal erosion and future storm events threaten the long-term stability of this landform. The low elevation of the archaeological deposits and the loss of protective dunes increase the risk of future erosion. Recent data suggest that shoreline loss from 1952 through 2013 was 0.07 m/yr (0.2 ft/yr) (Figure 6-188). An estimated 4.43 m (14.5 ft) of shoreline has been lost from this site in the last 60 years.

Figure 6-187. Lithic sample, RI 2643.

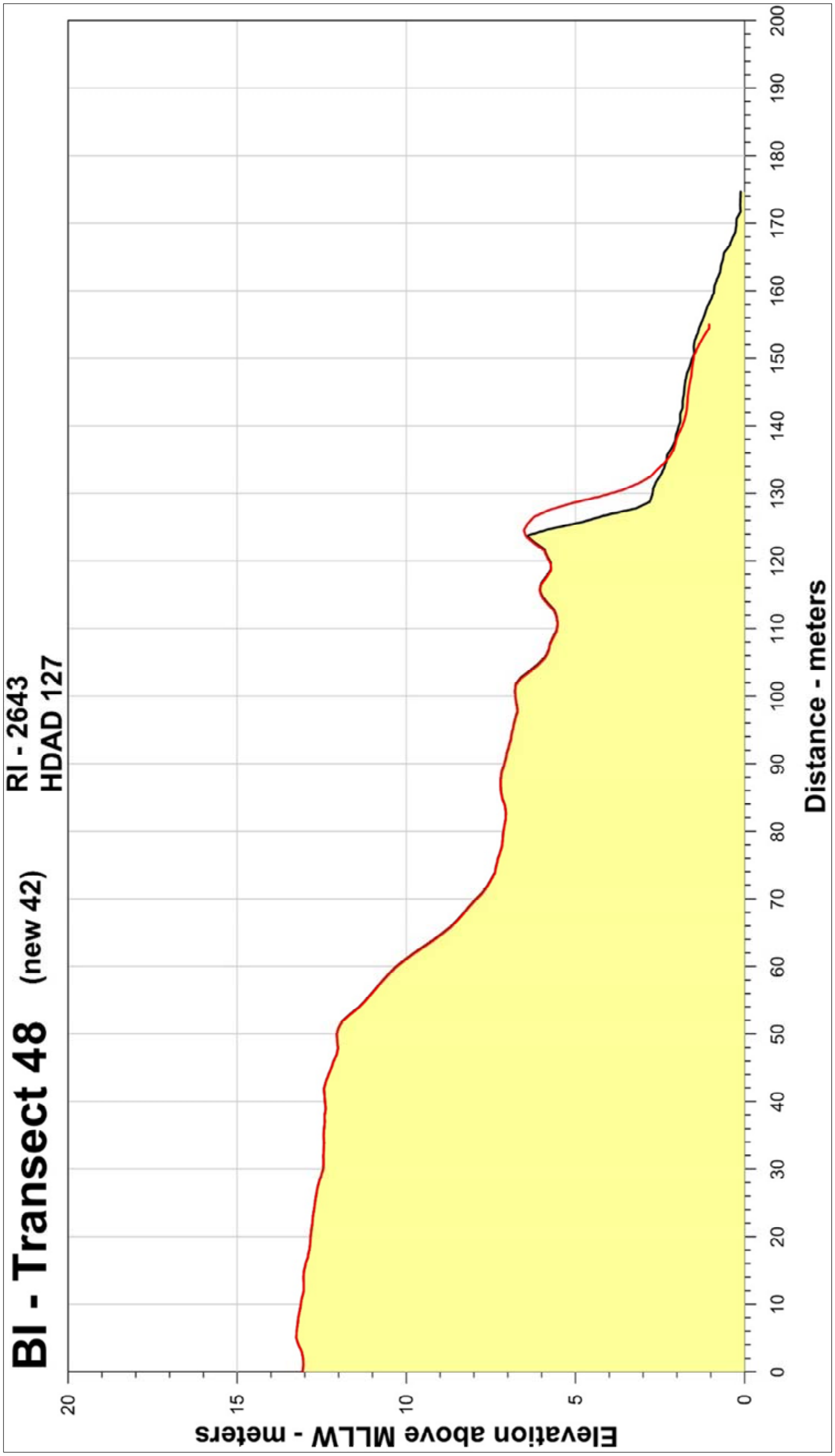

Figure 6-188. Bluff Erosion Profile, RI 2643.

Table 6-71. Lithic Type, RI 2643.

Type	Count	Percentage
Angular Debris	43	37
Biface	2	2
Primary Reduction Flake/Debris	32	27
Secondary Flake	32	27
Tertiary Flake	4	3
Whetstone	1	1
Fire-Cracked Rock	3	3

Table 6-72. Features Containing Identified Material, RI 2643.

Feature #	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Feature type	Unknown	Hearth?	Modern Post	Modern Post	Modern Post	Unknown	Unknown
Botanicals							
Cornaceae Seed				1		2	1
Hickory Nutshell		2					2
Parenchymous tissue						1	
Scleria Seed						1	
Spurge Seed						4	
Unidentified Seed					1	5	2
Viburnum Seed						1	
Wood	72	55	9	41	36	105	100
Fish							
Shellfish							
Unidentified		8					
Faunal							
Ceramic							
Lithic							

The presence of multiple, largely intact pre-contact features associated with a moderate to high density of lithic artifacts suggests that RI 2643 may yield important new information about seasonal use of Block Island's eastern shorelines during the Pre-Contact Period. It is MPMRC's opinion that this site may be eligible for listing in the National Register under Criterion D.

RI 2648 (formerly HDAD 163)

Site Setting and Description

RI 2648 is located on a high bluff overlooking the southwest coast of Block Island along the heavily eroded bluff. The site is on Audubon Society property characterized by mown field and pastures divided by stone fences. USDA-NRCS classifies the bluff top soils as Hinckley loamy sand, 8 to 15 percent slopes, bordered by Udorthents, very steep soils along the eroding bluffs (Figure 6-189). The tested area lies at an average elevation of 30 m (98.6 ft) amsl. The tested area is approximately 10 m northeast of the near-vertical bluff edge (Figure 6-190).

Phase II Summary

Four transects with a total of 62 STPs were excavated during Phase II excavations (Figure 6-191). Twenty-eight (45%) of the test pits contained cultural material. Many of the test pits excavated contained very deep plow zones extending up to 1 m (3 ft] below the ground surface. The stratigraphy suggests that eolian sands from the steep bluff face have been accumulating on the site surface throughout the period of active cultivation.

A relatively small number of lithics were recovered during the Phase II survey: 16 quartz, 4 quartzite, 2 rhyolite, 1 chalcedony, and 1 shale (Table 6-73; Figure 6-192). The lithic assemblage was confined to debitage with the exception of a single quartz core and one rhyolite uniface (Table 6-74; Figure 6-193). One charred hickory nutshell was recovered along with charred wood and 14 unidentified shell from test pit T13-75, suggesting the presence of at least one pre-contact cultural feature. The depth of the eolian plow zone prevented further excavation of the deposits during the Phase II testing.

Based on the density and variety of artifacts recovered at this site, MPMRC tentatively interprets RI 2648 as a pre-contact temporary camp. Additional survey would be needed to test this hypothesis and fully assess the intra-site patterning of pre-contact deposits.

MPMRC also recovered post-contact domestic and architectural artifacts during the Phase II survey, including 8 ironstone sherds, 1 English white salt glazed stoneware sherd, 115 glass (including 91 pieces of colored window glass from a stained glass window), 87 machine-cut nail fragments, 1 unidentified iron fragment, and 1 sheet iron fragment. The density of post-contact architectural debris suggests that there may have been a building nearby, though no stone walls, foundations, or other structural remains were identified during the Phase I and II surveys.

Site Condition and Future Threats

The Phase II testing indicated that intact archaeological deposits remain along the southern coastline away from the eroding bluff face at RI 2648. Recent data suggest that shoreline loss from 1952 through 2013 was 0.04 m/yr (0.1 ft/yr) (Figure 6-194). An estimated 2.22 m (7.3 ft) of shoreline has been lost from this site in the last 60 years. Although the total distance of shoreline retreat appears to be modest, the steep and weakened bluff face along the site's seaward margin is at risk of future loss from coastal storms.

The variety of lithic materials and the rhyolite uniface recovered during the Phase II testing, along with large numbers of eighteenth- to twentieth-century artifacts, indicate that this site could contribute important information on the pre- and post-contact use of the south coast of Block Island. It is MPMRC's opinion that RI 2648 site may be eligible for listing in the National Register under Criterion D.

RI 2649 (formerly HDAD 164)

Site Setting and Description

RI 2649 is located on the southwest coast of Block Island along a heavily eroded bluff. The property, owned by the Audubon Society, is characterized by mown fields and pastures divided by stone fences. USDA-

Figure 6-189. View of site from below, facing north, RI 2648.

Figure 6-190. View of site facing west, RI 2648.

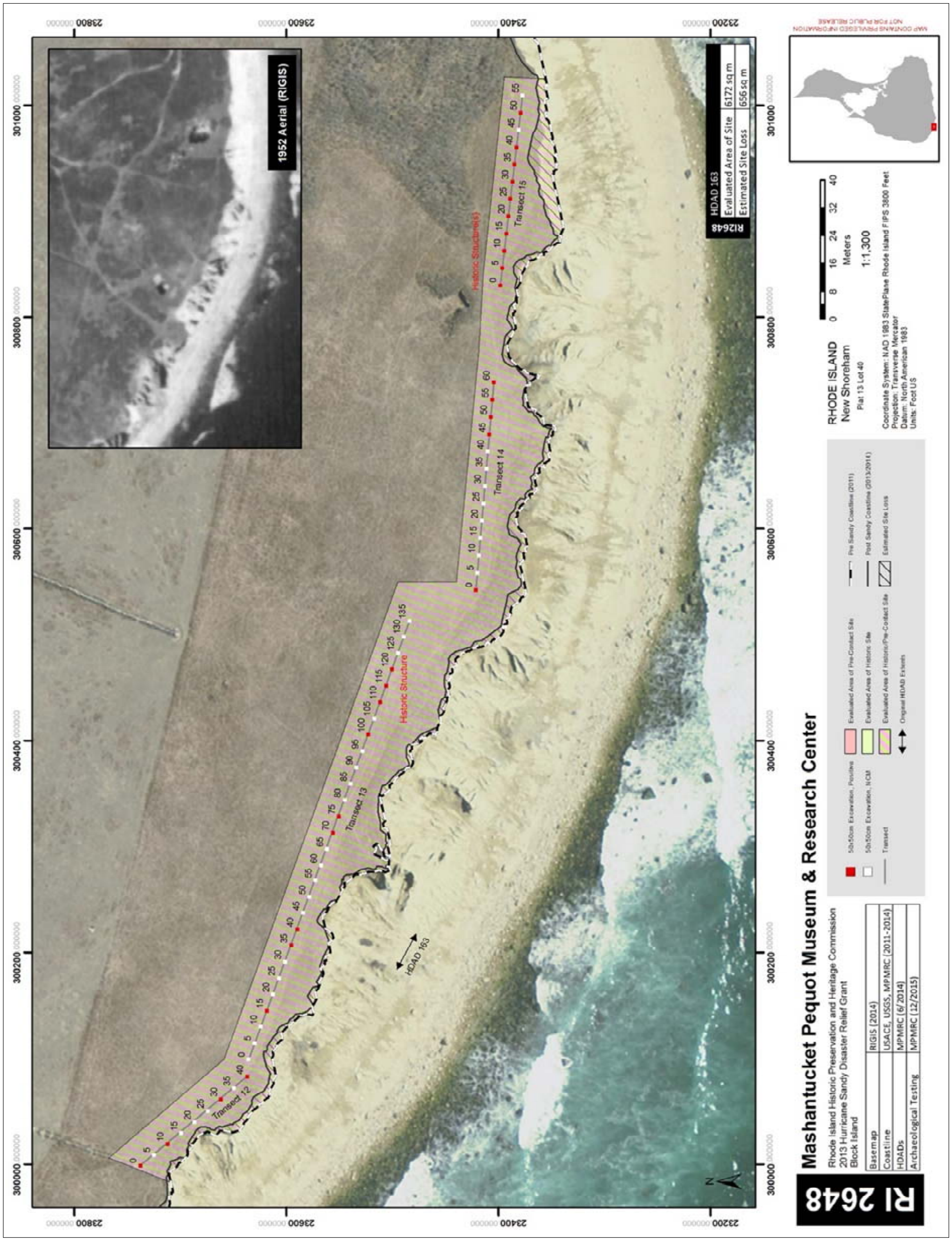

Figure 6-191. Phase II testing, RI 2648.

Table 6-73. Lithic Material, RI 2648.

Material	Count	Percentage
Chalcedony	1	4.17
Quartz	16	66.67
Quartzite	4	16.67
Rhyolite	2	8.33
Shale	1	4.17

Table 6-74. Lithic Type, RI 2648.

Type	Count	Percentage
Core	1	4.17
Crystal	1	4.17
Secondary Flake	4	16.67
Tertiary Flake	3	12.50
Primary Reduction Flake/Debris	3	12.50
Angular Debris	10	41.67
Uniface	1	4.17
Untyped	1	4.17

Figure 6-192. Lithic sample, RI 2648.

Figure 6-193. Lithic tools, RI 2648.

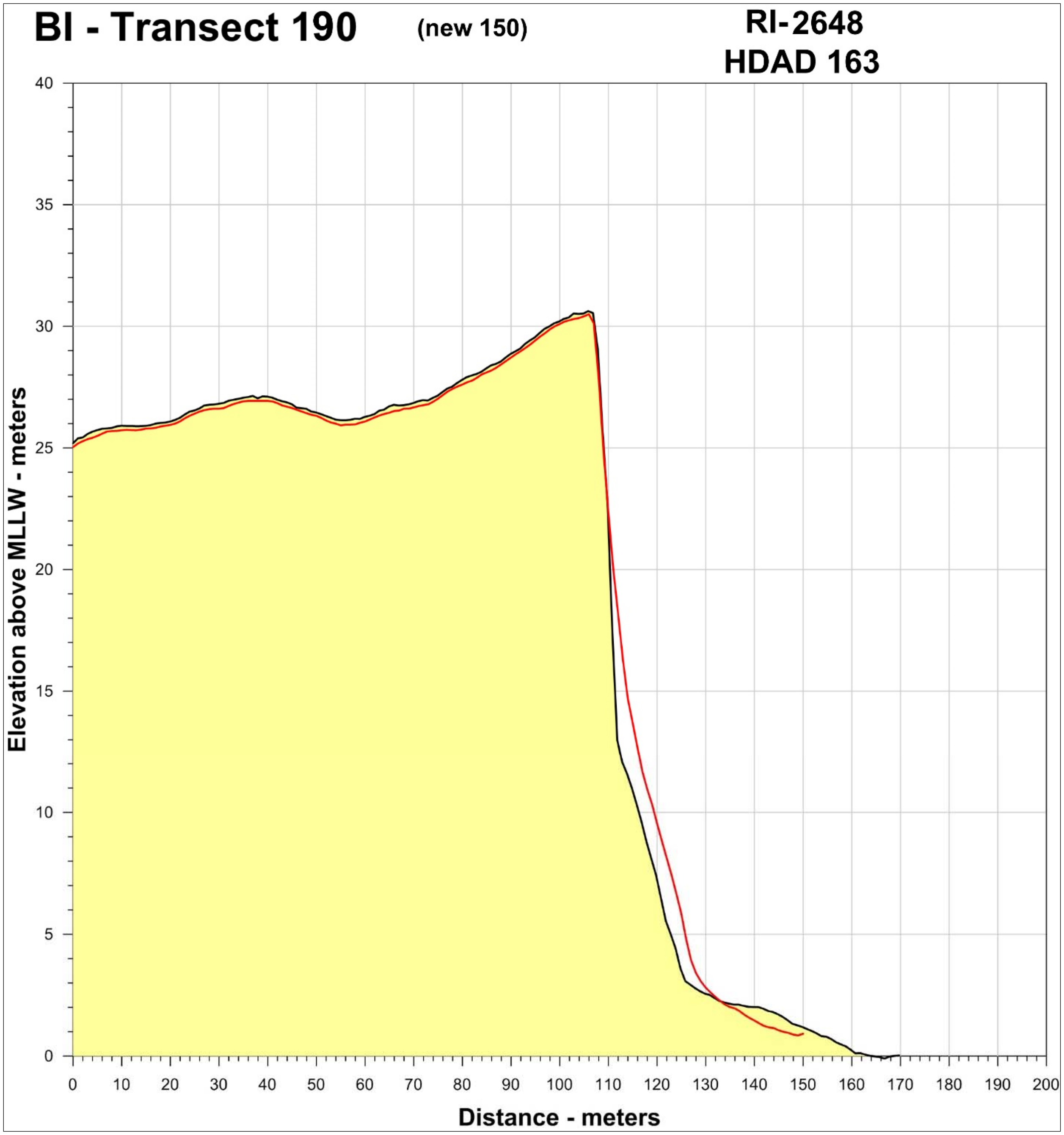

Figure 6-194. Bluff Erosion Profile, RI 2648.

NRCS describes the soils as Hinckley loamy sand, 8 to 15 percent slopes, bordered by Udorthents, very steep soils along the eroding bluffs (Figure 6-195). The tested area lies at an average elevation of 21.3 m (69.8 ft) amsl and is approximately 10 m north east of the bluff edge (Figure 6-196).

Phase II Summary

The Phase II testing consisted of three transects with a total of twenty-nine 50-x-50-cm STPs excavated at 5-m intervals and eight additional test pits excavated at 10-m intervals (Figure 6-197). Eight test pits (22%) contained low densities of pre-contact artifacts. One large quartzite core was collected during the Phase I walkover survey. Only 12 additional lithics were recovered during Phase II testing: 9 quartz, 1 argillite biface fragment, 1 rhyolite, and 1 siltstone (Tables 6-75 and 6-76; Figures 6-198 and 6-199). No cultural features were identified during the Phase II survey. Additional testing is required at this site to assess the temporal and functional range of pre-contact uses.

Site Condition and Future Threats

Recent data suggest that the rate of shoreline loss from 1952 through 2013 was only 0.01 m/yr (0.03 ft/yr) (Figure 6-200). Although only an estimated 0.6 m (2 ft) of shoreline retreat has occurred at this site in the last 60 years, active erosion related to ground water movement continues to threaten the site. MPMRC believes it is likely that significant portions of this site have been lost to bluff erosion and collapse.

Despite the potential loss of the seaward margins of RI 2648, the Phase II testing indicated that intact archaeological deposits remain. The site may yield important information regarding the nature of pre-contact use of Block Island's southwest coast. It is MPMRC's opinion that RI 2648 may be eligible for listing in the National Register under Criterion D.

RI 2652 (formerly HDAD 168)

Site Setting and Description

RI 2652 is located at the southwest corner of Block Island on Audubon Society property. The area is characterized by mown and abandoned fields and pastures divided by stone fences. USDA-NRCS classifies the bluff top soils as Gloucester-Bridgehampton complex, hilly. Udorthents, very steep soils are found on the eroding bluffs. The terrain on the bluff top has more relief than other surveyed sections of Block Island's south coast (Figure 6-201). Minimal testing was conducted northeast of the bluff edge during the Phase II survey (Figure 6-202).

Phase II Summary

Phase II testing at the site was limited to two 50-x-50-cm STPs; both contained small numbers of artifacts (Figure 6-203), including 1 clear curved glass fragment, 2 quartz, and 2 rhyolite primary reduction debris (Figure 6-204). No features were identified during the Phase II testing. Due to limited testing, low artifact density, and lack of diagnostic artifacts, it is not possible to draw conclusions regarding the nature of the use of this site.

Site Condition and Future Threats

RI 2652 is heavily eroded near the edge of the bluff and continues to be threatened by erosion from future storms. Recent data suggest that shoreline loss from 1952 through 2013 was 0.38 m/yr (1.3 ft/yr) (Figure 6-205). An estimated 23.21 m (76.5 ft) of shoreline has been lost from this site in the last 60 years.

Figure 6-195. View of site from below, facing northeast, RI 2649.

Figure 6-196. View of site facing south, RI 2649.

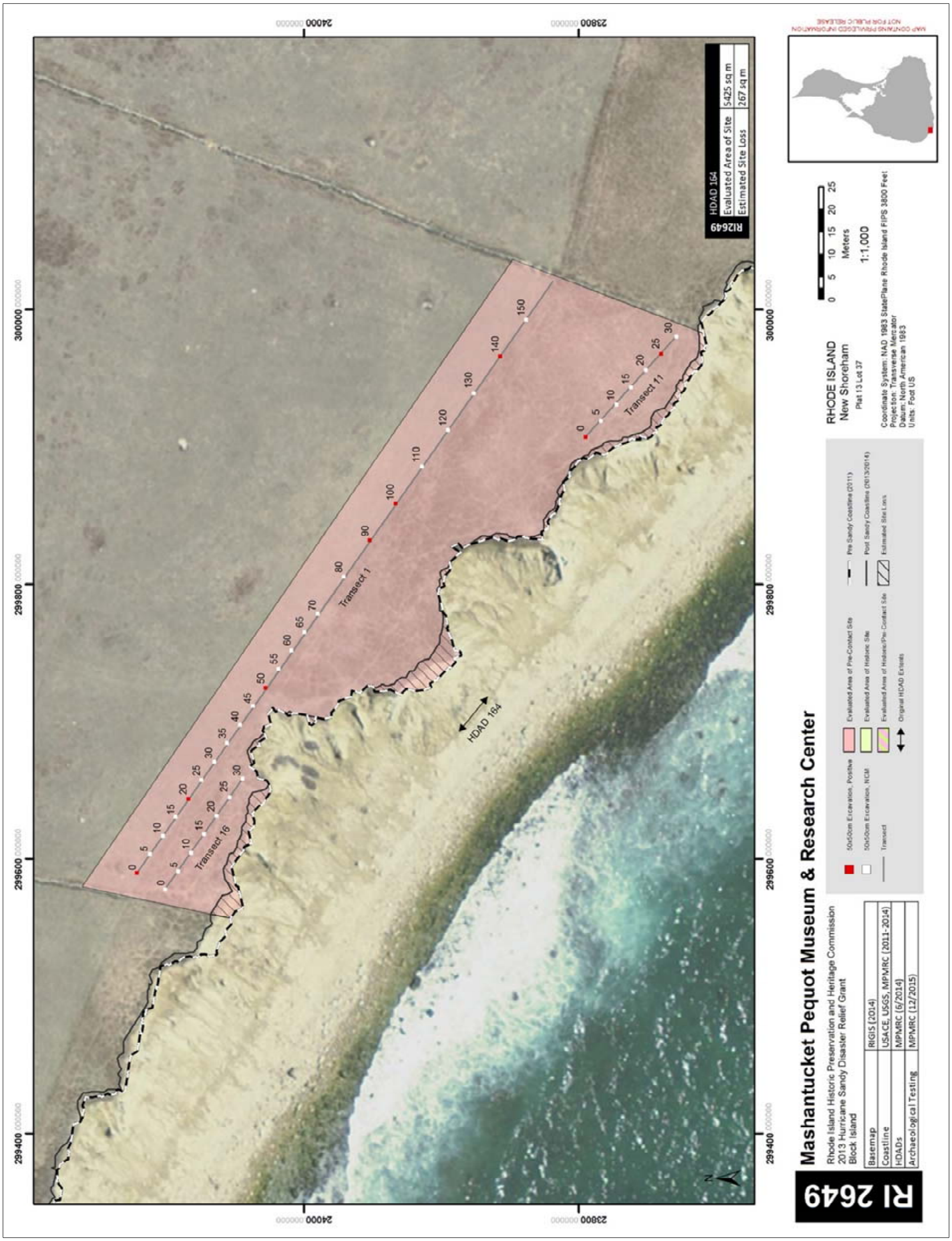

Figure 6-197. Phase II testing, RI 2649.

Table 6-75. Lithic Material, RI 2649.

Material	Count	Percentage
Argillite	1	8
Quartz	9	75
Rhyolite	1	8
Siltstone	1	8

Table 6-76. Lithic Type, RI 2649.

Type	Count	Percentage
Angular Debris	3	25
Biface	1	8
Primary Deduction Flake/Debris	3	25
Secondary Flake	4	33
Tertiary Flake	1	8

Figure 6-198. Lithic sample, RI 2649.

Figure 6-199. Argillite biface, RI 2649.

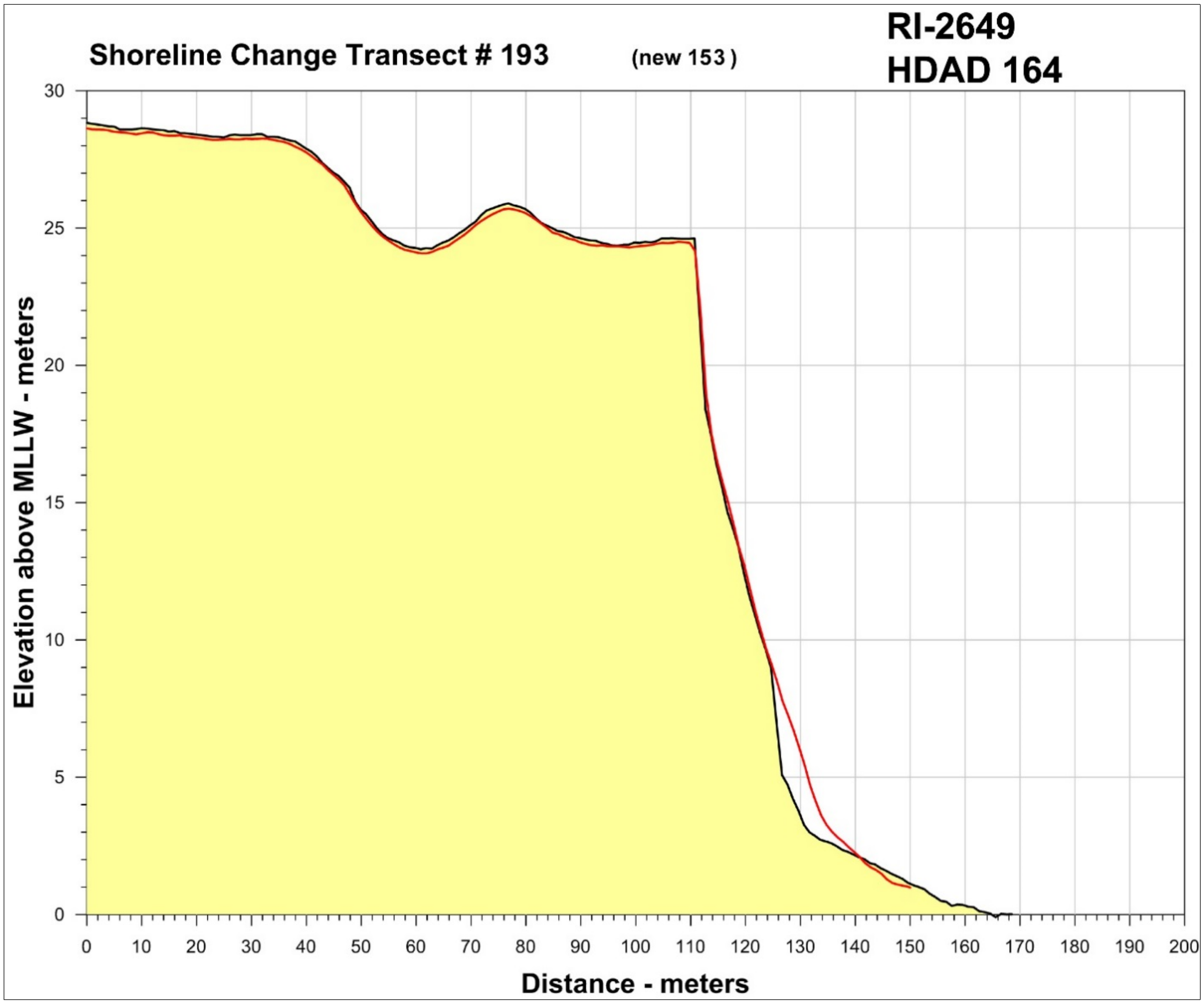

Figure 6-200. Bluff Erosion Profile, RI 2649.

Figure 6-201. View of site facing south, RI 2652.

Figure 6-202. View of site facing north, RI 2652.

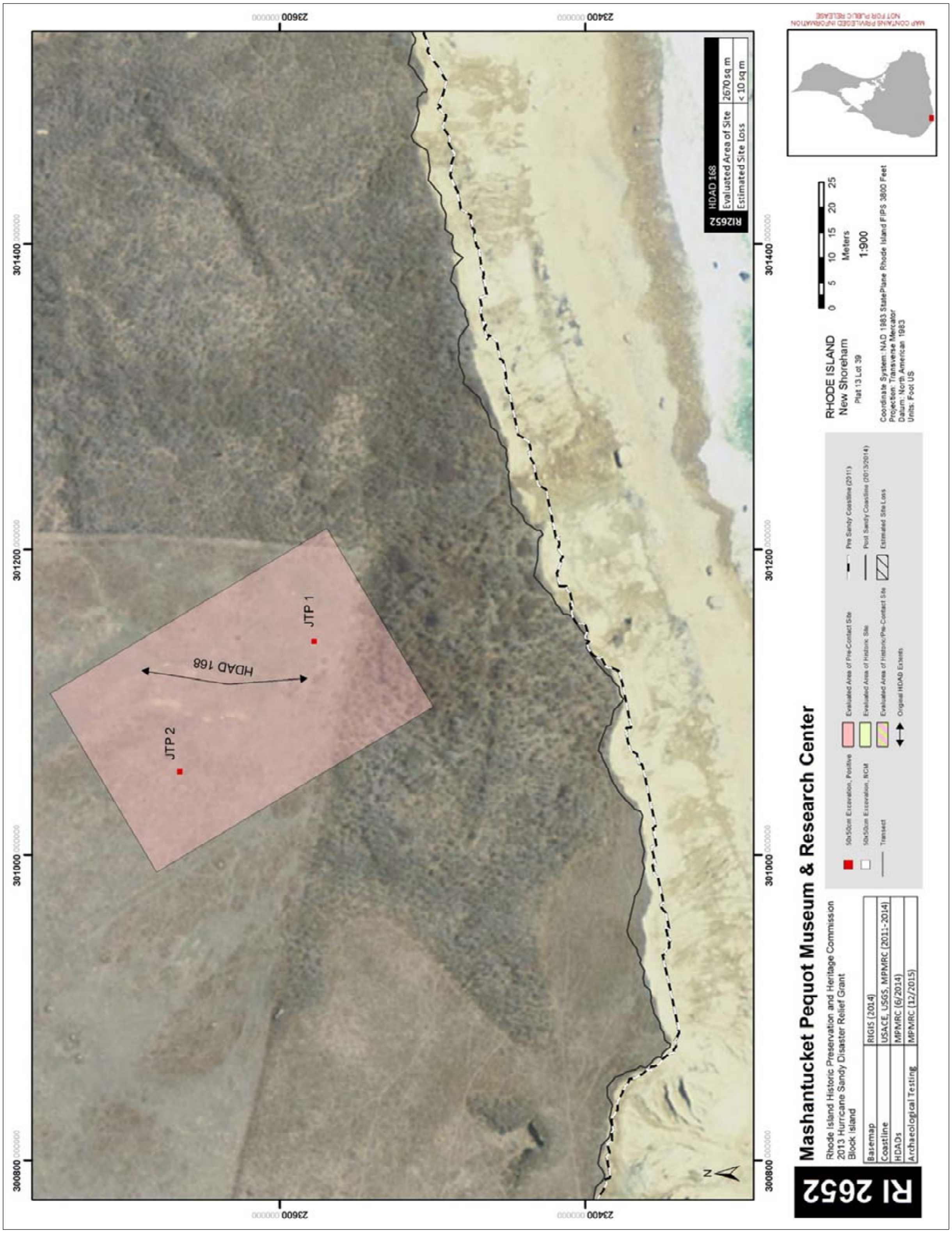

Figure 6-203. Phase II testing, RI 2652.

Figure 6-204. Recovered lithics, RI 2652.

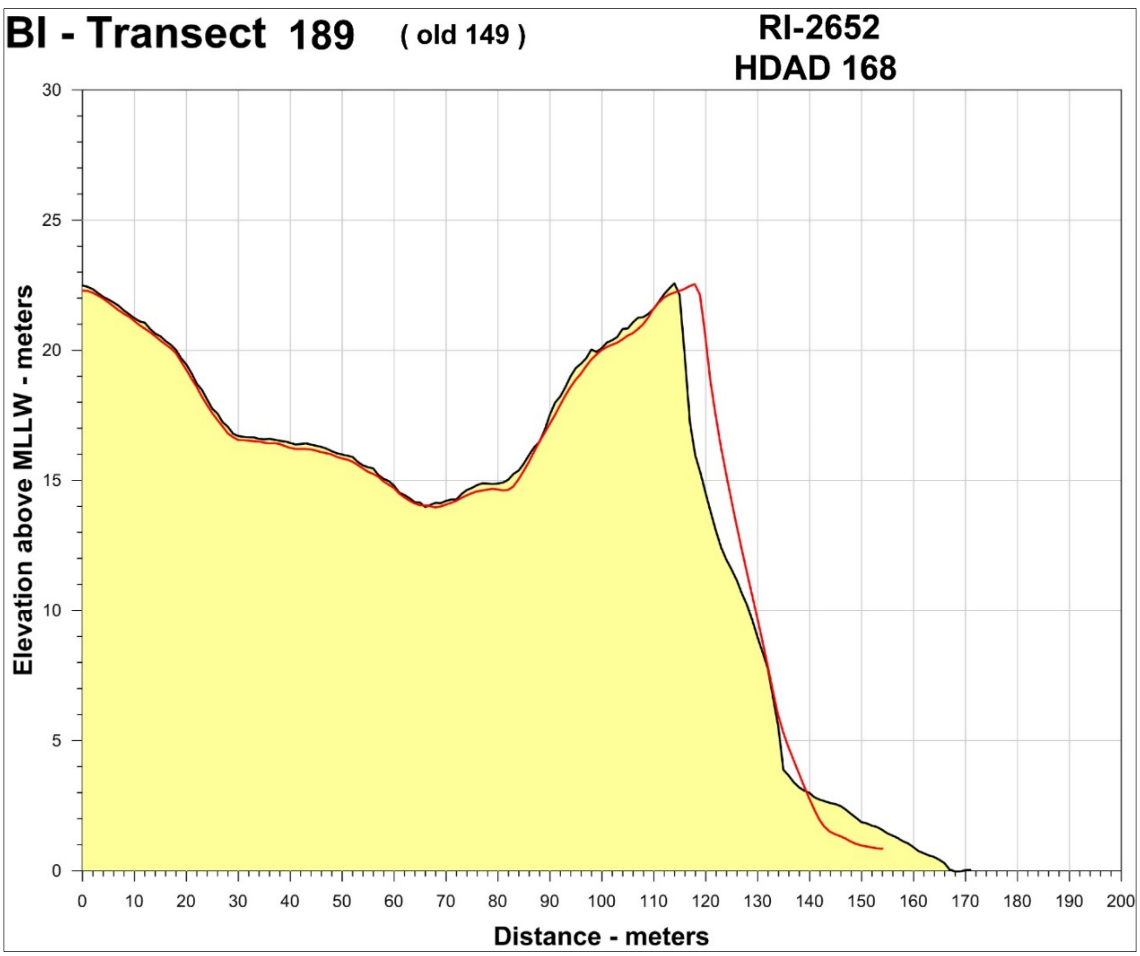

Figure 6-205. Bluff Erosion Profile, RI 2652.

Limited testing on this site indicates that intact archaeological deposits remain to the north of the unstable bluff edge. MPMRC recommends additional testing to determine RI 2652's vertical and horizontal boundaries and to evaluate the site's eligibility for listing in the National Register.

RI 2654 (formerly HDAD 94)

Site Setting and Description

RI 2654 is located on the southwest coast of Block Island along a heavily eroded bluff on property belonging to the Audubon Society. The area is characterized by mown field and pastures divided by stone fences (Figure 6-206). USDA-NRCS classifies the bluff top soils as Gloucester-Bridgehampton complex, hilly bordered by Udorthents, very steep soils along the eroding bluffs. The tested area lies at an average elevation of 14.8 m (48.4 ft) amsl. There are several sites identified along this stretch of the coast; RI 2628 lies approximately 150 m to the northwest and site RI 2636 lies 160 m to the southeast.

Phase II Summary

During Phase II testing a total of twenty-six 50-x-50-cm STPs were excavated at 5-m intervals. The majority of test pits were excavated along Transect Six placed 10 m from the edge of the bluff. An additional transect (Transect 7) was placed to the northwest approximately 50 m inland of Transect Seven (Figure 6-207). Nineteen (35%) of the Phase II test pits contained pre-contact and/or post-contact artifacts. The pre-contact artifact assemblage included 12 quartz, 1 quartzite, 15 rhyolite, and 14 unidentified shell fragments (Tables 6-77 and 6-78; Figure 6-208). Four post-contact artifacts were recovered during the Phase II survey: 1 untyped clear glass and 3 whiteware sherds. No cultural features were identified.

RI 2654 appears to be a short-term, task-specific site, similar to others identified during the Hurricane Sandy surveys along the southwest coast of the island. The period(s) of pre-contact use and specific site function(s) are undetermined due to a lack of temporally diagnostic artifacts or features.

Site Condition and Future Threats

It is likely that significant portions of this site have been lost to erosion of the bluff. Active erosion continues to threaten the site and this area is particularly vulnerable to future storm damage (Figure 6-209). Recent data suggest that the rate of shoreline loss from 1952 through 2013 was 0.14 m/yr (0.4 ft/yr) (Figure 6-210). An estimated 8.35 m (27.4 ft) of shoreline has been lost from this site in the last 60 years.

The Phase II testing indicated that intact archaeological deposits are present at RI 2654. The range of lithic materials recovered from this site is similar to those recovered from the south coast section of the island. MPMRC tentatively interprets these sites as locations of short-term, task-specific use of the seaward shoreline. They were likely associated with larger encampments or settlements located near the salt ponds, or, after 1000 B.P., with horticultural sites adjacent to good farming soils. It is MPMRC's opinion that RI 2654 may yield important new information on pre-contact settlement and subsistence patterns on Block Island and, therefore, may be eligible for listing in the National Register under Criterion D.

RI 2703 (formerly HDAD 73)

Site Setting and Description

RI 2703 is located on the east side of the Great Salt Pond. USDA-NRCS classifies soils in the area as Bridgehampton silt loam, till substratum, 3 to 8 percent slopes (to the east) and Gloucester-Bridgehampton

Figure 6-206. View of site facing southeast, RI 2654.

Figure 6-207. Phase II testing, RI 2654.

Table 6-77. Lithic Material, RI 2654.

Material	Count	Percentage
Quartz	12	43
Quartzite	1	4
Rhyolite	15	54

Table 6-78. Lithic Type, RI 2654.

Type	Count	Percentage
Angular Debris	7	25
Secondary Debris	13	46
Primary Reduction Flake/Debris	6	21
Split Cobble	2	7

Figure 6-208. Lithic sample, RI 2654.

Figure 6-209. View of site from below, facing east, RI 2654.

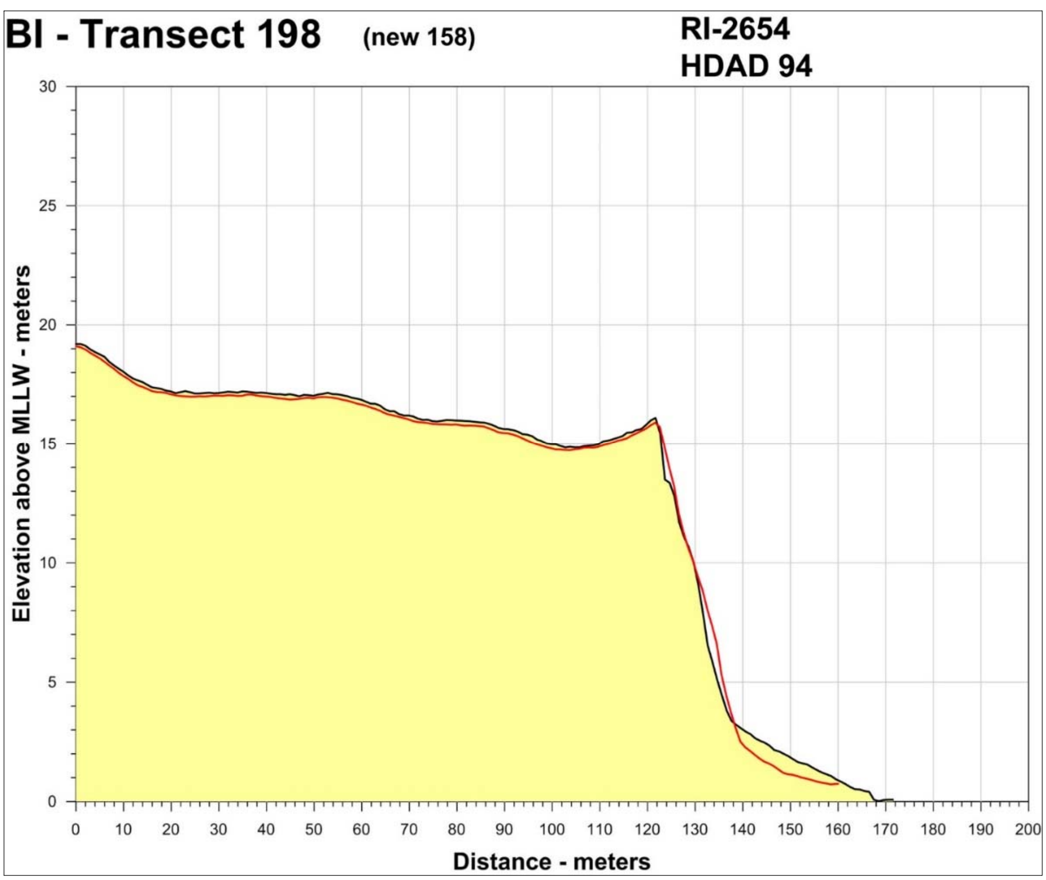

Figure 6-210. Bluff Erosion Profile, RI 2654.

complex, rolling (to the west). The elevation slopes gently from a high of 17 ft (2.1 m) on the east side of the site to an elevation of 3.4 m (11 ft) toward the pond. There are kettle holes located approximately 200 m northeast and 150 m northwest of the site.

Phase II Summary

MPMRC established a 5-m grid for the Phase II survey of RI 2703. A total of nineteen 50-x-50-cm STPs were excavated as part of the Phase II testing (Figure 6-211). Fifteen (79%) of the test pits contained pre-contact and/or post-contact artifacts. Three possible features were identified and documented, but not excavated.

Recovered artifacts include 33 lithics: 25 quartz, 3 quartzite, 1 quartzite uniface, 2 basalt, 1 rhyolite, and 1 jasper utilized flake (Tables 6-79 and 6-80; Figure 6-212). One quahog shell was recovered. Post-contact artifacts include 4 container glass and a scattering of coal and slag. The three possible features were encountered at the interface of the plow zone and the B_1 horizon. All the soil anomalies were recognized as darkened soils with charred wood. These were recorded and backfilled for potential future investigation.

The functional and temporal nature of RI 2703 was not determined from the Phase II testing; however, there is potential for this site to yield significant information regarding the pre-contact use of the areas adjacent to the Great Salt Pond.

Site Condition and Future Threats

This site is well protected from storms and tidal erosion, and the most imminent threats come from development. This site contains intact archaeological deposits that are likely to contribute to the understanding of the pre-contact use and settlement of Block Island. It is MPMRC's opinion that RI 2703 may be eligible for listing in the National Register under Criterion D.

Other Recently Identified Coastal Archaeological Sites on Block Island

During the Phase II surveys, MPMRC was notified by local preservation partners of two pre-contact archaeological discoveries in coastal sections of Block Island. MPMRC documented these resources and reported them to RIHPHC as potentially significant archaeological sites. Both newly identified sites are summarized below to provide additional context for the Pre-Contact Period Native American history of the island and the interpretation of the sites identified during the Hurricane Sandy surveys.

RI 2653

Site Setting and Description

This site was located when utility workers, excavating a trench with a backhoe, encountered a shell midden feature (Figures 6-213 and 6-214). RI 2653 is located on the east side of the Great Salt Pond 170 m inland from the water's edge. The site lies at an average elevation of 2.1 m (7.0 ft) amsl and is 60 m north of a small stream that feeds kettle ponds to the southeast and southwest.

MPMRC scraped the exposed midden deposits clean by trowel along the trench profile (Figure 6-215), prepared a field sketches of the feature, and photographed the deposits in profile. The remaining intact feature matrix was collected for flotation. Recovered artifacts include 165 lithics consisting of 48 percent quartz, 34 percent rhyolite, 7 percent quartzite, 6 percent felsite, and 1 percent or less of argillite, basalt, chert and gneiss (Table 6-81; Figure 6-216). Lithic tools include 1 celt, 2 biface, 1 uniface, 4 cores, 1 scraper, and 1 unidentified projectile point (Table 6-82; Figure 6-217). Fifty-six Middle and Late Woodland

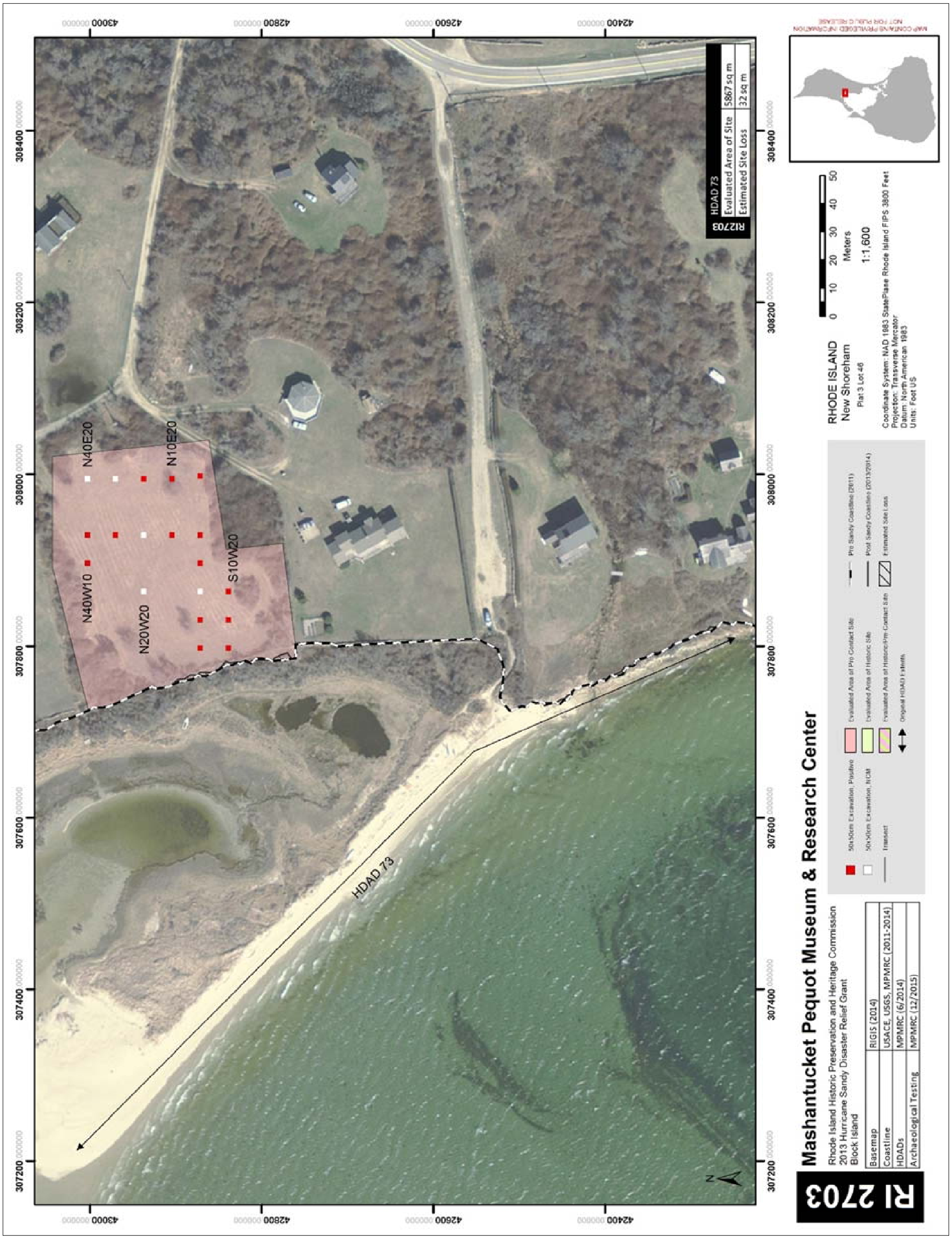

Figure 6-211. Phase II testing, RI 2703.

Table 6-79. Lithic Material, RI 2703.

Material	Count	Percentage
Basalt	2	6.06
Chalcedony	1	3.03
Jasper	1	3.03
Quartz	23	69.70
Quartzite	5	15.15
Rhyolite	1	3.03

Table 6-80. Lithic Type, RI 2703.

Material	Count	Percentage
Argillite	2	1
Basalt	2	1
Chert	2	1
Felsite	10	6
Gneiss	1	1
Granite	1	1
Quartz	79	48
Quartzite	11	7
Rhyolite	56	34
Unidentified	1	1

Figure 6-212. Lithic sample, RI 2703.

Figure 6-213. Excavation area, RI 2653.

Figure 6-214. Phase II testing, RI 2653.

Figure 6-215. Excavated units, RI 2653.

Table 6-81. Lithic Material, RI 2653.

Material	Count	Percentage
Argillite	2	1
Basalt	2	1
Chert	2	1
Felsite	10	6
Gneiss	1	1
Granite	1	1
Quartz	79	48
Quartzite	11	7
Rhyolite	56	34
Unidentified	1	1

Figure 6-216. Lithic sample, RI 2653.

Table 6-82. Lithic Type, RI 2653.

Type	Count	Percentage
Biface	2	1
Angular debris	14	8
Blade	1	1
Celt	1	1
Core	4	2
Hammerstone	1	1
Primary Reduction Flake/Debris	15	9
Projectile Point	1	1
Scraper	1	1
Secondary Flake	47	28
Tertiary Flake	77	47
Uniface	1	1

Figure 6-217. Lithic tools, RI 2653.

aboriginal ceramic sherds (Table 6-83) were recovered along with 868 fish, bird, and mammal bone. The only identified species during MPMRC's preliminary analyses were Atlantic Sturgeon and Tautog. A sample consisting of over 20,000 scallop, surf clam, blue and ribbed mussel, oyster, quahog, and soft shell clam shells was recovered. Identified charred botanicals include 1 hickory nutshell, 1 butter-and-eggs seed, 6 compositae seed, 3 cornaceae seeds, 1 dock seed, and 1 polygonaceae seed. Charred wood was also collected (Table 6-84). Late Post-Contact to Modern Period artifacts (1 colored glass fragment, 1 cuprous wire fragment, and 1 steel birdshot) were also recovered.

The data recovered from the shell midden feature adds significantly to the knowledge of Woodland Period lifeways. The large numbers of faunal and botanical remains provide detailed information about diet and seasonality. The recovered ceramics date this site to the Middle and Late Woodland periods. The wide variety of tools and lithic materials indicate a wide range of tasks being carried out related to the procurement of a variety of resources and the manufacture and maintenance of tools.

RI 1249 (near HDADs 57 and 166)

Site Setting and Description

During construction of pavilion for the Town of New Shoreham in 2014, a pre-contact refuse pit (Feature 1) was accidentally impacted in a backhoe trench (Figures 6-218 and 6-219). Construction personnel, familiar with MPMRC's ongoing archaeological surveys in the area, informed MPMRC of the unanticipated discovery and allowed MPMRC staff to document and sample the disturbed feature. RI 1249 is located north of West Side Road approximately 150 m south of the Great Salt Pond and 300 m southeast of Champlin's Marina.

Table 6-83. Aboriginal Ceramics, RI 2653.

Count	Temper	Description	Thickness (mm)	Time Period
10	Not discernible	Unknown	n/a	unknown
1	Medium grit	Unknown	n/a	unknown
1	Medium grit	Interior/exterior: smooth	9.8	Middle Woodland
1	Fine grit	Cord marked	10	Middle Woodland
3	Medium grit	Unknown	n/a	Middle Woodland
29	Shell	Unknown	n/a	Late Woodland
4	Shell	Unknown	5.8, 6.2, 6.7, 7.3	Late Woodland
1	Shell	Interior/exterior: smooth	6.5	Late Woodland
1	Shell	Incised	6.4	Late Woodland
5	Not discernible	Unknown	n/a	Late Woodland

Table 6-84. Features Containing Identified Material, RI 2653.

Feature #	N/A
Feature type	Midden
Botanicals	
Butter-and-Eggs Seed	1
Compositae Seed	6
Cornaceae Seed	3
Dock Seed	1
Hickory Nutshell	1
Polygonaceae Seed	1
Wood	262
Fish	
Atlantic Sturgeon	3
Fish/Bird	562
Tautog Tooth	8
Unidentified	139
Unidentified Calcined	56
Unidentified Scales	17
Shellfish	
Atlantic Bay Scallop	7,885
Atlantic Surf Clam	4
Blue Mussel	308
Eastern Oyster	7,042
Green Razor Clam	1
Northern Quahog	1,427

Continued on next page

Feature #	**N/A**
Ribbed Mussel	31
Soft Shell Clam	2,377
Unidentified	3,607
Faunal	
Bird	32
Bird Calcined	2
Mammal	8
Mammal Burned	4
Unidentified	24
Unidentified Calcined	13
Aboriginal Ceramic	
Middle Woodland	5
Late Woodland	40
Unidentified	11
Lithic	
Quartzite Celt	1

Several previously reported archaeological resources are located in the vicinity of the site, where a Phase I survey was conducted in 1996 as part of the permitting for construction of a bathhouse at the O'Brien ballpark (Figure 6-220). The 1996 survey yielded six quartz and one argillite debitage (RIHPHC site files). MPMRC identified HDAD 57 during Phase I of the Hurricane Sandy surveys, approximately 120 m (400 ft) north of RI 1249. RI 121, a previously reported pre-contact site is located approximately 240 m (790 ft) northwest of RI 1249. Additional testing of the area between these archaeological sites would be needed to assess their potential temporal and functional relationships.

Phase II Summary

MPMRC staff scraped clean by trowel the portion of the refuse feature remaining in the construction trench. The feature was drawn and photographed in profile. MPMRC then collected the remaining feature matrix for flotation and analyses.

A large number and variety of artifacts and faunal remains were recovered from the flotation sample, including 7,882 unidentified fish bone (presumably sturgeon), 6 Atlantic Sturgeon bone, 2 turtle bone, 428 unidentified mammal and bird bone, and 2,642 oyster shell. A total of 54 lithics were recovered consisting of quartz (82%), quartzite (13%), schist (4%) and rhyolite (2%) (Table 6-85; Figure 6-221). The majority of lithics were chipping debris, although 1 biface and 1 quartzite projectile point fragment were identified (Table 6-86). Additionally, 54 aboriginal ceramics dating to the Late or Final Woodland Period were also recovered (Table 6-87; Figure 6-222). Final Woodland ceramics (ca. A.D. 1400–1600) are characterized by a thin body (6–7 mm), no discernible temper, and incised decoration. One smartweed seed and several charred wood fragments were obtained from the sorted flotation samples.

Although the excavations at RI 1249 were very limited (Figure 6-223), Feature 1 adds significantly to the data from site RI 1249. The number and variety of species recovered in a single context suggest they were all obtained at the same time. Atlantic Sturgeon is an excellent spring indicator (April–May) and Atlantic

Figure 6-218. View of site west to east, RI 1249.

Figure 6-219. Disturbed refuse pit, RI 1249.

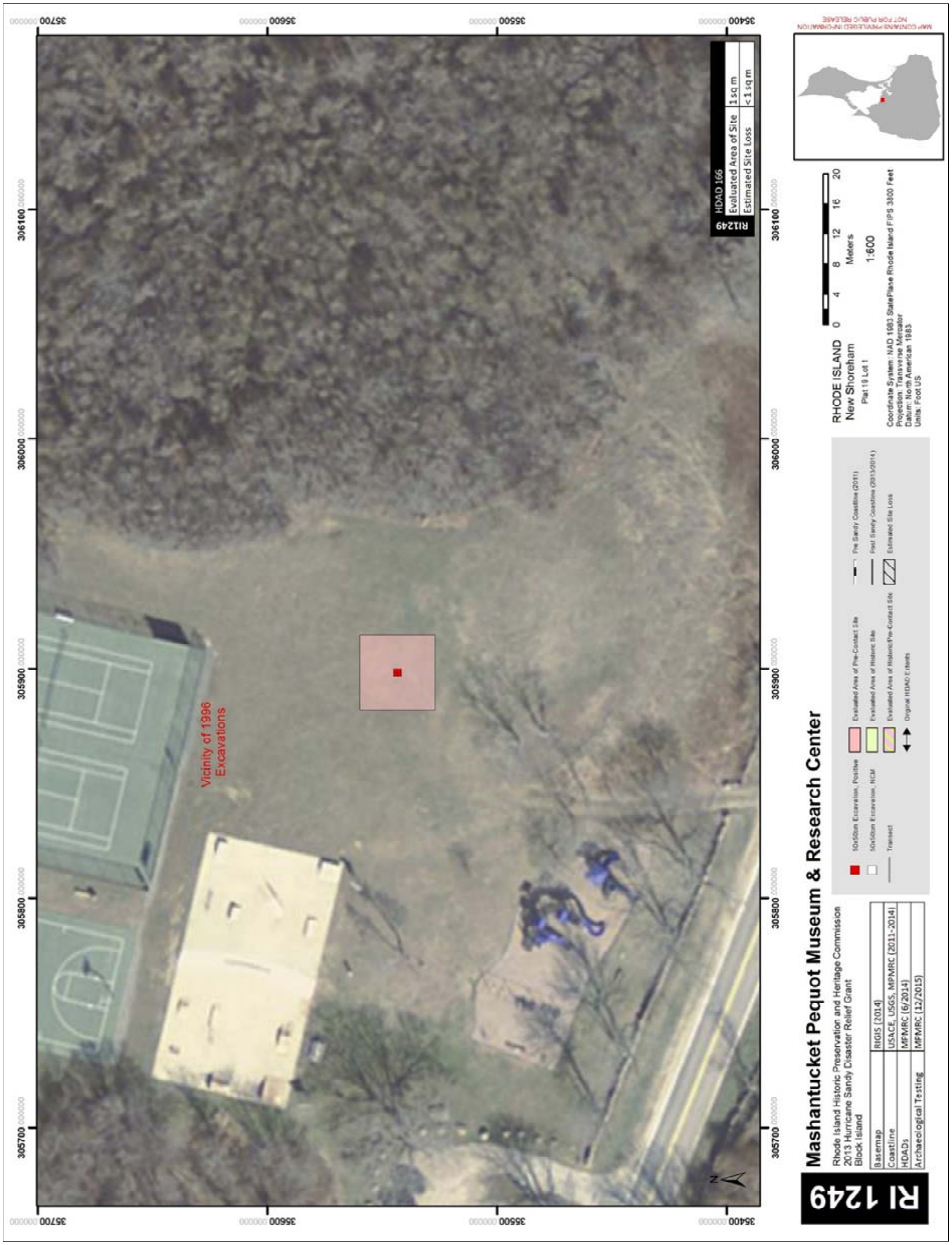

Figure 6-220. Phase II testing, RI 1249.

Table 6-85. Lithic Material, RI 1249.

Material	Count	Percentage
Quartz	46	82.14
Quartzite	7	12.50
Rhyolite	1	1.79
Schist	2	3.57

Figure 6-221. Lithic sample, RI 1249.

Table 6-86. Lithic Type, RI 1249.

Type	Count	Percentage
Angular Debris	1	1.79
Biface	1	1.79
Primary Reduction Flake/Debris	8	14.29
Projectile Point	1	1.79
Secondary Flake	9	16.07
Tertiary Flake	34	60.71
Utilized Flake	2	3.57

Table 6-87. Aboriginal Ceramics, RI 1249.

Count	Temper	Description	Thickness (mm)	Time Period
48	Not discernible	Interior/exterior: smooth	n/a	Late Woodland
4	Not discernible	Interior/exterior: smooth	6.8, 7.3, 7.6, 7.5	Late Woodland
1	Shell	n/a	6	Late Woodland
1	Shell	Rim sherd, has residue	6.4	Late Woodland

Figure 6-222. Late/Final Woodland Period ceramics, RI 1249.

Figure 6-223. RI 2628 and Fishing Place.

Cod are more common in the spring and fall. The unidentified bird remains may represent migratory waterfowl common in the spring and fall as well. The recovered ceramics and lithics date this site to the Late Woodland Period (Table 6-88).

Table 6-88. Features and Associated Materials, RI 1249.

Feature #	**1**
Feature type	Refuse Pit
Botanicals	
Smartweed Seed	1
Wood	201
Fish	
Atlantic Sturgeon	7,845
Atlantic Cod	42
Unidentified Bird	38
Shellfish	
Eastern Oyster	2,642
Mammal/Reptile/Bird	
Turtle (Testudine)	2
Unidentified	392
Unidentified Bird	38
Unidentified Claw	1
Unidentified Mammal	1
Unidentified Tooth	2
Aboriginal Ceramic	
Late Woodland	54

Site Condition, Future Threats, and Significance

RI 1249 is protected from major erosion from tidal and storm events by its location on higher ground and away from the immediate edge of the salt pond. The greatest threats are due to continued construction and development at the park. This site has archaeological potential and likely is eligible for listing in the National Register.

Summary of New Site Types Identified during Phase II Surveys

It is clear from the Hurricane Sandy surveys that earlier conclusions regarding the nature and distribution of Native American sites and settlement patterns were based on incomplete and biased information (Bellantoni 1987; Tveskov 1992). The Phase I and II surveys of the entire Block Island shoreline more than doubled the number of reported pre-contact archaeological sites on the island (see Appendix G for RIHPHC Site Forms). The abundant evidence for Native American use of the seaward coasts, in particular, contradicts earlier interpretations of pre-contact settlement patterns.

The Phase II survey identified several large and relatively complex seasonal spring (and perhaps fall) fishing camps situated on the lower elevation bluffs (less than 10 m) along the east and west seaward coastlines. In addition, small temporary or seasonal camps have been identified along the bluffs on the southern coastline between 15-m and 30-m elevations. These newly identified site types and locations indicate that Woodland Period settlement patterns are more complex than previously thought. This has implications for developing a predictive model of site locations and assessing archaeological sensitivity. In addition to MPMRC's verification of high archaeological sensitivity around the salt ponds, an equally high degree of sensitivity can be predicted for seaward bluffs below the 30-m elevation and in proximity to large freshwater wetlands.

The Phase II surveys identified two Woodland/Contact Period coastal site types not recognized prior to the Hurricane Sandy surveys: medium to large (about 1,000–2,500 sq m) seasonal spring fishing camps situated on low elevations (about 5 m–10 m) along the eastern and western seaward coasts, and small temporary camps (about 100–150 sq m) located along the higher elevations (15 m–30 m) along the southern coastline and possibly associated with the exploitation of wetland resources and/or nut harvesting. The addition of these two site types suggests a higher degree of complexity and flexibility within Block Island settlement and subsistence patterns than previously believed. Unfortunately, the sites classified as "temporary" along the higher elevations yielded few if any plant or animal remains. RI 2628 and RI 2648 each yielded a single hickory nut fragment and charred wood. Although nut fragments are often interpreted as indicators of fall season occupations, hickory, walnut and other nuts can be stored easily and may have been consumed months after they were collected. Nut fragments are consistently associated with the fishing camps for which all other indicators suggest spring season occupations. MPMRC further suspects that the relative paucity of food remains at high-elevation sites is at least partially explained by the field methods used to identify and evaluate sites along the shorelines. Phase II surveys of low-elevation sites were aided in many cases by the horizontal exposure of paleosols. Evaluation of high-elevation sites was restricted to test pits and a small number of EUs, which are far less effective in intercepting cultural features.

Seasonal Fishing Camps

Eight sites are interpreted as Woodland/Contact Period seasonal spring fishing camps: RI 137, RI 2621, RI 2622, RI 2623, RI 2624, RI 2625, RI 2630, and RI 2643. Neither RI 2623 or RI 2643 yielded any diagnostic Woodland or Contact Period artifacts but both are similar to the other spring seasonal sites with respect to setting/location, complexity of the lithic assemblage, number and range of features, and recovered faunal and botanical remains. Tables 6-2 and 6-3 list all identified faunal and botanical remains recovered from seven of the eight sites interpreted as spring fishing camps (RI 137, RI 2621, RI 2622, RI 2623, RI 2624, RI 2630, and RI 2643); two villages tested during Phase II investigations (RI 1249 and RI 2653); and two temporary camps (RI 2628 and RI 2648).

The faunal and botanical assemblages from village sites around the Great Salt Pond tend to be more variable than those from spring fishing camps, because the duration of occupations extended over several seasons (Bellantoni 1987; Tveskov 1992). The more limited faunal and botanical assemblages at spring fishing camp sites might be expected from shorter-duration sites. Sturgeon was found in four of the seven seasonal sites, and parenchyma tissue was recovered from six of the seven seasonal sites. Parenchyma is soft plant tissue found in the roots and tubers of wetland plants such as bulrush, cattail, water lily, and arrow root. Wetland roots and tubers are best harvested in fall and in early spring after the plant stops growing and has stored sufficient energy for renewed growth in the form of carbohydrates in its storage tissue. Net sinkers were also recovered from a few of the seasonal camps. Identified features at seasonal sites included hearths, middens, and refuse pits, and large and small post molds. The range in post mold size suggests that complex structures may have been constructed at the seasonal fish camps rather than just the simple, ephemeral shelters typically associated with sites occupied for short periods. Several other sites are also considered to be likely candidates for Woodland Period spring fishing camps based on their location/setting and features.

Temporary Camps

Previous archaeological surveys on Block Island identified a number of sites in the southern interior of the island that were interpreted as temporary or task-specific sites, but archaeological investigations were not sufficient to more precisely define the nature and function of the sites. RI 2628 (and possibly others) is interpreted as a temporary or perhaps small seasonal camp of limited duration based on the density and diversity of lithics, ceramics, a feature, and the recovery of charred nutshell and wood and unidentified calcined mammal remains. RI 2628 is indicative of the complexity of land use and settlement patterns away from the salt ponds and lower-elevation seaward coastlines. RI 2629, RI 2638, RI 2648, and RI 2649 also may represent temporary camps, but this interpretation needs to be confirmed with additional archaeological testing.

RI 2628 yielded over 1,600 lithic artifacts. Approximately 160 artifacts/sq m were recovered—the highest lithic frequency and density of any site evaluated during the Phase II surveys. The site is approximately 150 m southwest of a small kettle hole/wetland; it is oriented to the east–northeast and nestled against a steep protective slope, presumably as shelter against prevailing southwest winds during summer and early fall. The span of occupations at the site (Early, Middle, and Late Woodland periods) suggests it was a desirable location for several thousand years, though the specific reasons for this are not yet understood. The majority of the cultural materials are believed to be associated with the Early Woodland component. One hickory nut fragment and several calcined bone fragments were recovered, one of which could be identified as "mammal." Although extremely limited, the assemblage suggests activities related to nut harvesting and hunting. The presence of ceramics (probably from a single Early Woodland vessel) and a high density and variety of lithics indicate both cooking and a duration of occupation of more than a day or two.

In seventeenth-century deeds, the site is in an area referred to as "West Woods," with White and Black Oak and walnut mentioned to define property boundaries. Interestingly no hickory was mentioned, perhaps because hickory trees do not grow to sufficient breadth to serve as boundary markers and were not used as such. Although no fish remains were identified in the Phase I or II assemblages, it is possible fish were exploited as well. The southwest corner of Block Island where the site is located was referred to as the "fishing place" in seventeenth-century deeds. The bathymetry is unique off the southwest corner of the island and supports a highly diverse fish population.

CHAPTER SEVEN

SUMMARY OF HURRICANE SANDY SURVEYS AND MANAGEMENT RECOMMENDATIONS

Summary

The same destructive impacts from Hurricane Sandy that removed the protective mantle of dunes and vegetation over many coastal sites also provided unprecedented visibility and broad horizontal exposures of archaeological deposits that were sufficient to assess the content, internal structure and complexity, and age of many identified sites. The results of the Phase I survey clearly indicate that many sections of coastline contain both pre-contact and post-contact archaeological deposits that may provide new information about the lives of the island's residents over a span of at least 8,000 years.

The frequency of Woodland Period archaeological deposits along the seaward coastlines and the density of cultural materials recovered from these contexts conflict with previous settlement models. Fishing camps, particularly those associated with the exploitation of Atlantic Sturgeon in the spring months, appear to have been important components of Woodland Period subsistence systems on Block Island. Further investigations and comparisons of Block Island's seacoast sites and their contemporary occupations around the salt ponds may yield a more detailed understanding of Pre-Contact and Contact Period economies. The evidence for short-term use of the island's seaward coasts and the specific targeting of finfish during the Woodland Period is significant, but does not challenge the long-held view that settlements, such as hamlets or villages, were primarily located near the margins of the salt ponds. MPMRC's archival research does, however, suggest that previous settlement models may have under-emphasized the importance of high-quality agricultural soils in the location of long-term settlements after the adoption of intensive maize horticulture. Evaluation of this hypothesis is beyond the scope of the Hurricane Sandy surveys, but future surveys may help evaluate the timing and reasons for a shift toward horticultural economies, even in places offering rich and reliable marine and estuarine resources.

The nature of the Hurricane Sandy surveys placed several significant constraints on MPMRC's field investigations and interpretations, most notably the narrow horizontal limits of subsurface testing. In many cases, a precise determination of site boundaries could not be made through standard archaeological testing without damaging existing vegetation and potentially triggering additional erosion of unstable archaeological deposits. In those circumstances, MPMRC estimated site boundaries from the horizontal extent of level land surfaces bounded by wetlands, eroded bluffs, or other natural and cultural topographic breaks. MPMRC considered the eligibility of each site evaluated during the Phase II surveys for listing in the National Register through association with the historic contexts developed through archival research that are presented in Chapter 2.

To decide whether a property is significant within its historic context, MPMRC considered

- the facet of prehistory or history of the local area, state, or the nation that the property represents;
- whether that facet of prehistory or history is significant;
- whether it is a type of property that has relevance and importance in illustrating the historic context;
- how the property illustrates that history; and

- whether the property possesses the physical features necessary to convey the aspect of prehistory or history with which it is associated.

Eleven of the 33 sites on seaward-facing shorelines were evaluated as National Register eligible due to their clear expression of significance under the pre-contact historic contexts. MPMRC considers the remaining 22 Phase II-tested sites potentially significant at the local, state, or national level, but additional testing would be required to adequately document these sites' association within the following specific contexts:

- Woodland Period (ca. 3000–450 B.P.) land use and settlement patterns on Block Island within the broader context of a developing maritime-focused economy;
- Social, demographic, and economic impacts on the Native inhabitants of Block Island following the introduction and intensification of maize horticulture about 1000–800 B.P.; and
- Social and economic impacts on the Native inhabitants following contact and sustained interaction with Europeans.

Recommendations

Advancing Preservation Planning

The results of the Phase II surveys indicate that a relatively large proportion of Block Island's seaward shorelines contain intact and significant archaeological resources. The risks to these sites are acute in several specific settings, and those settings do not necessarily lend themselves to short-term solutions such as bluff stabilization or other engineering efforts. A broadly conceived, effectively collaborative, and systematically executed preservation plan is needed to address the short-term and long-term goals of preserving the island's threatened archaeological properties.

Preservation planning is a process that organizes preservation activities (i.e., identification, evaluation, registration, and treatment of historic properties) in a logical sequence. Preservation planning standards determine when an area should be examined and/or surveyed for historic properties, whether an identified property is significant, and how a significant property should be treated. Preservation planning can occur at several levels or scales, i.e., townwide, statewide, or island-wide. Depending on the scale, the planning process will involve input from the local, state, and federal government, Native American tribes, the general public, historical societies, land conservancies, and representatives from a variety of professional communities and disciplines.

The long-term protection and preservation of Block Island's archaeological resources can only be achieved by developing a comprehensive Archaeological Resource Management Plan (Management Plan) that considers a wide range of social, cultural, and environmental variables: 1) short- and long-term threats to sites; 2) archaeological site significance; 3) role of key stakeholders; and 4) definition and implementation of management policies and strategies. Historic preservation is most effective when it is based on information gathered during a formal planning process designed to identify appropriate management practices and actions. Individual, district, or island-wide management approaches must be suited to local situations and conditions, including the social, economic, political, and physical environments. The planning process is a series of interrelated steps, undertaken in logical order, that result in a Management Plan for the long-term protection and preservation of archaeological sites and districts. This Management Plan will provide a structure for developing appropriate solutions intended to preserve Block Island's historic and cultural resources using a planning process that involves the steps described below.

Identify Key Interest Groups and Stakeholders

The first step in the process is to identify all individuals and institutions that have an interest in Block Island's historic, archaeological, and cultural heritage and determine how they can be involved in the management of cultural resources. Block Island is unique in many respects. It is a very close community with a significant portion of the residents, local government, and land conservancies knowledgeable about and invested in the preservation of the ecology, history, architecture, and archaeology of the island. The Block Island Historical Society (BIHS) plays an instrumental role in collecting and disseminating information to residents and the off-island population, particularly with respect to ongoing archaeological investigations. Obvious stakeholders invested in the protection and preservation of Block Island's archaeological resources are its residents, avocational archaeologists, artifact collectors, RIHPHC, NITHPO, the Rhode Island CRMC (RICRMC), Town of New Shoreham, BIHS, Block Island Conservancy, The Public Archaeology Laboratory, Inc., (PAL) and the Mashantucket Pequot Museum and Research Center. Academic partners such as Salve Regina University, the University of Connecticut, the University of Rhode island, Rhode Island College, and Brown University could also play a significant role in mitigating threats to sites and supporting Narragansett tribal interests and those of the Town of New Shoreham and the BIHS.

Document the Pre-Contact and Post-Contact History of Block Island

The second step in the management planning process involves identifying and inventorying potentially significant archaeological resources through archaeological surveys and historical research and placing identified sites in the appropriate historical and cultural context. This report is part of this step, but also suggests a great deal more work remains to be done to adequately assess the National Register eligibility of the large group of archaeological sites on Block Island not currently listed in the National Register.

Previous archaeological surveys on Block Island identified 113 sites, 18 of which were included in the Great Salt Pond Archaeological District (Figures 7-1 and 7-2). The Phase I Hurricane Sandy survey identified a total of 163 HDADs, 26 of which were associated with previously identified sites. Seven of the 26 HDADs were associated with previously reported sites around the salt ponds, including two (RI 118 and RI 1380) that are contributing resources to the Great Salt Pond Archaeological District. Forty-nine HDADs were identified within the boundaries of this district during the Phase I survey. Phase II testing focused on the most threatened locations along the seaward shorelines, so additional investigations would be needed to assess the National Register eligibility of these HDADs as contributing resources to the Great Salt Pond Archaeological District.

Assess Site Significance

The Phase II survey tested 33 archaeological sites associated with HDADs (20% of the identified 163) (Figure 7-3; Table 7-1). Of the 33, 7 were located around the salt ponds (4.3% of 163 HDADs, 12.5% of 56 salt pond HDADs), and 26 were located along the seaward coast (16.0% of 163 HDADs, 23.6% of 110 coastal HDADs; Figure 7-3). MPMRC considers 13 (39.4%) of the Phase II-tested sites eligible for listing in the National Register under Criterion D (properties that have yielded, or may be likely to yield, information important to prehistory or history). An additional 13 (39.4%) sites assessed as having "unknown" significance were determined to have moderate to high archaeological potential and may be eligible for listing in the National Register, but would require additional investigations outside the scope of the surveys reported here to determine their eligibility.

Phase II investigations found that 7 of 26 (26.9%) seaward coastal sites evaluated were likely eligible for listing in the National Register. An additional 12 (46%) of the seaward coastal sites likely had sufficient

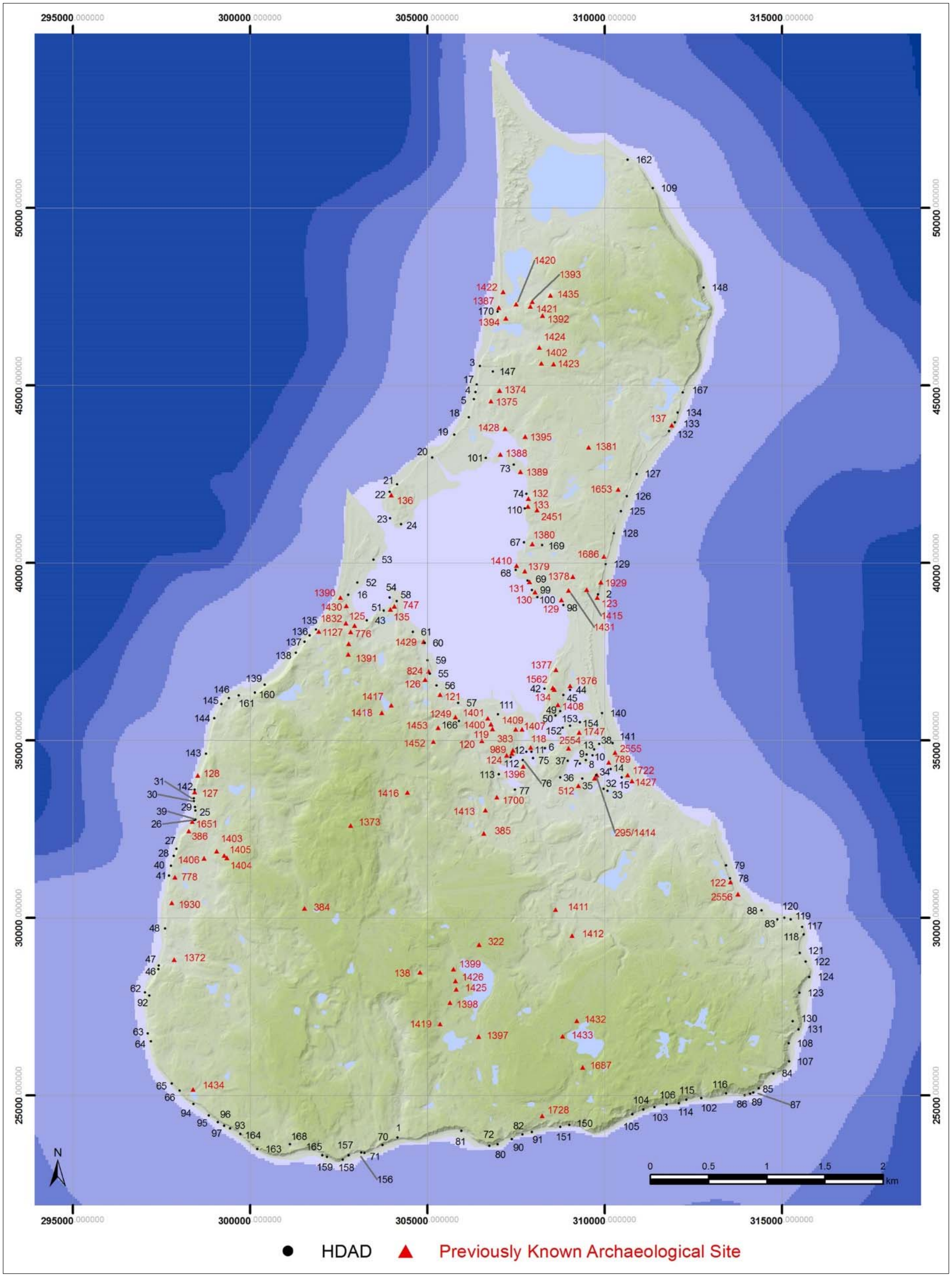

Figure 7-1. Previously known sites and HDADs.

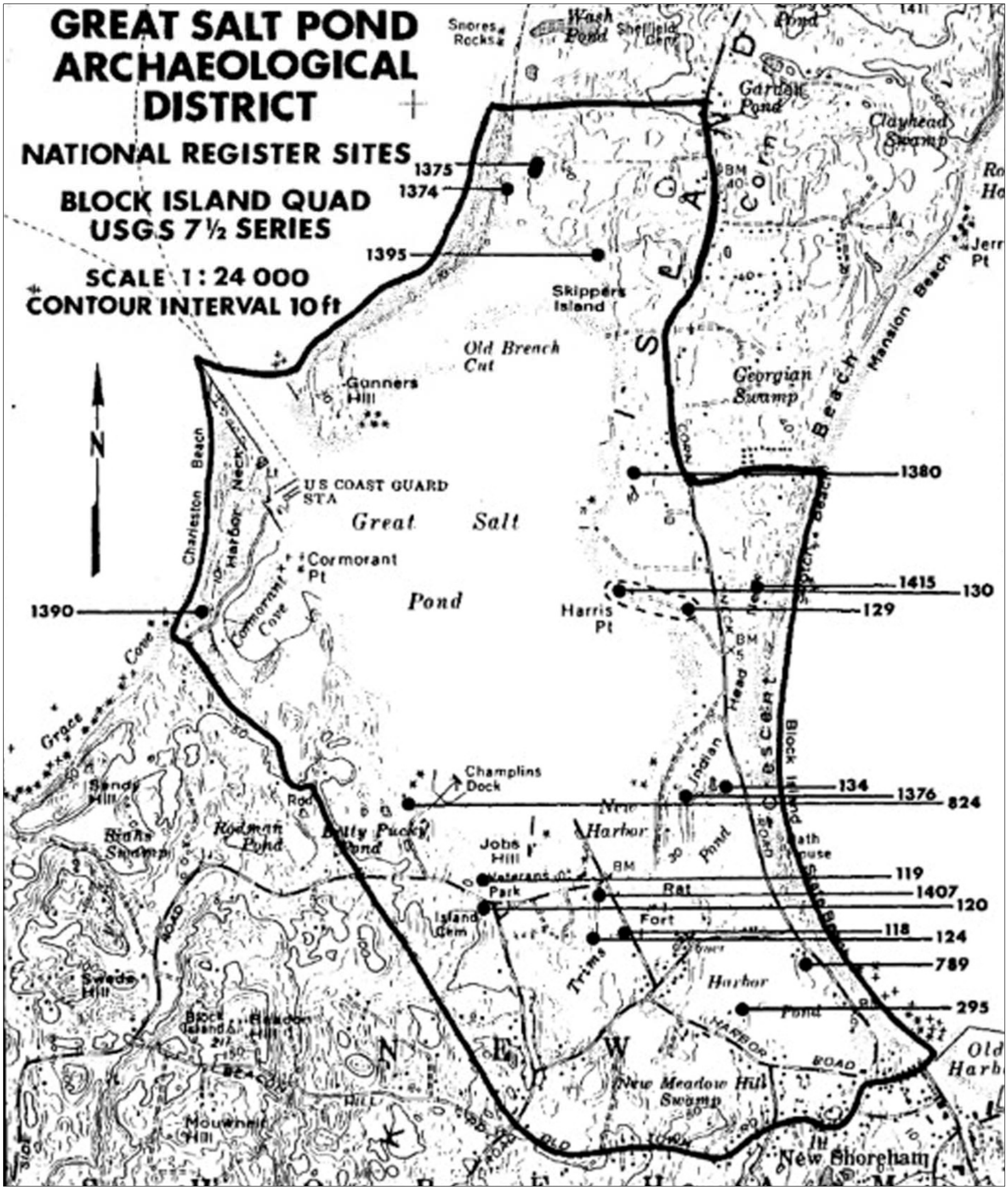

Figure 7-2. Great Salt Pond Archaeological District.

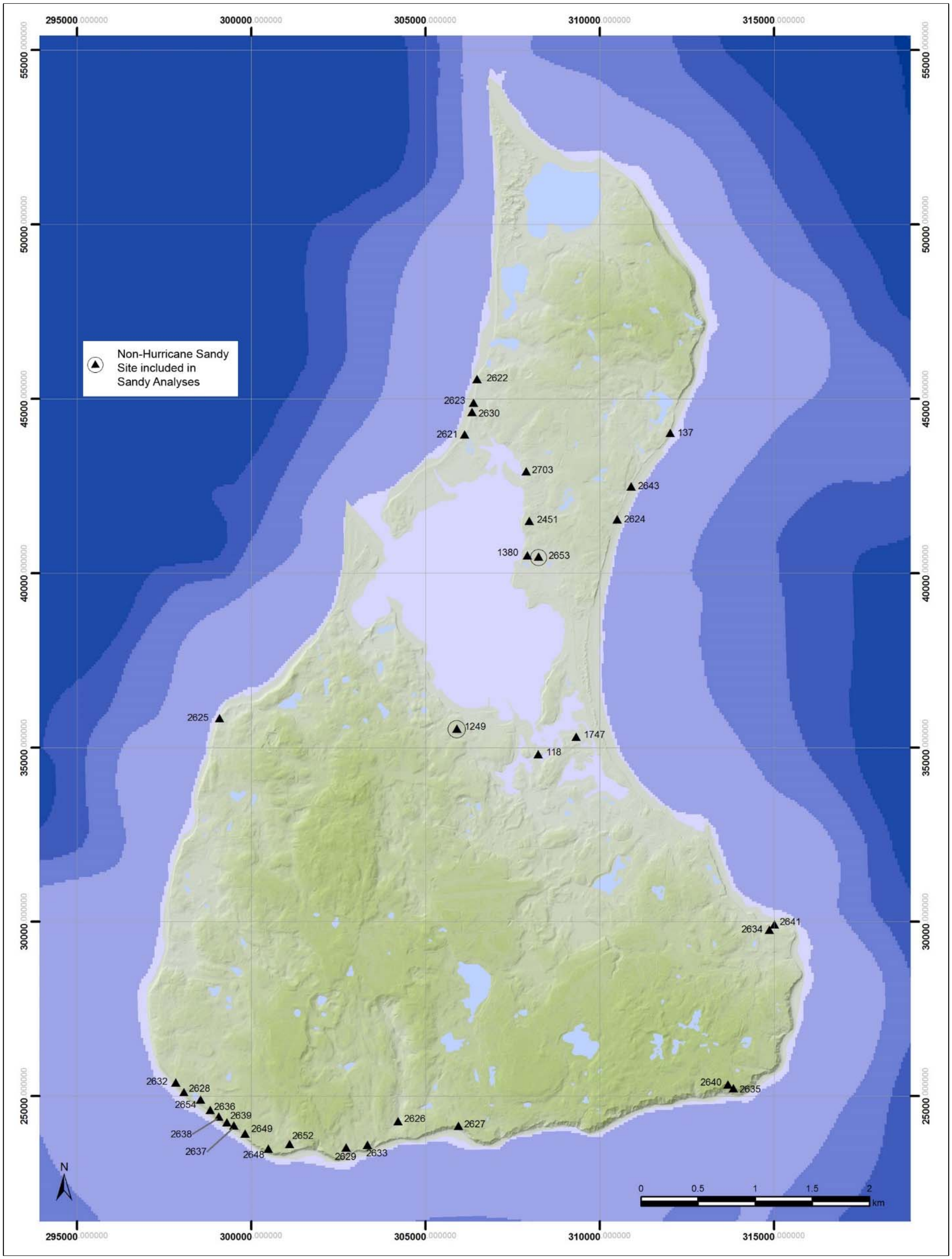

Figure 7-3. Location of sites with Phase II surveys and RI 1249 and RI 2653.

Table 7-1. National Register Assessments of Phase II Sites.

RI Site #	HDAD #(s)	Period of Significance	Site Type	Condition	Archaeological Potential	Significance	Threat	Management Rank
118	11/12	Late Woodland, Contact	Fort	Good	High	Criterion D	Low	2
137	132/133	Late Woodland	Spring Seasonal	Good	High	Criterion D	High	1
1249	166	Late Woodland	Unknown	Fair	Moderate	Criterion D	Low	2
1380	67	Middle and Late Woodland, Contact	Village	Good	High	Criterion D	Low	2
1747	153/154	Late Woodland	Village	Good	High	Criterion D	Low	2
2451	110	Early, Middle, and Late Woodland, Contact	Unknown	Good	High	Unknown	Low	2
2621	18	Late Woodland, Contact	Spring Seasonal	Fair	High	Criterion D	High	1
2622	3	Early and Middle Woodland	Spring Seasonal	Fair	High	Criterion D	High	1
2623	4	Woodland?	Spring Seasonal	Fair	High	Criterion D	High	1
2624	125	Woodland?	Spring Seasonal	Fair	Moderate	Criterion D	High	1
2625	145	Early and Late Woodland	Spring Seasonal	Fair	High	Criterion D	High	1
2626	1	Unknown	Unknown	Good	Moderate	Unknown	Moderate	2
2627	81	Unknown	Unknown	Good	Moderate	Unknown	Moderate	2
2628	66	Early and Late Woodland	Temporary camp	Good	High	Criterion D	High	1
2629	157	Unknown	Unknown	Good	Moderate	Unknown	Moderate	2
2630	5	Early, Middle, and Late Woodland	Spring Seasonal	Fair	High	Criterion D	High	1
2632	65	Unknown	Unknown	Good	Low	Unknown	Moderate	3
2633	71	Unknown	Unknown	Good	Moderate	Unknown	Moderate	2
2634	83	Unknown	Unknown	Good	Moderate	Unknown	Moderate	2
2635	86	Unknown	Unknown	Fair	Low	None	Moderate	3

Table 7-1 (cont'd). National Register Assessments of Phase II Sites.

RI Site #	HDAD #(s)	Period of Significance	Site Type	Condition	Archaeological Potential	Significance	Threat	Management Rank
2636	95	Unknown	Unknown	Good	Low	None	Moderate	3
2637	93	Unknown	Unknown	Good	Low	Unknown	Moderate	3
2638	96	Unknown	Unknown	Good	High	Unknown	Moderate	3
2639	97	Unknown	Unknown	Good	Low	Unknown	Moderate	3
2640	116	Unknown	Unknown	Fair	Low	None	Moderate	3
2641	120	Unknown	Unknown	Good	Low	None	Moderate	3
2643	127	Unknown	Unknown	Fair	High	Unknown	High	2
2648	163	Unknown	Unknown	Good	Moderate	Unknown	High	2
2649	164	Unknown	Unknown	Good	Moderate	Unknown	High	2
2652	168	Unknown	Unknown	Good	Moderate	Unknown	Moderate	2
2653	169	Middle and Late Woodland	Village	Good	High	Criterion D	Low	2
2654	94	Unknown	Unknown	Good	Moderate	Unknown	Moderate	2
2703	73	Unknown	Unknown	Good	Moderate	Unknown	Low	3

integrity and archaeological potential to be listed in the National Register, but additional testing is needed to collect sufficient data. The other 7 seaward coastal sites evaluated during the Phase II surveys are recommended by MPMRC as ineligible for listing in the National Register due to a lack of integrity and/or very limited potential to yield important new information.

Six of the seven seaward coastal sites with sufficient information to be recommended as National Register eligible had broad horizontal exposures of paleosols. The task of collecting data on seasonality and subsistence, time period, site complexity, and site type was much easier at these sites (where exposing hidden features required scraping only a few centimeters of the remaining paleosol) than at sites such as RI 2628, an example of the less visible, smaller, temporary and seasonal camps situated on the high bluffs. These sites, often located in overgrown, second growth vegetation that could not be cleared, could rarely be tested at the requisite 5-m testing intervals to determine site boundaries and collect sufficient information to assess National Register eligibility.

Approximately 276 sq m of RI 2621 was exposed by Hurricane Sandy (Figure 7-4) and was easily examined to determine where best to scrape the exposed paleosol to identify possible features. The remaining thin paleosol (often less than 5 cm) was removed from 26 sq m of the site, revealing 33 features with a relatively small investment of time. Conversely, a total of 35 STPs and 10 EUs were excavated at RI 2628, but only because one of the STPs fortuitously contained a fragment of ceramic and a concentration of quartz lithics. RI 2628 is relatively small (50 sq m), and without the chance find of a ceramic and concentration of lithics in a single test pit, it is unlikely any additional effort would have been made beyond the standard linear testing at 5-m intervals (Figure 7-5).

The testing and excavation program carried out at RI 2628 clearly indicates that a fair investment of time and effort is necessary to both locate and adequately assess the National Register eligibility of small, less complex sites along the seaward coasts at elevations above 10 m. Figures 7-6 and 7-7 depict lithic densities for RI 2628 and RI 2627, both located along the south coast above the 10-m elevation. Both sites were characterized by areas of no or low lithic densities punctuated by a dramatic increase in lithic density within a relatively small area. RI 2627 could not be tested more intensively because of vegetation constraints, but it is certainly a candidate for additional investigations. MPMRC recommends that supplemental surveys of RI 2628 and RI 2627 be incorporated as a significant element of the management plan.

The Management Assessment process takes place within the contexts of the Phase II-tested sites considered eligible for listing in the National Register and the incompletely assessed HDADs considered to have archaeological potential under Criterion D. These sites are distributed across the broader coastal landscape, defined by the individual Shoreline Change Areas depicted in Figures 7-8 and 7-9. Although the number of National Register eligible sites may appear low, this is largely due to the increased visibility and access to sites situated on elevations below 10 m at the expense of sites above the 10-m elevation with lower visibility and access. This suggests that many HDADs above the 10-m elevation in Areas 1a and 3 to 9 (see Figure 6-8) are potentially eligible for listing in the National Register but have not been adequately assessed archaeologically.

Prioritize Preservation Efforts

An important aspect of the Management Assessment process is not just determining whether sites meet the criteria for listing in the National Register and retained integrity at the time of the surveys, but also assessing the short-term and long-term threats to each site's integrity. Threat levels are based on the elevation models discussed in Chapter 3; bluff elevations of 0–10 m are at high risk of coastal erosion, elevations of 10–15 m are at moderate risk, and elevations between 15 and 45 m are at low risk. The threat levels (risk of loss due to coastal erosion) of sites within the Salt Pond Area are low (see below). The more pressing problem is the

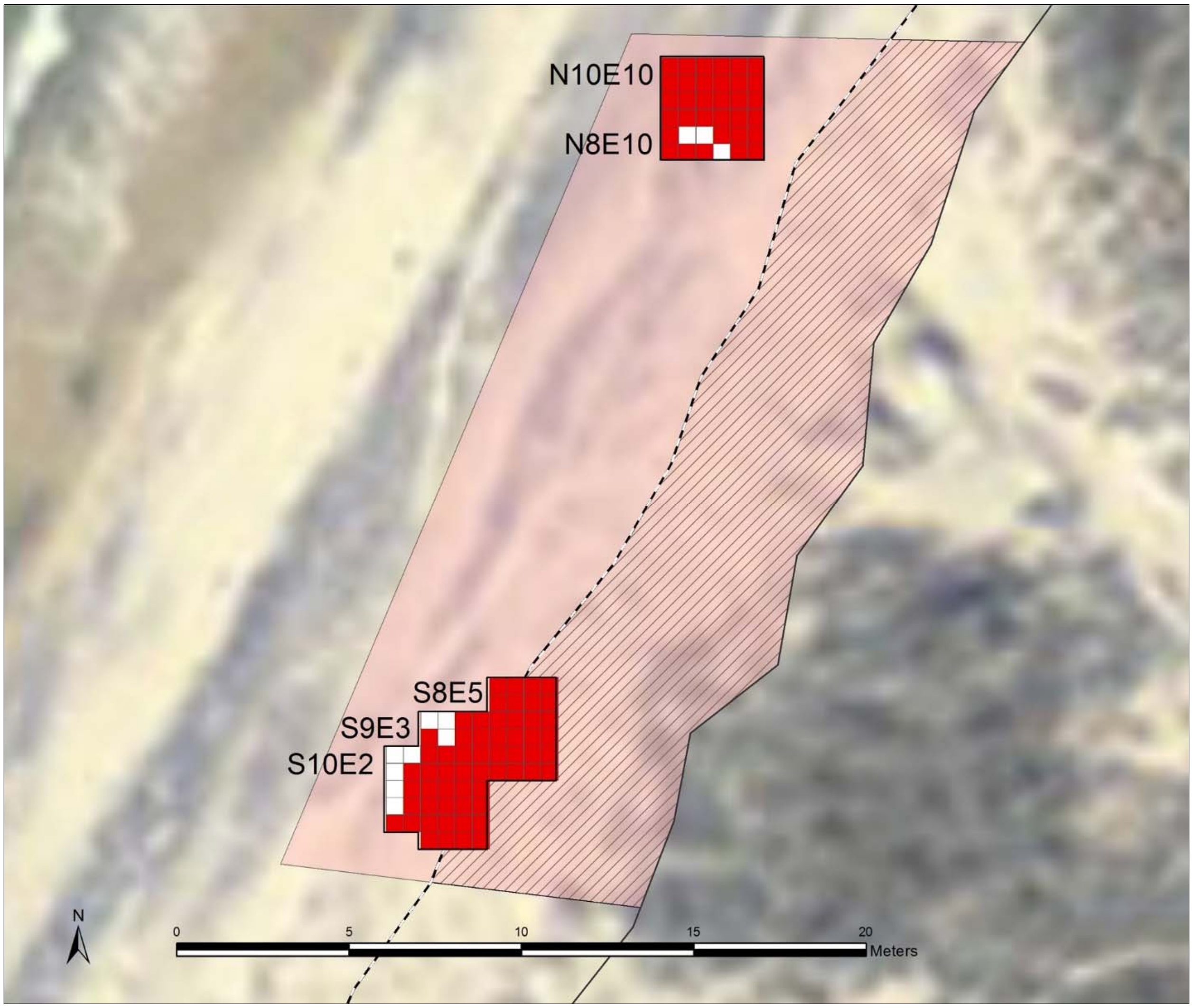

Figure 7-4. RI 2621 excavations.

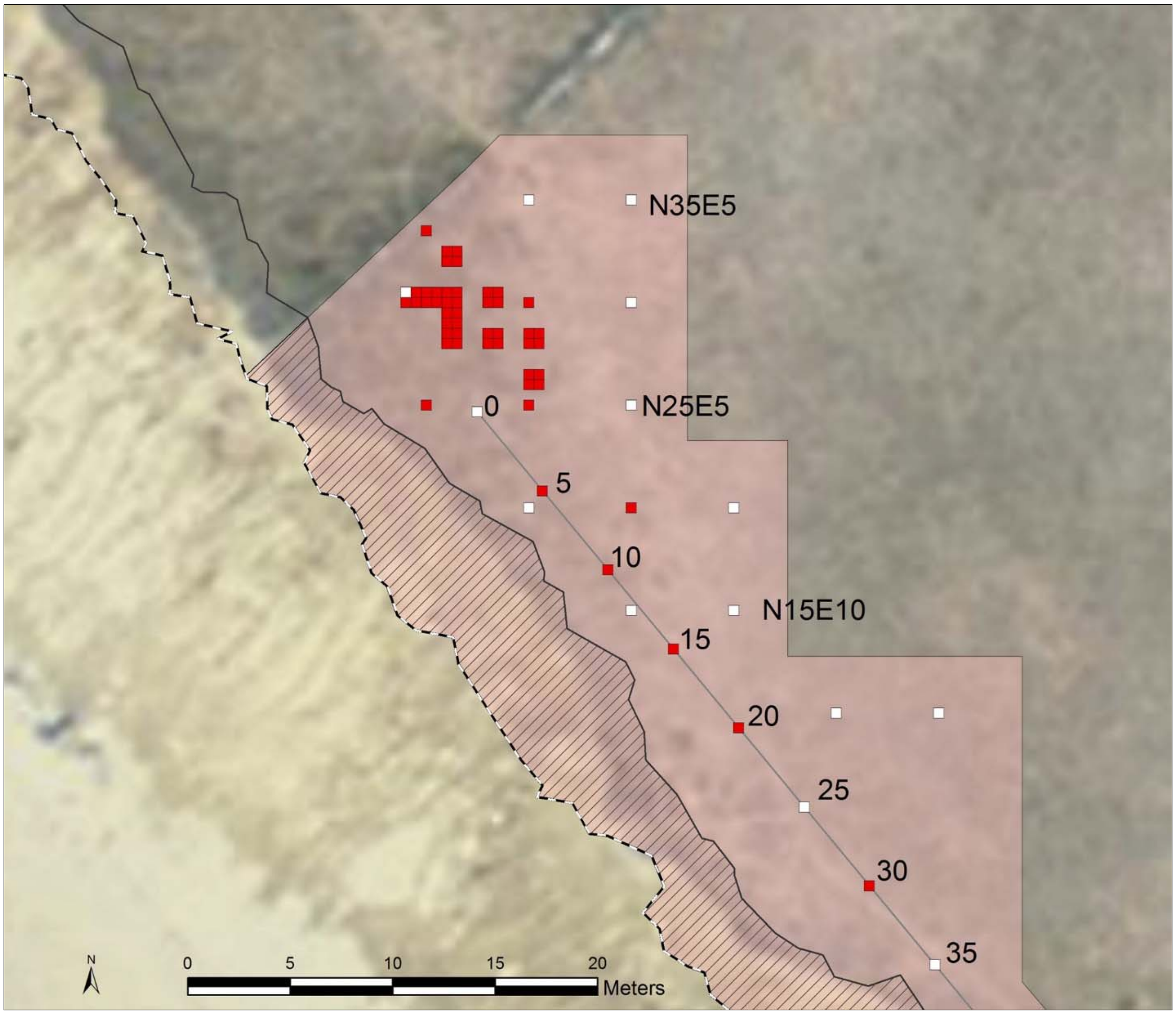

Figure 7-5. RI 2628 testing and excavations.

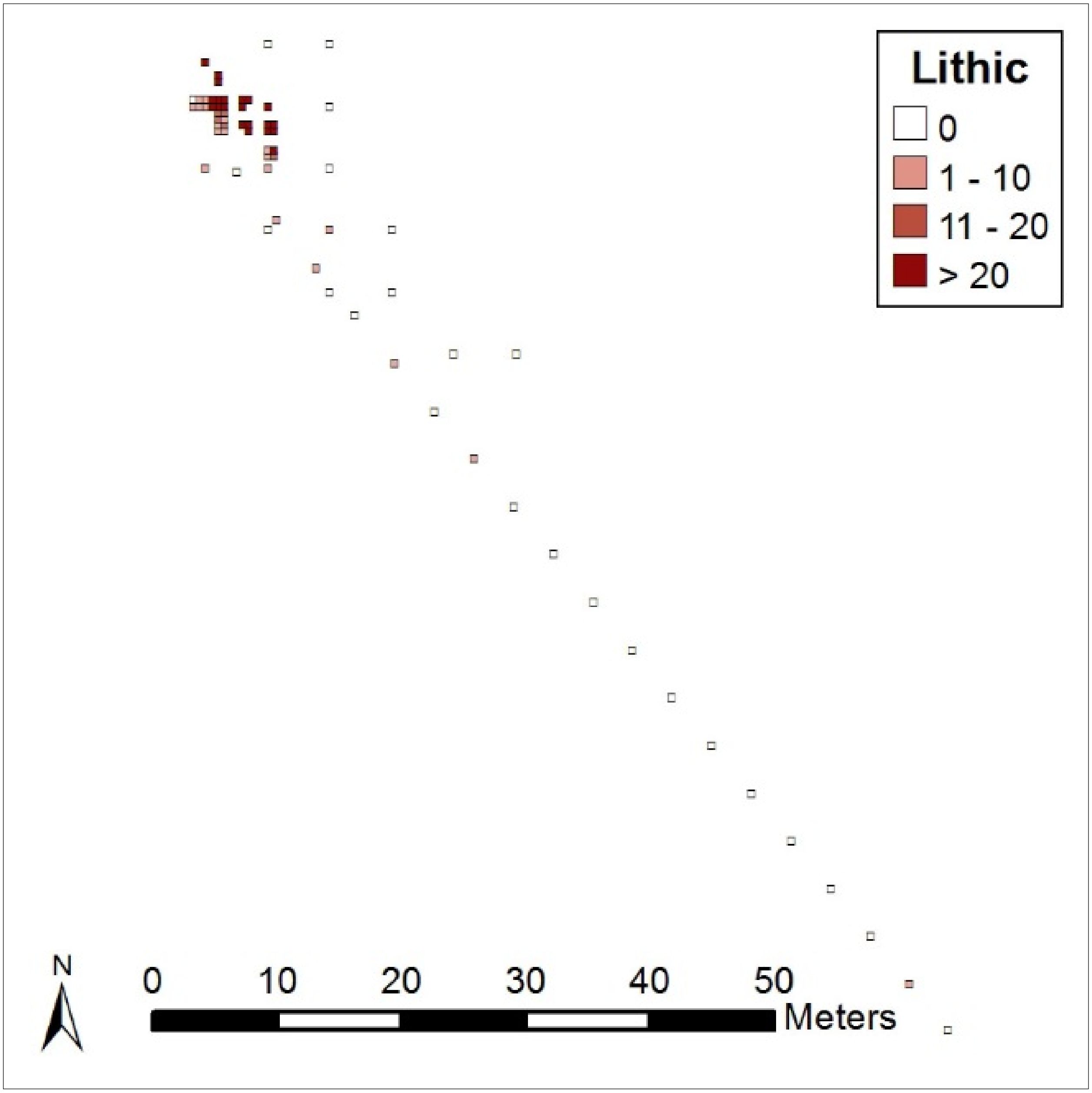

Figure 7-6. Lithic density, RI 2628.

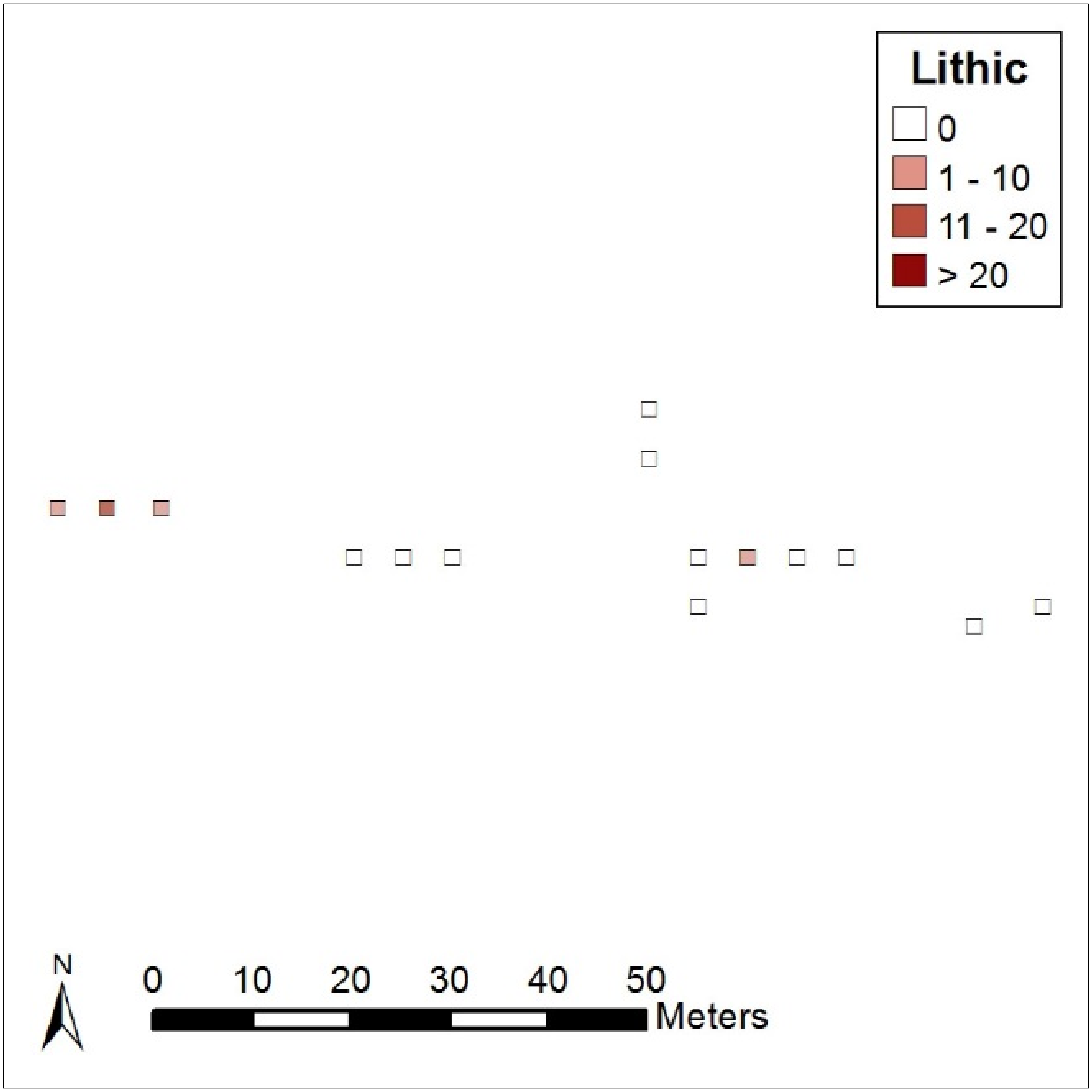

Figure 7-7. Lithic density, RI 2627.

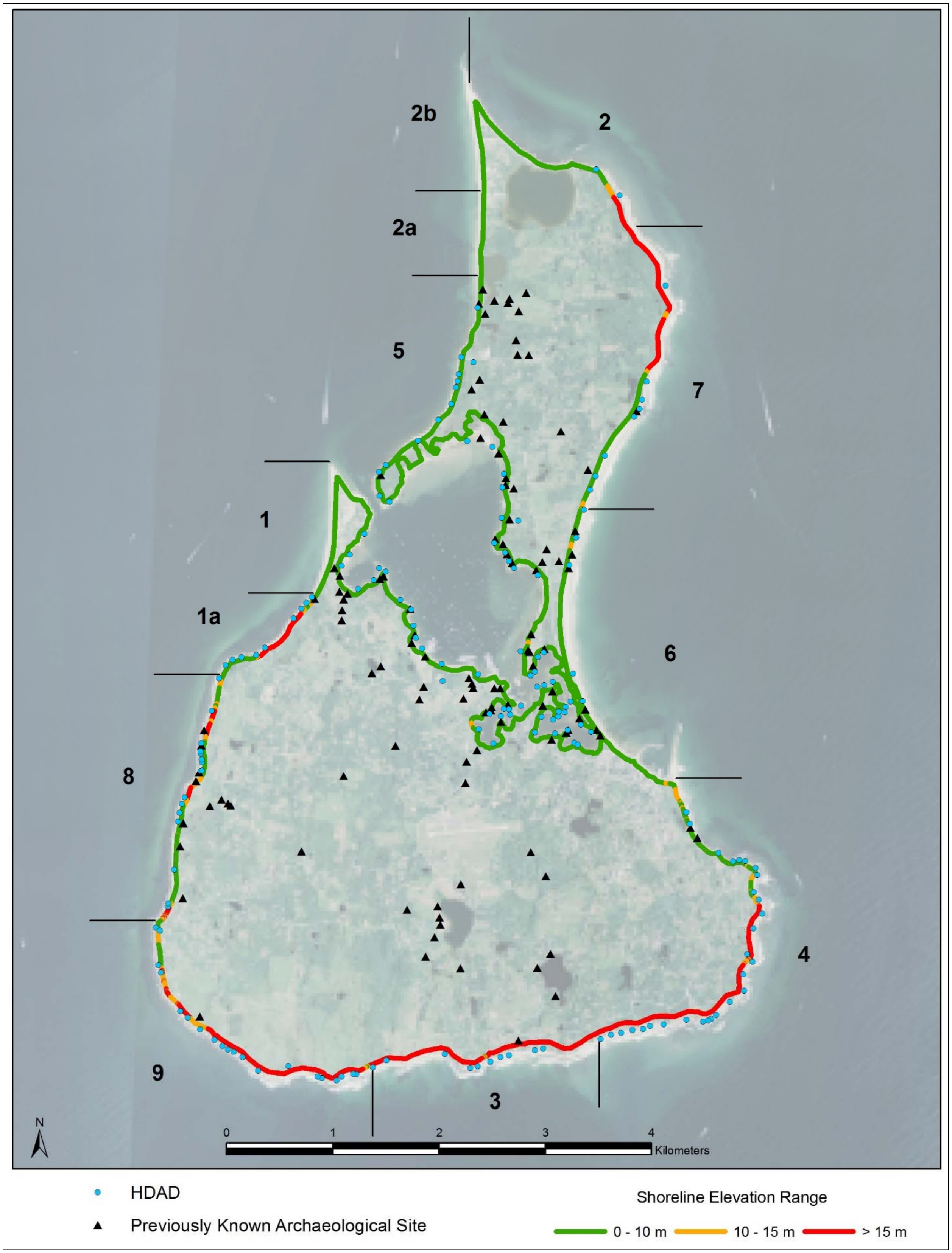

Figure 7-8. Shoreline Change Areas, Elevation Threats, and HDADs.

Figure 7-9. Phase II sites and threat level.

remaining 110 sites/HDADs along the seaward coastline, 58 of which are situated on landforms with moderate to high risk from coastal erosion and/or represent rare and under-documented types of pre-contact sites (Figures 7-8 and 7-9).

The Management Assessment takes into account variables such as integrity, archaeological potential, National Register eligibility, site type and rarity, and future threats from shoreline erosion. Table 7-2 lists the variables used to assign a threat level to an individual site, which is identified as the Management Rank in Table 7-1. Table 7-1 shows a Management Assessment of the 33 Phase II tested sites by time period, site type, condition, archaeological potential and significance, and threats. Each site was assigned a Management Ranking of 1–3 as a preliminary way to prioritize them with respect to future archaeological preservation efforts (Tables 7-1 and 7-2). Rank 1 sites have a known period of significance and historic context under Criterion D, are in fair to good condition, have moderate to high archaeological potential, and are at a high threat level. Rank 2 sites have an unknown period of significance but are considered to have moderate to high archaeological potential such that additional testing will likely provide the necessary information to list them in the National Register under Criterion D. Rank 2 sites are also at moderate to high threat levels from coastal erosion. Sites are classified as Rank 3, even if they have moderate to high archaeological potential, if they are located within a low threat area such as the salt ponds and represent well-documented site types. Sites are also classified as Rank 3 if they have low or no archaeological potential even if they are in located within a moderate to high threat area.

Table 7-2. Management Ranking Matrix.

Rank	Period of Significance	Condition	Archaeological Potential	Significance	Threat level
Rank 1	Known	Fair–good	Moderate–high	National Register eligible under Criterion D	High
Rank 2	Unknown	Fair–good	Moderate–high	Undetermined	Moderate–high
Rank 3	Known and unknown	Fair–good	Low–high	Undetermined or Not National Register eligible	Low–moderate

The relative weighting of each site's potential to yield significant new information against the threat of erosion is most apparent in MPMRC's Management Ranking of sites found along the south coast of the island. Although many sections of the high bluffs found in Areas 3, 4, and 9 are at a low risk of coastal erosion, the percentage of these shorelines containing HDADs and sites, and the lack of prior archaeological investigations of these landforms, means the archaeological sites found in these contexts have a greater potential to yield substantially new information about the Pre-Contact Period than those found along the salt ponds.

A Management Assessment of the remaining HDADs by Area is necessary to assess the integrity, significance, and future threats to each potentially significant archaeological site based on Shoreline Change Distance and Elevation models. The results of the Hurricane Sandy surveys suggest that the relative abundance (frequency and density) of sites and site types in a given Area is a critical aspect of evaluating site significance. Such assessments are best done within the context of the Shoreline Change Models by Area (Figures 7-1, 7-4, and 7-5; Tables 7-3 and 7-4).

The most important variables for assessing short- and long-term threats to archaeological sites within any given Area are the Shoreline Change Distance and Rate over the previous 60 years and the percentage of land area within specific elevation ranges (0–10 m, 10–15 m, and 15–45 m). As discussed in Chapter 3, seaward elevations at greatest threat from shoreline erosion are bluff heights of 0–10 m MLLW (Mean Lower Low Water) with bluff elevations 10–15 m at a modest threat level, and bluff elevations 15–45 m (MLLW) with the lowest threat level. Sites that are situated on bluff elevations 0–10 m are at the highest risk in part because even storms of modest intensity, which occur several times a year, may have a significant impact on these sites. Some of the sites in Area 5 will likely be completely destroyed by erosion in the next 5–15 years. Conversely, even though sites situated on the 15–45 m bluff elevation were assigned a low threat level, it is only a matter of time (decades, not centuries) before substantial losses will occur.

Table 7-3. HDADs as Percentage of Shoreline Length and Threat Level by Area.

Area	Total Shoreline Length (km)	# HDADs	Average HDAD Length (m)	Aggregate HDAD Length (m)	HDADs as % of Shoreline Length	Area Threat Level
1	1,164	0	0	0	0	Low
1a	1,229	9	32	288	23.0	High
2	2,061	2	14	28	1.0	Low
2a	843	0	0	0	0	Low
2b	801	0	0	0	0	Low
3	2,305	10	30	300	13.0	Moderate
4	4,002	29	48	1,392	35.0	Moderate
5	2,370	11	32	352	15.0	High
6	3,095	5	48	240	8.0	High
7	2,954	8	48	384	13.0	High
8	2,479	16	32	512	21.0	High
9	2,962	20	30	600	20.0	Moderate
Salt Ponds	15,033	56	27	1,512	10.0	Low

Table 7-4. Percentage of Shoreline by Elevation Range and Threat Level by Area.

Area	# HDADs	% 0–10 m Elevation	% HDADs	% 10–15 m Elevation	% HDADs	% 15–45 m Elevation	% HDADs	Area Threat Level
1	0	100	0	0	0	0	0	Low
1a	9	41.4	67.0	11.2	22.0	47.2	11.1	High
2	2	77.3	50.0	6.0	0	16.7	50.0	Low
2a	0	843.0	0	0	0	0	0	Low
2b	0	801.0	0	0	0	0	0	Low
3	10	0.5	0	1.0	10.0	98.5	90.0	Moderate
4	29	30.5	31.0	11.5	7.0	58.0	62.0	Moderate
5	11	100	100	0	0	0	0	High
6	5	92.0	100	4.0	0	4.0	0	High
7	8	46.0	87.5	4.5	0	49.5	12.5	High
8	16	62.0	62.5	20.0	25.0	18.0	12.5	High
9	20	11.0	10.0	22.0	20.0	67.0	70.0	Moderate
Salt Ponds	56	100	100	0	0	0	0	Low

Tables 7-3 and 7-4 and Figure 7-10 summarize the number and total length of HDADs by elevation and Area to assess the threat levels for particular elevations. These assessments by Area are based on the frequency, density, and aggregate linear extent of HDADs. The data indicate that Areas 1a and 5–8 have the greatest threat levels because a significant percentage of HDAD length was located at 0–10 m elevations. Moderate threat levels were assessed for Areas 3, 4, and 9, as a high percentage of HDADs were within the 10–15 m and 15–45 m elevations. Low threat levels were assigned to Areas 1, 2a, 2b, and the Salt Pond Area, either because the Areas contained no sites (Areas 1, 2a, and 2b) or very few sites (Area 2) or, in the case of the Salt Pond Area, because relatively little erosion occurs during major storms.

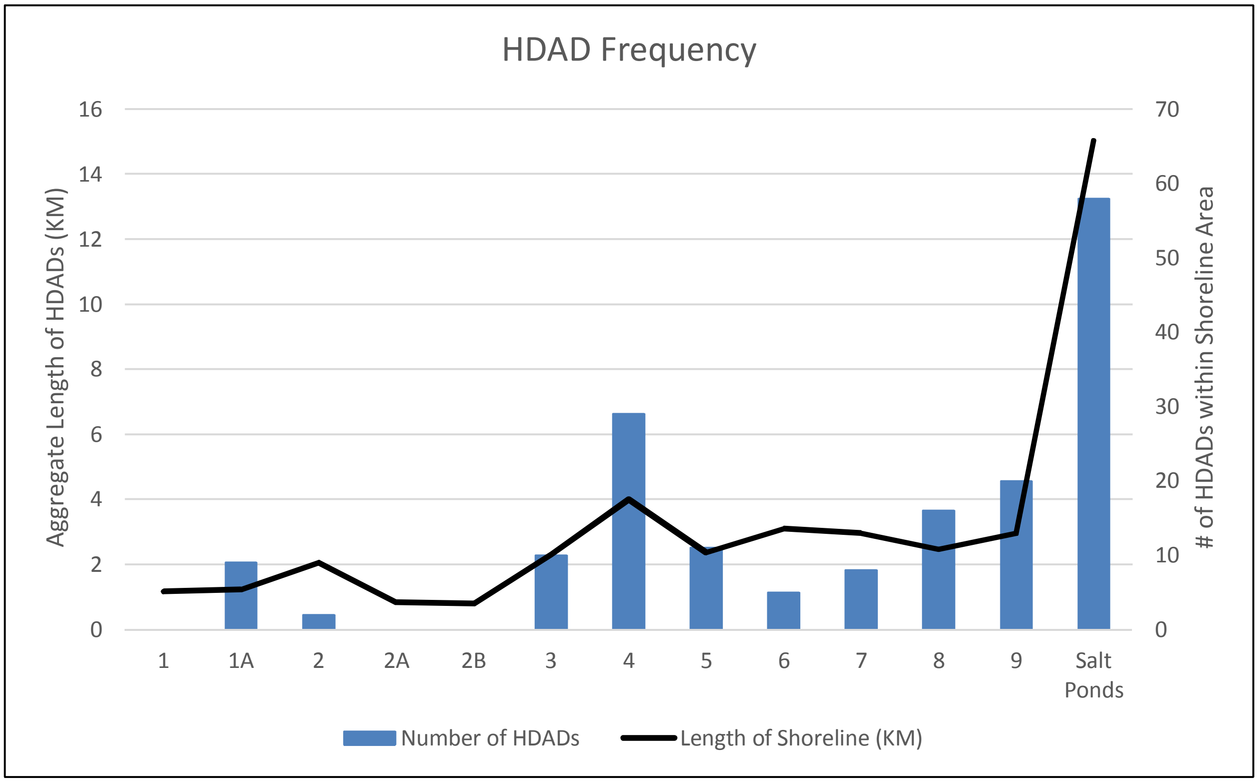

Figure 7-10. Length of area by number of HDADs.

Develop a Historic Preservation Mitigation Strategy and Implementation Plan

Developing a mitigation strategy and implementation plan for Block Island presents some interesting challenges. First and foremost are the logistical and access issues given the remoteness of Block Island, particularly during the storm season. Second is the need for effective site impact assessments by historic preservation specialists during periods of reduced access to the island. Third, supplemental site assessments along the 14.5 miles of seaward shorelines may be needed on a regular basis. Finally, the mitigation plan strategy and implementation has to be island-wide to encompass the range and complexity of cultural and historic properties on Block Island.

Preservation efforts at this scale are always constrained by funding and staffing. Whenever feasible, MPMRC recommends that RIHPHC and its partners plan for the participation of volunteers in response to future disasters. Relatively minor investments in planning before the next major storm strikes the island may substantially improve the preservation outcomes and foster a greater appreciation of the island's unique cultural heritage.

Once the full scope and nature of the cultural resources on Block Island have been identified and evaluated with respect to the criteria for listing in the National Register, the next step is to develop a Historic Preservation Mitigation Strategy and Implementation Plan (Implementation Plan) to ensure the long-term protection and preservation of National Register eligible or potentially eligible sites. Given the inevitability of short-term and long-term impacts to National Register sites on the seaward coasts, the Implementation Plan should incorporate a variety of options for an ongoing assessment of sites and partial mitigation through data recovery where warranted.

The goal of the Implementation Plan is to involve historic preservation specialists, organizations, and individuals at the local, state, and national levels in an ongoing effort to identify, assess, and mitigate threats to National Register sites, while at the same time preserving the character and integrity of the cultural resources. One of the most important aspects of the Implementation Plan will be to maintain a current list of Pre-Contact and Post-Contact Period cultural resources on Block Island with information on their current condition, significance, and potential threats. Cultural resources designated as significant and under greatest threat from hazards should be assessed immediately after a hazard event as part of the mitigation process.

MPMRC recommends that RIHPHC implement six specific actions to address the identified threats to significant archaeological resources on Block Island.

1. **Identify Historic Preservation Professionals and Volunteers to Participate in the Implementation Plan**

To help ensure that the integrity of cultural resources are adequately assessed and protected during mitigation efforts, whenever possible RIHPHC and NITHPO should take the lead in identifying historic preservation specialists and volunteers who are willing to participate in the Implementation Plan. Professional archaeologists familiar with Block Island and its archaeological resources will likely play an important role, and there are a number of potential academic partners for the efforts. Block Island has a highly dedicated and experienced resident population of amateur archaeologists who likely would be willing to participate. The BIHS and its dedicated members could play a lead role in the plan and act as a clearing house for the collection and dissemination of information.

Identifying stakeholders and participants is important, but preparing those participants to work effectively in implementation requires training and coordination. RIHPHC and NITHPO, with assistance from other historic preservation specialists, could take the lead in developing training programs for volunteer damage assessment teams to evaluate impacts to National Register-listed or potentially eligible sites following storm events and be part of the consultation process regarding site-specific recovery efforts, if necessary.

2. **Develop Procedures to Assess Damage to Cultural Resources**

RIHPHC, in coordination with NITHPO, should develop procedures to assess impacts to cultural resources from major coastal storms. These procedures will address cultural, historical, architectural, and archaeological characteristics, including qualities or aspects to cultural properties that may require special treatment(s), particularly with respect to properties of traditional cultural and spiritual significance to the Narragansett Indian Tribe. A comprehensive database should be developed to track previous and current impacts, conditions, and threats to sites. This process should be compatible with and linked to a comprehensive survey database maintained by RIHPHC so that the determinations made during the assessment would automatically become part of the database.

3. **Develop Damage Assessment Forms and Mitigation Protocols**

RIHPHC should develop data recording procedures and protocols that take into consideration the unique historical, cultural, archaeological, and environmental contexts and conditions on Block Island, particularly with respect to sites of traditional and spiritual importance to the Narragansett Indian Tribe. Actions taken by emergency response teams immediately following a natural disaster can inadvertently cause extensive damage to, and even destroy, cultural resources. RIHPHC and NITHPO could take a lead role in developing training guidelines for emergency response teams on Block Island to assist in the documentation, salvage, stabilization, reconstruction, and other post-disaster procedures that may affect historic and cultural resources. RIHPHC and NITHPO might coordinate with local, state, and federal partners to ensure emergency response teams are aware of the procedures outlined in the Implementation Plan.

4. Conduct Comprehensive Damage Assessments of At-Risk Cultural Resources

Recent post-disaster experiences on Block Island demonstrate that on many occasions the most critical aspect of mitigation efforts is an immediate and appropriate response before additional damage occurs from natural or human causes. Trained volunteers and teams of historic preservation and cultural specialists potentially from RIHPHC, NITHPO, MPMRC, and PAL may need to survey and assess conditions and impacts to at-risk cultural resources and landforms; determine the nature and scope of impacts; and in consultation with the RICRMC, develop mitigation procedures in the form of stabilization and/or reconstruction of the physical landscape associated with or surrounding the site, and/or develop partial mitigation of impacted portions of the site through data recovery.

5. Develop a Post-Disaster Mitigation Process for the Evaluation and Mitigation of Impacted Cultural Resources

RIHPHC, in coordination with NITHPO, should consider developing a post-disaster mitigation process that encourages a preservation ethic and allows for the evaluation and possible mitigation through data recovery of damaged cultural resources or the implementation of other appropriate treatment measures that take into account the historic and traditional cultural significance of the affected archaeological properties. Understanding stakeholders' perspectives on mitigation and treatment of storm-damaged archaeological or cultural resources may help avoid conflicts in the aftermath of a future natural disaster.

6. Conduct Ongoing Phase I and Phase II Archaeological Surveys

The single most important aspect of historic preservation planning is to identify and assess the National Register eligibility of sites located within the high threat areas of the Block Island seaward coastline. Only 26 (24%) of the 110 identified seaward coastal sites were tested during Phase II investigations. Of those, 22 (85%) were considered eligible or potentially eligible for listing in the National Register. A comparable percentage of the remaining 84 seaward coastal sites may be eligible for listing in the National Register. Ongoing and cost-effective surveys of sites in high threat areas would provide critical information to prioritize and organize preservation efforts in response to a future event. One option to fund such surveys is 50 percent federal matching grants administered by RIHPHC, which coordinates a Certified Local Government grant program for municipal historic preservation activities. The Town of New Shoreham is a Certified Local Government and would be eligible for grant funding to identify and evaluate significant historic and archaeological properties, nominate eligible properties to the National Register, and develop historic preservation plans.

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Personal Communications

Timothy Ives, Rhode Island Historical Preservation & Heritage Commission, June 14, 2013.

Joseph Waller, Jr, The Public Archaeology Laboratory, Inc., 2014.

Information in Chapter 3:
Robby Lewis, Block Island resident, 1987

The pot was identified by Ivor Noël Hume as a sixteenth-Century Iberian (Spanish or Portuguese) vessel, 1987 (Figure 3-14).

Information in Chapter 4:
Chris Littlefield, Block Island Conservancy, 2014.

Joseph Waller, Jr, The Public Archaeology Laboratory, Inc., 2015.

Chris Blaine, Block Island resident, 2015.