

The Salem Neck Sewerage Plant Site
A Prehistoric Site on Cat Cove
Salem, Massachusetts



Prepared for:
South Essex Sewer District
Prepared by:
PAL

July 2000

**The Salem Neck Sewerage Plant Site
(19-ES-471)**

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Prepared for

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WHY AN ARCHAEOLOGICAL INVESTIGATION?

In 1990, the South Essex Sewerage District (SESD) began planning for the construction of a secondary wastewater treatment plant at Salem Neck in the city of Salem, Massachusetts. The proposed site was a 13.2-acre parcel on Cat Cove that contained an existing sewage treatment plant. As part of the planning process, the SESD was required by law to take into account the effects of the project on the local environment. As a result, a number of studies were undertaken to evaluate the impact that the construction and operation of the



Map of Massachusetts with the location of the City of Salem.

facility might have on conditions such as water and air quality, fisheries, wildlife, traffic and other elements of the environment in and around the proposed project area.

One of the studies addressed the effect of the construction of the proposed treatment plant on historic properties. Historic properties are districts, buildings, structures, objects, and sites that are significant in American history, architecture, archaeology, engineering, and culture. Since there were no standing historic structures at the site, the historic property study focused solely on the identification of archaeological sites. Archaeological sites are the physical remains of the past that appear as ruins or are buried below ground and have little or no visibility.

There are a number of Federal and State laws that regulate development in areas where historic properties are present. The Federal law that applies most frequently in these situations is Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, which requires agencies or other parties engaging in developmental activities that use federal funds or permits to identify impacts that the proposed activity will have on historic properties and take action to eliminate, minimize, or mitigate the impacts before construction begins. The State of Massachusetts has a similar law that pertains to projects using state funding or licensing¹. In the case of the wastewater treatment plant at Salem Neck, the SESD required federal permitting for construction and operation of the proposed facility.

¹ MGL Chapter 9, sections 26-27c as amended by Chapter 254 of the acts of 1988 (950 CMR 71), administered by the Massachusetts Historical Commission and the State Archaeologist.

In compliance with both Federal and State regulations, the SESD and their engineering consultant, Camp Dresser & McKee, Inc., contracted with the Office of Public Archaeology (OPA) at Boston University to carry out the required studies. A series of archaeological investigations ranging from initial survey to site examination or evaluation was completed within the project area. An intensive survey, conducted by OPA in 1992, confirmed that a prehistoric site previously named the Salem Neck Sewerage Plant Site (19-ES-471) was located in the project area. The site was a “shell midden” originally identified by an amateur archaeologist and recorded in the inventory of cultural resources maintained by the Massachusetts Historical Commission (MHC). This type of site consists of soil layers filled with dense deposits of shell fragments. The Salem Neck Sewerage Plant Site consists of refuse left by ancient Native American groups who visited Cat Cove to harvest softshell clams, mussels, and other shellfish.

A second study, called a site examination, was completed in 1992 by OPA. This study found that the site contained important archaeological data and was therefore eligible for listing in the National Register of Historic Places, the nation’s official list of significant historic properties.

In its report on the site examination project, OPA recommended the treatment facility be relocated or redesigned so that construction activities would not impact the site. The SESD, however, determined that avoidance was not feasible since no other site location was as suitable or cost effective for the placement of the treatment facility. In addition, particular areas within the

SALEM NECK SEWERAGE PLANT SITE



Location of the Salem Neck Sewerage Plant (19-ES-471) on the Salem MA USGS topographic quadrangle(7.5 minute series)

site could not be avoided because plans for the facility already incorporated an innovative space saving design to fit the plant on the relatively small parcel.

Pursuant to the process outlined in Section 106 of the NHPA, interested parties, including the United States Environmental Protection Agency, the Advisory Council on Historic Preservation, the MHC, Massachusetts Department of Environmental Protection, the Massachusetts Division of Marine Fisheries, and the SESD, entered into consultation to decide the appropriate mitigation for the destruction of the Salem Neck Sewerage Plant Site. In a Memorandum of Agreement signed by all the consulting parties, the SESD was required to ensure that a “data recovery” archaeological investigation of the site was undertaken as mitigation for the project’s effects.

DATA RECOVERY PROGRAM DESIGN

An archaeological data recovery is defined as the “systematic removal of the scientific, prehistoric, historic, and/or archaeological data that may provide an archaeological site with its research or data value” (950 CMR 70.04). It involves extensive site excavation to locate and identify materials that add to the scientific understanding of past cultures. In the design of such programs, specific field and laboratory methodologies are developed to provide for the handling of known and expected categories of data from the site such as deposits with shell and bone fragments, ceramic sherds, stone tools, and other artifacts. In addition, the design must provide adequate means for the

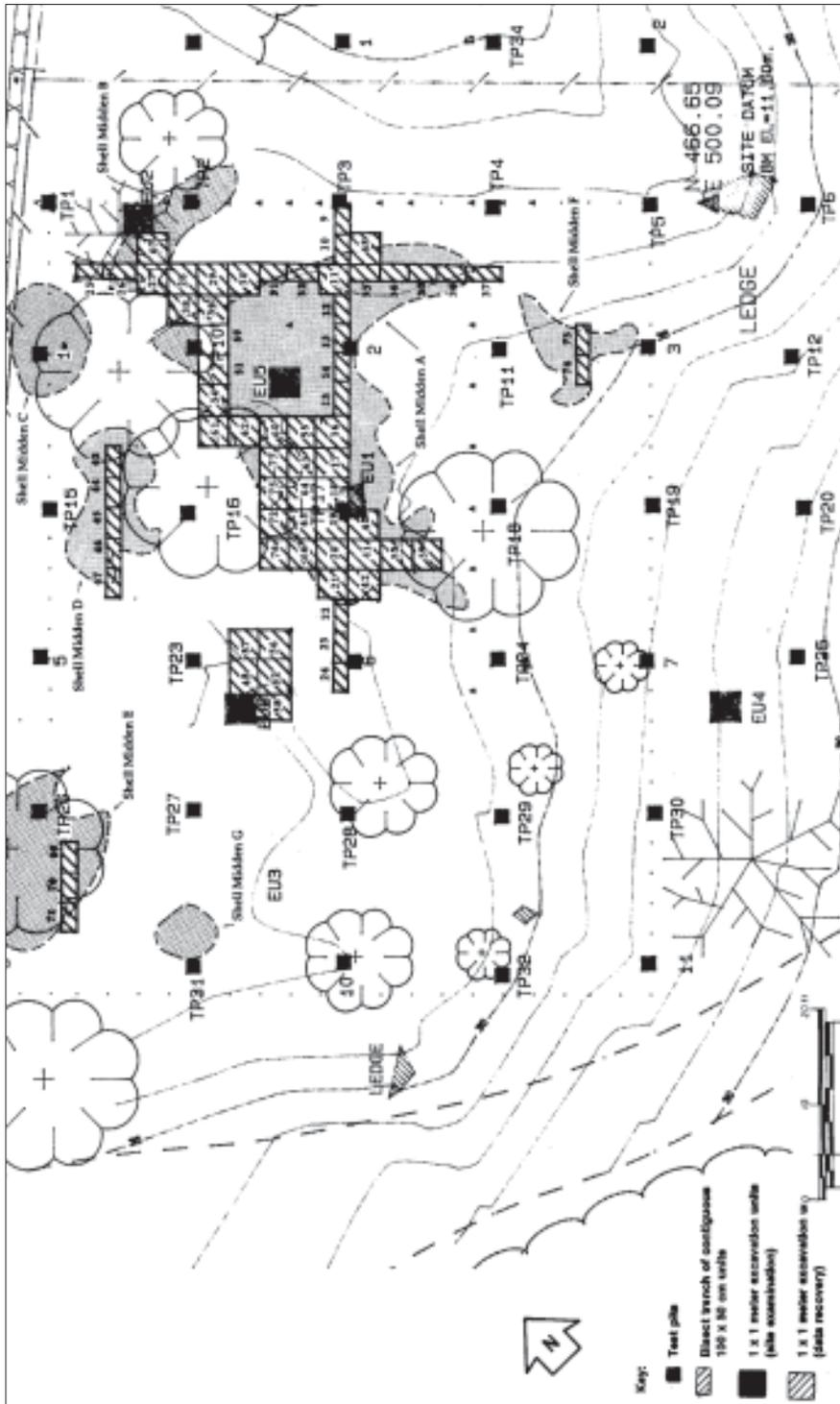
cleaning, cataloging, and curation of artifacts and organic materials such as bone and shell after their removal from the archaeological site.

The archaeological data recovery plan developed for the Salem Neck Sewerage Plant Site was designed to explore how the activities of ancient Native Americans fit into the natural environment and culture in which these people lived. The research design for the data recovery program consisted of questions and research problems involving aspects of the physical environment and Native American cultures at the site and across the coastal zone of southern New England. The fieldwork methods used in the data recovery were intended to collect the kinds of archaeological data needed to answer these research questions.

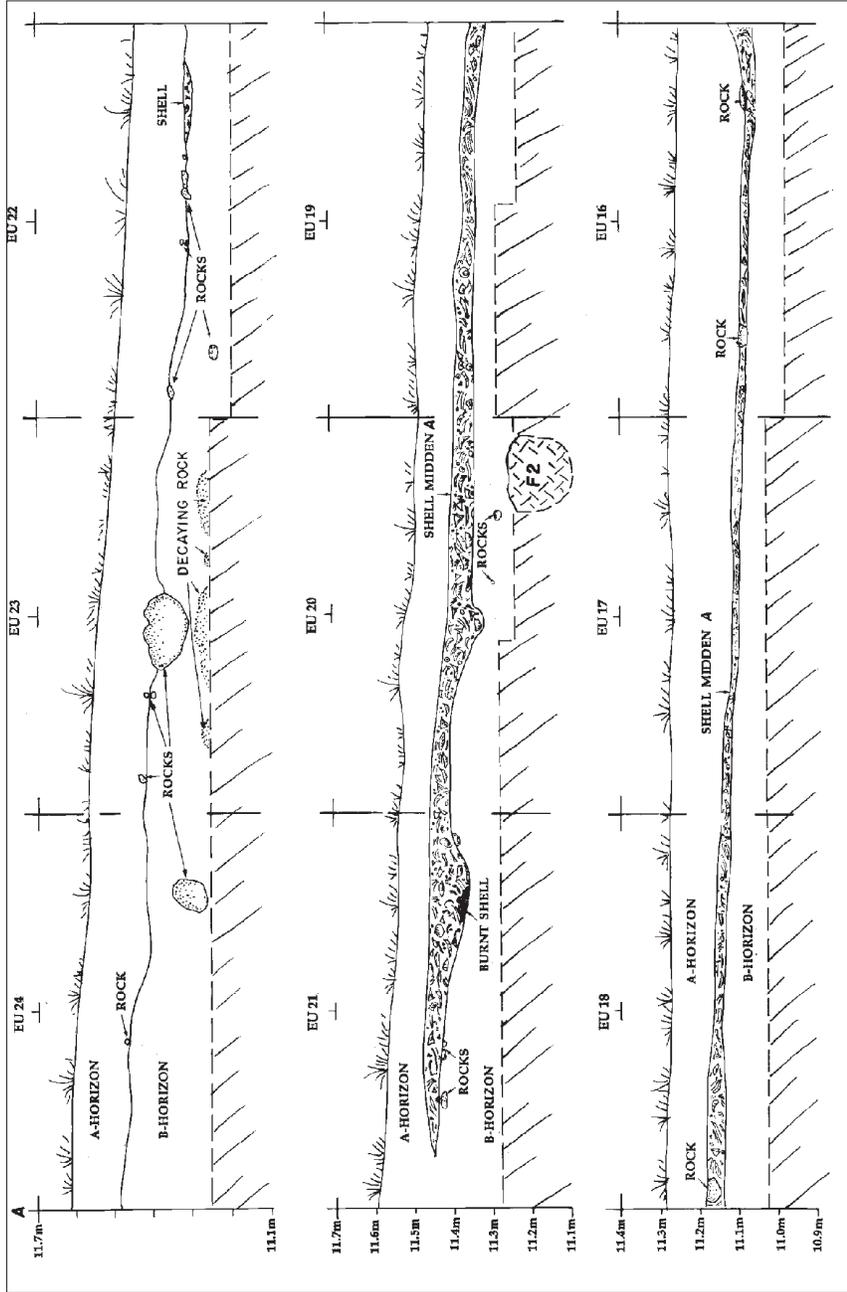


HOW WAS THE SITE EXCAVATED?

A team of archaeologists from the OPA conducted the fieldwork for the data recovery program during the spring of 1993. One of the goals of the data recovery was to collect a sample of archaeological information from the section of the site to be impacted by construction. This information had to be adequate to address a number of questions about ancient Native Americans, including what kinds of food they ate, what types of ceramic vessels were used for cooking, what types of stone were used to make tools, and when the site was occupied. The sample size or amount of



Plan of Salem Neck Sewerage Plant Site (19-ES-471) showing where archaeological excavations were carried out. The shaded areas are the seven shell midden deposits (Middens A-G) on the site.



This drawing was made by archaeologists to show part of a shell midden deposit (Midden A) and a pit feature (Feature 2) found in one of the trenches excavated at the Salem Neck Sewerage Plant Site. This trench consisted of nine excavation units (EU16-EU24) placed next to each other to form a continuous profile. The locations of EU16-EU24 can be seen in the plan on page 7.

area to be excavated during the data recovery program was based on information collected during the previous archaeological investigations. The archaeologists knew that the densest deposits of shell midden, trash pits, and artifact concentrations were within the defined site area. These deposits covered an area of about 750 square meters (sq m). The data recovery program, as approved by the MHC, was designed to collect a ten percent sample of the concentration areas within the site. Since about three percent of those areas had been previously excavated during the earlier intensive survey and site examination studies, the data recovery program needed to collect an additional seven percent (50 sq m) within these areas.

From previous investigations, archaeologists knew the site actually contained seven separate shell midden deposits. The largest midden, known as “Midden A”, was surrounded by six smaller deposits of shell refuse designated as “Middens B, C, D, E, F, and G.” The 50 sq m of excavation needed to complete the data recovery program was carried out in two stages. In the first stage, narrow trenches made up of adjacent 100 x 50 cm excavation units were placed in five of the seven shell middens, (Middens A, B, D, E, and F). A coordinate grid system was used to organize the placement of all trenches and 1 x 1 m excavation units. The baseline or starting point for this grid system was oriented in an east/west direction across the site area.

The purpose of excavating the trenches was to obtain a complete cross-section, or profile, of the soil layers and shell refuse deposits in the five middens. In Midden A, two intersecting trenches allowed the archaeologists to look at soil profiles in two different directions

across this large deposit of shell refuse. All of the soil profiles exposed in the walls of these trenches were carefully recorded in scaled drawings, which showed the thickness of the topsoil, shell midden deposit and underlying subsoil. Any archaeological features such as trash pits, hearths or workshops where stone tools were made were also recorded.

In the second stage of fieldwork, 1 x 1 m sq excavation units were placed next to each other to uncover more of the site. These units were used to investigate parts of the site with high densities of artifacts and the thick shell midden deposits. Some of the 1 x 1 m excavation units were also used to expose features found in the trenches crossing the two largest middens (Middens A and B).

Standard procedures for archaeological excavation were used. The trenches and 1 x 1 m units were excavated in 5 cm levels using hand trowels. All soil and shell midden deposits removed from the trenches or excavation units were sifted through a ¼-inch wire mesh screen. Artifacts and animal or fish bone fragments that remained in the screen after the sifting were placed in sealed plastic bags and labeled according to their depth and horizontal location in the trenches and excavation units. Each bag was assigned a unique record number used to track the materials throughout the excavation, laboratory processing and analysis stages of the data recovery program.

During fieldwork, the archaeologists working on the site also collected several kinds of samples to be used in later analysis. Samples of shell fragments forming the midden deposit were taken from each excavation unit for analysis to determine which types



These archaeologists are screening soil to recover artifacts and taking notes to record what they have found in one of the excavation units at the Salem Neck Sewerage Plant Site.

of shellfish were most often collected and eaten by the ancient Native Americans who occupied the site. Samples of soil from the shell midden deposit and features, including refuse pits and hearths, were collected for specialized analysis that yields evidence of food remains such as small fish bones, seeds, and nut shell fragments. Another set of soil samples collected during fieldwork was saved for a type of analysis that yields fossil pollen. This pollen can be used to determine what species of trees grew in forests near the site. Small fragments of charcoal found in features and sections of the shell midden deposits were carefully collected and stored in aluminum foil containers. These charcoal samples were used for radiocarbon dating to determine the periods during which the site was occupied by Native Americans.

Recording information from the site was one of the most important tasks for the archaeologists working on the data recovery program. Much of their time was spent recording the soil profiles, features and artifacts found in each trench or excavation unit. At each step in the excavation process, field notes were taken to record observations about the shell midden deposits, soils, features, and artifacts found in the site. The archaeologists also took black-and-white and color photographs to document important finds and provide a visual record of the various steps of the excavation process. After the fieldwork was completed, all trenches and excavation units were filled to match the original ground surface. This is good archaeological practice and prevents erosion of soils.

ARTIFACTS AND FEATURES

Excavations at the Salem Neck Sewerage Plant Site yielded important data that was used to answer questions about when and for how long the site was occupied by Native American groups and the types of activities they engaged in while at the site. Soils in New England are generally acidic and organic materials such as bone and shell tend to decay after being buried for a few hundred years. Shell middens like those at the Salem Neck Sewerage Plant Site can provide important exceptions to this by preserving large numbers of bone fragments and other organic remains. Leaching of calcium carbonate from shell midden deposits frequently neutralizes acid soils enough to allow preservation of numerous pieces of shell, as well as fish, mammal, and bird bone. While no artifacts or tools made of organic materials were found, the site did yield large amounts of shell and bone

fragments of tremendous value for reconstructing ancient hunting and fishing practices and diet.

The thousands of artifacts collected from the site were all made of inorganic materials such as stone and ceramic. These artifacts included stone tools, pieces of chipping debris from making these tools and ceramic sherds or pottery that provided important information about ancient lifeways. Most of the stone tools were projectile points used to tip either spears or arrows. Other chipped stone tools were blanks or preforms for making projectile points as well as drills and scrapers probably used for working wood or leather. The ceramic sherds were pieces of cooking vessels or pots used and broken on the site. The site also contained features or the “non portable” remains and facilities that are common elements of prehistoric sites. Some examples of features are fire pits or hearths, refuse pits used to dispose of bone, shells, chipping debris or other garbage and burned rocks used in cooking, heating or other processing tasks.

WHAT WAS RECOVERED?

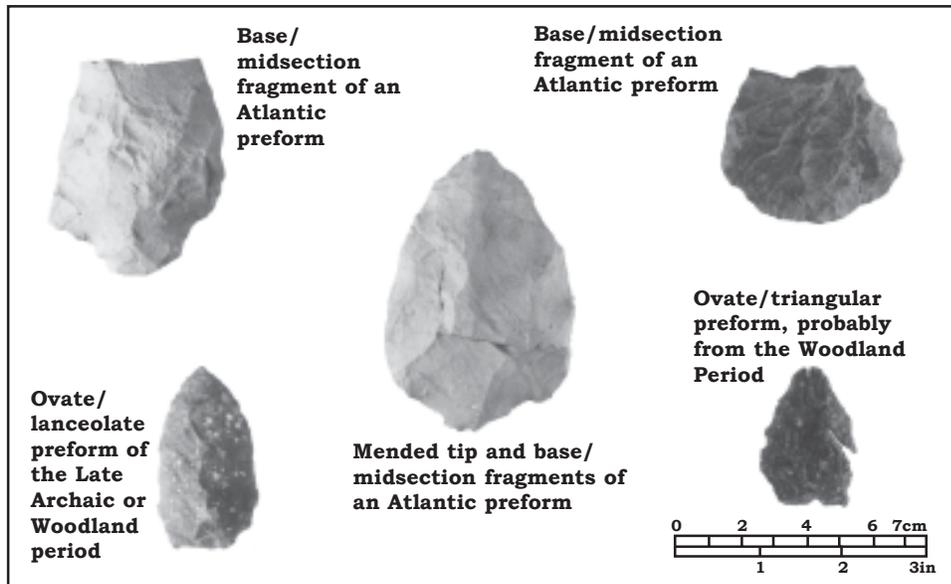


CHIPPED STONE TOOLS

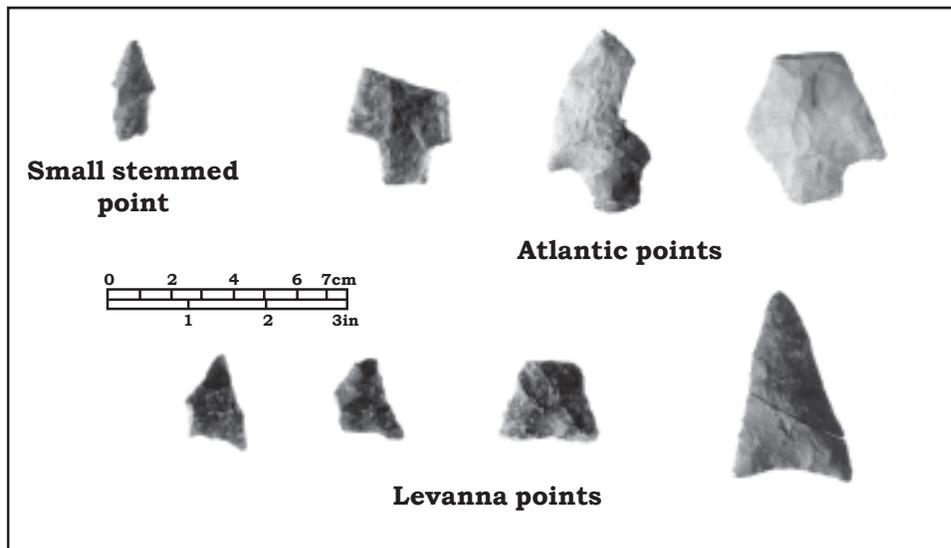
A total of 13 projectile points and some other chipped stone tools found in the site were useful indicators of when it was occupied. From these tools the archaeologists were able to determine that Native American groups camped at the site over a roughly 3,500-year time span from about 4,000 to 500 years ago.

Some of the earliest activity at the site was indicated by four projectile points of the *Atlantic* type. This broad bladed point style was used by people belonging to an early phase of the Susquehanna tradition. This cultural tradition was active in southern New England during the Late Archaic Period between about 4,000 and 3,600 years ago. Distinctive preforms or blanks for making this type of projectile point were also found in workshop areas with dense concentrations of chipping debris in the central portion of the site. These Atlantic preforms are large, oval blades with slight stems and appear to have been left on the site because they broke during the manufacturing process.

Two examples of points belonging to a general category of *small stemmed* projectile points also provided evidence of another occupation or episode of activity on the site. Projectile points like these were made by people of the Small Stem Point tradition during the Late Archaic Period, but they were also used after this time.



Some of these bifacial tool blades were used by Susquehanna tradition people about 3800 years ago as blanks for making projectile points. Others may have been used for cutting, scraping and similar tasks.



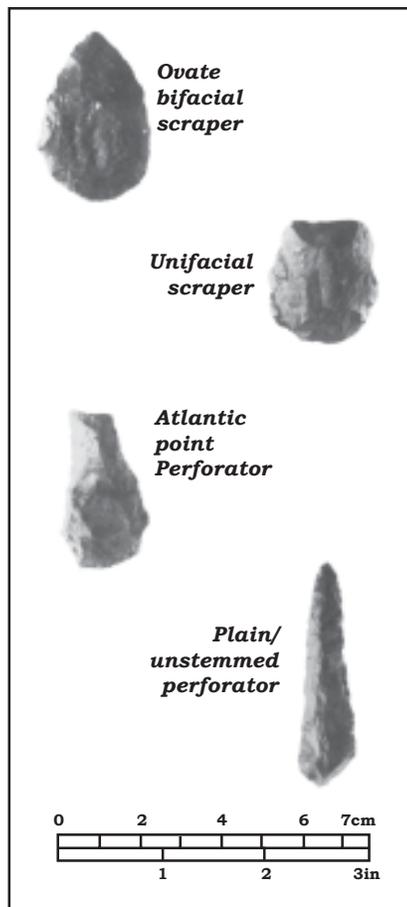
Examples of projectile points found at the Salem Neck Sewerage Plant Site.

The points may have been left there during the Late/Terminal Archaic or Early Woodland periods between 4,000 and 2,500 years ago. The Archaic Period *Atlantic* and *small stemmed* projectile points would have been used to tip spears. Five other projectile points found at the site were of the *Levanna* type. These triangular points were in use during the Late Woodland Period, from about 1,100 to 350 years ago. Unlike the older, Archaic Period projectiles, Levanna points were used to tip arrows. With the exception of one *small stemmed* point made of quartz, all the projectile points found on the site were manufactured from varieties of felsite, a fine grained volcanic rock that can be found in the Salem area. Other kinds of stone tools

found were bifacial tool blades, scrapers, and drills. Manufacture and repair of chipped stone tools, wood, bone, and leather working are some of the activities indicated by these artifacts.

CHIPPING DEBRIS

More than 4,500 pieces of chipping debris representing the by-product or waste from making stone tools was found in the data



Perforators or drills and scrapers found at the Salem Neck Sewerage Plant Site.

recovery program. About 95 percent of the chipping debris was felsite, with smaller amounts of other rock types such as quartz and chert. Some specific varieties of felsite were clearly preferred by Native Americans for stone tool making, since hundreds of flakes of these materials were found in workshop areas within the site. Grey green, grey purple, dark grey, and brown grey felsites appear to have been the materials most frequently used at this site. From specialized analysis of stone tools and chipping debris we know that all of these varieties of felsite are probably from the Lynn volcanic complex. This rock formation occurs in the North Shore area between the Middlesex Fells and Salem. Most of the felsite used by Native American groups at the Salem Neck Sewerage Plant Site was probably collected from outcrops in the Salem Harbor and Marblehead Neck area.

The small amount of quartz used for tool making was most likely collected from the local area around the site. Chert is a fine grained flint-like rock not found in the southern New England region. Pieces of green grey and olive grey chert chipping debris found in the site represent non-local material that is most likely from sources in the Hudson Valley area of eastern New York. Only 14 chert flakes were found in the site, but they are valuable evidence that some type of mechanism was used to obtain material from distant sources. Native American groups in the Salem Harbor area may have been involved in trade networks with other people located in areas such as central Massachusetts that were closer to the source for this chert.

CERAMIC SHERDS

Ceramic or pottery sherds were one of the largest categories of artifacts found during the data recovery program. The majority of the 547 sherds found at the Salem Neck Sewerage Plant Site were located in Middens A and B, the largest deposits of shell refuse on the site. Within both middens, many of the sherds were found near refuse or trash pit features filled with bone and shell fragments. These concentrations of ceramic sherds and features mark the locations of areas where activities like shellfish processing, animal butchering, cooking, and other essential tasks were performed. Ceramic vessels broken while being used for food processing and cooking were the source of the sherds found in these activity areas.

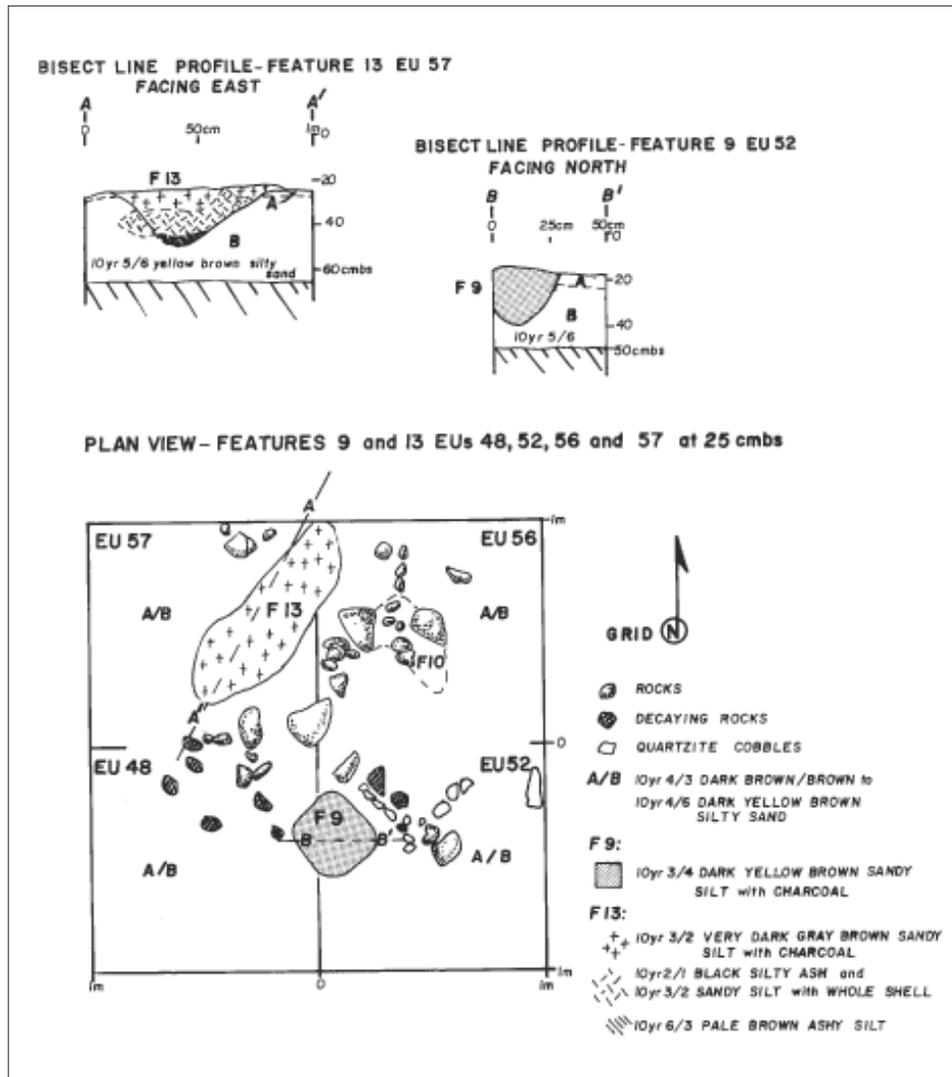
Unfortunately, the ceramic sherds found in the site were small and could not be used to reconstruct the size and shape of the pottery vessels they came from. The vessels used at the site probably had a cylindrical body and pointed, conical base, typical of those used by Middle and Late Woodland Period Native Americans in other sections of eastern Massachusetts. From analysis of the sherds we can tell how these pottery vessels were made and decorated. The clay used to make these vessels was tempered by mixing it with finely ground shell or sand. The vessels had either straight or slightly flared rims that were left undecorated. The bodies of most of the pots had smooth exterior surfaces with very little decoration, although some had been marked by wrapping cord or twine around a stick and pressing it into the wet clay. Other decoration techniques less frequently

used were incised lines made with some type of sharp tool and stamping with a dentate or toothed implement such as a comb.

FEATURES

Many of the artifacts previously described were found near features. A total of 29 features were identified and excavated during the project. These included 14 refuse or trash pits and six hearths consisting of pits with fragments of burnt rock and charcoal. Other feature types represented by a few examples were shallow ash pits and rock concentrations. All but six of the features were found within or under shell midden deposits.

The locations of features indicate where most of the domestic activities such as stone tool making, food processing, and cooking took place on the site. Most of the features were in the area covered by Midden A, a few others were in Midden B and an activity area outside the midden deposits. In Midden A there were two clusters of features where stone tool making workshops, refuse pits and hearths associated with the Late Archaic and Woodland occupations of the site overlapped. A large amount (64 pounds) of shell fragments, mostly from soft shell clam and mussel were removed from features during fieldwork. Soils filling the features also contained over 1,300 pieces of mammal, fish and bird bone.



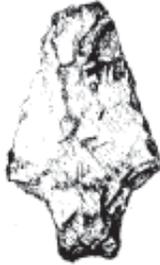
Features were recorded in scaled drawings such as this one which shows a plan and profiles of a fire pit/hearth and refuse pit.

FAUNAL REMAINS

Faunal remains, or the pieces of shell and bone found in archaeological deposits, were a large category of information collected from the Salem Neck Sewerage Site. A total of more than 1,100 pounds (500,000 grams) of shellfish remains were excavated from the site during the data recovery program. These shell fragments were not evenly spread across the site area, and occurred in midden layers or patches of varying density. The most dense shell deposits were found in Midden A, where some excavation units contained as much as 33 pounds (15 kilograms) of shell fragments per square meter. Lower densities of shell were found in the four other middens that were investigated as part of this study. About 95 percent of the shell was from one species (soft-shell clam); the remainder consisted of pieces of mussel, quahog, oyster, and various types of snails.

Other faunal remains consisted of pieces of bone from various mammal, fish and bird species. Over 4,300 pieces of bone were collected from Middens A, B, D, E, and F and other parts of the site. Densities of bone across the site varied from less than ten pieces to more than 300 pieces per sq m. Midden A contained the majority of this material and much of it was in some small, very dense concentrations of bone found around refuse pit and hearth features. About 60 percent of all bone found in the site was from fish. The remainder of the bone was from large, medium and small mammals and birds.

WHAT HAPPENS TO THE ARTIFACTS ?



LABORATORY PROCESSING

The collection of artifacts and other data from a site constitutes about one-half of a data recovery project. An equal amount of time is spent in the laboratory cleaning, cataloging, and analyzing the information from the fieldwork. For the Salem Neck Sewerage Plant Site data recovery project, archaeologists had to process more than 6,000 artifacts, 4,300 fragments of bone and 230 pounds (106.8 kg) of shell. Some of the initial processing work was done by the OPA, but in 1995 the SESD and Camp Dresser & McKee, Inc. contracted with The Public Archaeology Laboratory, Inc. (now PAL) to complete the project.

The first laboratory task was to clean all of the artifacts, bone and shell fragments collected from the site in preparation for cataloging. During cataloging, each piece of cultural material is described and categorized



Artifacts found during an archaeological excavation are cleaned in a laboratory before being cataloged.

according to characteristics such as quantity, color, material, size, function, style/form, and part. The descriptive data was entered into a computer program specifically designed for archaeological

cataloging purposes. The cataloging data was exported to a database management program used by archaeologists to carry out detailed analysis of specific categories of artifacts such as projectile points, ceramic sherds, and pieces of chipping debris.



Information about the artifacts is entered into a computer program designed for cataloging

After cataloging, the sealed plastic bags containing artifacts were organized according to provenience, or where they were found within the site (excavation unit, vertical level, etc). All artifacts were placed in acid-free cardboard storage boxes. Special samples or assemblages like bone and shell were bagged and boxed separately. The storage boxes were labeled with the provenience information, numbered sequentially placed in temporary storage in a temperature and humidity - controlled room at PAL. A complete inventory of the data recovery program collection was made to assist in future curation or storage. This process ensures that artifacts and faunal remains from the Salem Neck Sewerage Plant Site have been properly prepared for eventual transfer to a museum for long-term storage and curation.

METHODS OF ANALYSIS

A number of different analysis techniques were employed to provide clues about how the site was used. The results of these analyses yielded valuable information concerning the occupation of the site, including, the stone tool making capabilities, seasonal hunting and fishing patterns, diet, and refuse disposal methods of the people who lived there during the prehistoric period.

Stone tools were identified by comparing them to typologies developed by the New York State Museum and Massachusetts Historical Commission. Projectile point typologies are one method archaeologists use to reconstruct when a site was occupied. Other tools such as preforms for projectile points were examined to determine the types of stone and manufacturing methods used to make them and the stage that these unfinished tools were in when discarded on the site. Microscopic examination helped identify worn or damaged edges that could indicate what tasks the tools were used for, such as cutting, scraping, or drilling materials like leather or wood.

Ceramic sherds were analyzed to help determine how the pottery vessels used on the site were made and what they looked like. Among the attributes that help archaeologists identify pottery types are sherd thickness, color, temper type (shell, grit, burnt rock), decoration style, and vessel rim shape.

Faunal analysis is the study of animal remains from archaeological sites and involves identification of bone and shell fragments. The

samples of shell fragments collected from excavation units were sorted by species and weighed to determine how much each shellfish species contributed to the diet of the ancient Native American groups who occupied the Salem Neck Sewerage Plant Site. Pieces



A microscope is used to identify tiny seeds, bones, and pollen grains.

of animal and fish bone were identified by species and, when possible, anatomical part (rib, skull, vertebra etc.). After these bone and shell fragments were identified, estimates were made of the numbers of individual shellfish, mammals, and fish caught and consumed by the occupants of the site. Faunal analysis was also a source of information about the seasonal occupational patterns at the site since some fish and other species are present in coastal areas like Salem Harbor only at certain times of the year.

Another source of information about the range of plant and animal species used at the site was flotation analysis of soil samples collected from features and sections of the shell midden deposits. This type of analysis, which involves sifting soil samples in water through a set of screens with different mesh sizes, is used to retrieve very small items such as seeds, nutshell fragments, and fish bones that are usually lost in dry screening. After a soil sample has been processed, the remains are identified using faunal and floral reference collections containing specimens from hundreds of plant, animal and fish species.

Charcoal samples carefully selected from refuse pits, hearths and shell midden deposits in several parts of the site were sent to a laboratory specializing in radiocarbon dating. The six radiocarbon dates obtained from these samples helped the archaeologists determine the time periods that the site was occupied and the frequency of occupation within those periods. For example, certain artifacts indicated that the site was first used in the Late Archaic Period about 4,000 years ago, but the most intensive occupation was about 1,700 to 1,000 years ago during the Middle and Late Woodland periods.

The characteristics of features such as refuse pits, hearths, and stone tool making workshops within the site were analyzed to obtain information about on-site activities such as processing fish and shellfish and the disposal of shell and bone. The locations of features also gave some indication of how many people camped at the site and how long they remained, particularly in sections of the site where features were close together or overlapped.

Several types of specialized analysis were conducted by geologists and other archaeologists serving as technical consultants for the data recovery program. Petrographic thin section and geochemical analysis of stone tools and samples of chipping debris were done to determine the probable sources of materials used by occupants of the site. Samples of soil removed from the interior of shells in the midden deposit, and open, unprotected soil layers in the shell midden were analyzed to find fossil pollen. Pollen found in reliable context can be used to reconstruct former vegetation patterns on and near the site.

CONCLUSIONS



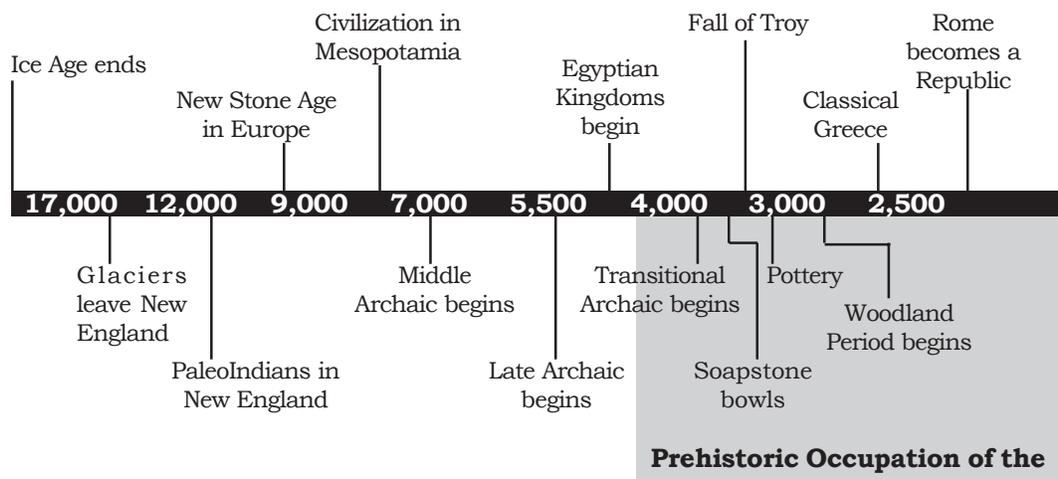
THE LARGER CONTEXT: THE PREHISTORY OF ESSEX COUNTY

The prehistory of Essex County has been a subject of interest to avocational archaeologists for more than 150 years. Many artifacts were collected from Native American sites disturbed by activities such as farming and construction in both rural areas and urban places like Newburyport and Salem. By the mid-nineteenth century the Peabody Museum in Salem began to curate a collection of artifacts from the Essex County area. Most of these artifacts were from sites along the Ipswich River and the coastal zone between the Merrimack River and Salem Harbor. Known archaeological sites in this area contain evidence of ancient Native American occupation from the PaleoIndian Period about 11,000 years ago to first contact with Europeans in the early seventeenth century.

One of the oldest sites in New England is near Bull Brook in Ipswich. A PaleoIndian base camp there contained hundreds of fluted projectile points, scrapers, flake knives, and other tools likely to be about 10,000 years old. At that time, sea level was much lower because glacial ice sheets located further north had not yet melted. Large areas of the Continental Shelf were exposed and the shoreline near Salem may have been about a mile east of its present location. PaleoIndian hunter-gatherers adapted to a spruce

dominated forest with resources that were different from later environments.

Approximately 8,500 years ago, a warmer, drier climate allowed the spread of deciduous forest, including hardwood trees like oak, to grow in southern New England. During this initial stage of what archaeologists refer to as the Archaic Period, ancient Native American populations in the region developed methods for exploiting the animal and plant resources of temperate forest environments. Early Archaic Period sites near Salem have been found in the Ipswich River watershed in the towns of Boxford, Ipswich and Danvers. In the Middle Archaic Period, roughly 7,500 to 5,000 years ago, Native American groups appear to have settled into fairly well defined territories in the larger river basins in southern New England. Ways of using seasonally abundant resources, such as spring-time fish runs and migrating birds established at the time, continued for the remainder of the Archaic Period. Tool kits expanded to include both chipped stone projectile points of the *Neville* and *Stark* type; drills and scrapers; and ground



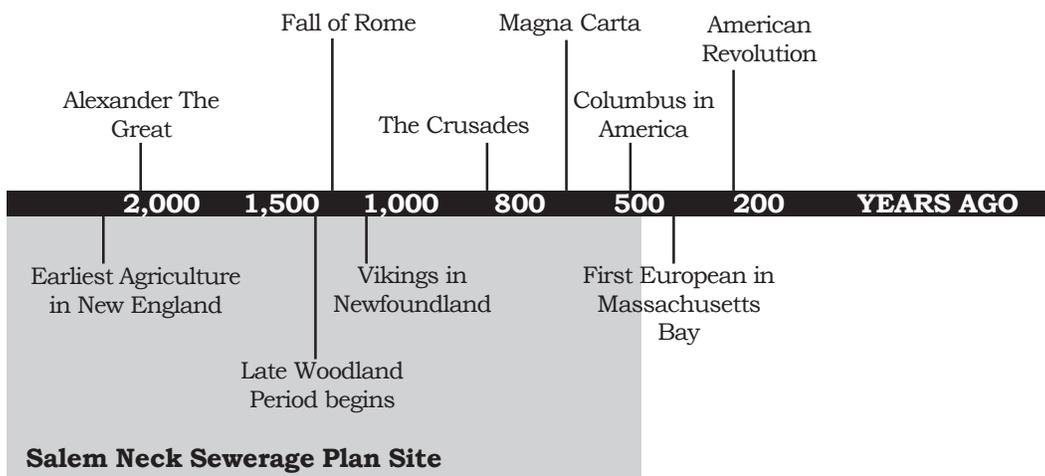


A hunter stalking deer with a spear and atlatl.

stone knives, woodworking tools (adzes, gouges), and whetstones. Many different locations in Essex County were used for base camps and smaller, special purpose sites. The lower Shawsheen and Ipswich River watersheds were probably core territories of Middle Archaic settlement.

In terms of numbers, the Native American population may have reached its zenith during the Late Archaic period, which ranged from 5,000 to about

2,500 years ago. Archaeologists have identified distinct artifact styles from three cultural traditions, and settlement expanded into a wide range of environments within both inland and coastal



areas. Like other sections of eastern Massachusetts, Essex County contains sites occupied by people of the Laurentian, Small Stem Point and Susquehanna traditions. Locations in the towns of Middleton, Danvers and Beverly were used for large habitation areas, small camps and burials. About 3,000 years ago, as the rise in sea level began to slow, estuaries formed and more locations in the Salem Harbor district were intensively used by Native Americans. The first use of shellfish documented by archaeological studies took place during this period, starting a trend that became much more important in the diet of later Woodland Period groups.

The Woodland Period covers the time span between about 2,500 years ago and the first contact between Native Americans and Europeans. The Danvers River and Salem Harbor district was a core area of Woodland Period settlement. Estuary base camps and other site locations established throughout coastal Essex County at the end of the Late Archaic Period were often re-used by Early and Middle Woodland people. As in other places along the Massachusetts coast, Native Americans living around Salem Harbor and the Parker/Ipswich and Annisquam River estuaries intensified their collection and processing of shellfish during the Middle and Late Woodland periods. Shell middens were formed on many coastal zone sites. Important changes in technology and subsistence during the Woodland Period were the development of ceramic vessels for food storage and cooking purposes, and the introduction of domesticated plants such as corn, beans, and squash from regions further to the west. Maize horticulture added a new food to the diet of Native Americans, but did not replace hunting, fishing and gathering as the primary means of subsistence.

By the early to mid-sixteenth century, European explorers and fishermen had probably made some contact with the Native Americans living in the Essex County area. Two early explorers, Champlain (1605) and Smith (1614) stopped in Salem Harbor. From their descriptions we know that this area was densely settled and contained cleared fields used for planting corn. Smith recorded the Native American name of Naumkeag, or “fishing place” for Salem Harbor. The native people living there were Algonquins and shared similarities in language and culture with other groups living along the coast from eastern Massachusetts to southern Maine.

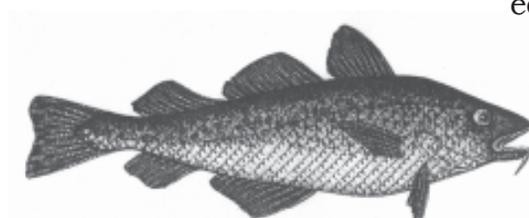


Making a dugout canoe used for transportation and fishing.

SITE ACTIVITIES: A PICTURE OF PREHISTORIC SUBSISTENCE

The many pieces of evidence collected from the Salem Neck Sewerage Plant Site were assembled to reconstruct how Native American people used the location over time and during different seasons of the year. In addition to stone tools, ceramic sherds, and features, the remains of animals taken by hunting and fishing can tell archaeologists much about the diet and seasonal scheduling of subsistence activities.

During the Late Archaic Period, about 3,800 years ago, Susquehanna tradition people appear to have used the site as a temporary hunting/fishing camp and stone tool making workshop. Broken projectile points left on the site may have been used in hunting deer and other animals in nearby upland forests. These people also fished, although no net sinkers or other fishing



Atlantic Cod

equipment was found on the site to aid in determining the methods used to the catch cod and other species whose remains were found at the site. Fishing for cod is often

best in early spring or late fall, so the Late Archaic occupation of the site may have occurred during those seasons. Shells and mammal and fish bones from this episode of site use were disposed of by dumping them in a hearth.

The proximity of the site to outcrops of felsite in the Salem Harbor/Marblehead area may have been one reason why Susquehanna tradition groups camped here. The manufacture of preforms and finished points from local felsites was a primary on-site activity. Many tools broken during production as well as hundreds of flakes were left on the site in small workshop areas. Some kind of wood or leather working was also done with long shafted drills and scrapers.

About 1,300 to 1,000 years ago, during the Middle to Late Woodland Period, Native Americans residing in the Salem Harbor area used the site as a seasonal camp for shellfish collection, fishing and hunting. Collecting and processing soft shell clams

and mussels and offshore fishing for cod, sea bass and probably some other species were the primary activities. Large birds, possibly migratory waterfowl or seabirds were also a source of food. Fish probably made up a significant portion of the diet of Woodland Period occupants of the site. Some large cod weighing from 15 to 30 pounds each were brought back to the site and processed. Other species caught in waters near the site were flounder, sea bass, drum/croaker and sturgeon. Hunting in interior, upland areas may have been an important source of meat for groups camped at the site. Deer, bear, raccoon, and river otter were among the animals that supplied meat, hides, and fur pelts. Fall to early winter and/or spring occupation of the site seems most likely based on analysis of the fish bone.

Shell fragments and fish and mammal bones from on-site processing were left near hearths and dumped in refuse pits clustered at the center of the site. Meat extracted from clams may have been smoked and dried to preserve it for winter use. Some fish could also have been processed this way for long term storage. Processing and disposing of shellfish resulted in the formation of seven separate dumps or middens composed primarily of shell fragments in a matrix of organic, loamy soil. Two larger middens were formed in the center of the site where campsite activities such as cleaning fish, shucking softshell clams and mussels, and cooking were done. The smaller middens on the rest of the site may be from brief visits to Cat Cove by groups or individuals to collect small amounts of shellfish.



In comparison to the earlier Archaic Period workshops on the site, the manufacture of chipped stone tools does not appear to have been an important on-site activity for Woodland groups. Pieces of chipping debris were found within the shell midden deposits, however, no dense workshop deposits of flakes and preforms were found. Stone tool making may have been limited to the production of some projectile points used in hunting.

HOW THE SITE CONTRIBUTES TO CURRENT KNOWLEDGE

The information collected from Site 19-ES-471 contributes to our current understanding of Native American use of coastal zone environments over the last 4,000 years. The thousands of pieces of archaeological material and other data found in the site clearly demonstrate that even a relatively small shell midden can be a source of a wide variety of information. For example, one of the research questions evaluated diet. From the numerous fragments of shell and bone found on the site, the archaeologists were able to reconstruct the ways ancient people used resources from marine and forest environments in the Salem area during visits to this location on Cat Cove. They also know more about a number of aspects of ancient lifeways such as the species of mammals, fish, and shellfish that were important food sources, what specific types of stone were selected for tool making, how Native Americans disposed of refuse or trash, and the methods used for making stone tools and pottery vessels.

At the regional scale, the Salem Neck Sewerage Plant Site shares some similarities with other shell midden sites in coastal Maine

and Boston Harbor. These indicate that ancient Native American populations in Salem also preferred sheltered coves for temporary camp sites, and hunted and fished for some of the same species of mammals and fish. The intensive collecting and processing of soft shell clam documented by the midden deposits on the site has also been noted by archaeologists working on other Middle to Late Woodland Period sites from southern New England to Maine.

The data recovery program also contributed new information about ancient Native American shell midden sites in the coastal zone of northeastern Massachusetts. Very few archaeological sites of this type have ever been systematically excavated in the area between Boston Harbor and the Merrimack River estuary. The few excavations done before this occurred in the late nineteenth and early twentieth centuries before many types of archaeological analysis used today were available.

Before this data recovery program, there was little detailed, accurate information about how ancient people lived before European settlement changed the landscape within the Danvers River and Salem Harbor district. While there are 11 known shell midden sites in Salem, the available information from them is limited to a list of artifacts. This data recovery program, therefore, provided the first opportunity to systematically excavate a shell midden site in a former core area of ancient Native American settlement now occupied by the city of Salem. The site yielded a permanent record of how Native American people adapted to processes of environmental change and used many coastal and marine natural resources at different points in the past.

This site was first occupied in the Late Archaic Period when the

shoreline of Salem Harbor was still changing due to sea level rise. For Late Archaic people living near Salem about 3,800 years ago, the site served as a small base camp and lithic workshop where stone from nearby sources in Marblehead was made into projectile points and other tools. From information collected at the Salem Neck Sewerage Plant Site and two other nearby shell middens we now know that Cat Cove was an area that supported shellfish resources used many times over at least 3,000 years by Native Americans in the Late Archaic, Middle, and Late Woodland periods. After sea level stabilized about 2,500 years ago, the site was used for seasonal collecting and processing of these shellfish. Since it provided a sheltered inlet and access to deeper, open water, Cat Cove also functioned as a staging area for Native American groups while fishing for cod and other species in Salem Harbor.

From careful excavation and study of the many kinds of information preserved within the Salem Neck Sewerage Plant Site, archaeologists now have an excellent chronological record of how this location was used by Native Americans.

FURTHER INFORMATION:

For further information about early Native American history and the archaeology of Massachusetts contact:

Office of the State Archaeologist
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220 Morrissey Boulevard
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The MHC establishes standards for archaeology in Massachusetts; review and compliance; maintains the state inventory of cultural resources; consultation about archaeological sites and human remains. The MHC also sponsors Massachusetts Archaeology Week each year.

Peabody Essex Museum
East India Square
Salem, MA
(978) 745-1876

Robert S Peabody Museum of Archaeology
Phillips Academy
175 Main Street
Andover, MA 01810
(978) 749-4490

Robbins Museum
Massachusetts Archaeological Society
P.O. Box 700
Middleboro, MA 02346
(508) 947-9005

SUGGESTED READINGS:

Braun, Esther and David P. Braun
1994 *The First Peoples of the Northeast*. Lincoln Historical Society, Lincoln, MA

Snow, Dean
1980 *The Archaeology of New England*. Academic Press, New York, NY.

GLOSSARY OF TERMS

A soil horizon: Soils which contain a mix of organic materials and the underlying mineral matter: for example, loams or topsoils.

Adzes: Pecked and ground stone tools that are less than ½ grooved and that have a convex cross-section.

Archaeological sensitivity: The likelihood for prehistoric and historic archaeological resources to be present.

Archaeological sites: The physical remains of the past that are in ruins or partially or completely buried in the ground.

Artifact: Any object made or modified by humans.

Atlantic Projectile Point: A style of projectile point associated with the Late Archaic period (4100-3600 B.P.) Susquehanna tradition that is widely distributed in eastern Massachusetts and along the Eastern Seaboard.

Assemblage: All of the cultural, floral, and faunal materials collected from a site.

Avocational archaeologist: A person with little or no formal training in anthropology or archaeology..

Axe: Pecked and groundstone tools that are at least ¾ grooved and tend to have a convex-convex cross-section.

B soils: Soil located below organic soils that consist of sands and inorganic materials that have been leached out through chemical interactions.

B.P.: An abbreviation for Before Present, 'present' being 1950.

Biface: A stone tool that has been worked on both the front (ventral) and back (dorsal) sides and exhibits two convex surfaces and at least one sinuous edge.

Bifurcate-base projectile point: A style of projectile point diagnostic of the Early Archaic Period (10,000-8000 B.P.). Also known as Kanawha Stemmed, Le Croy Bifurcate, St. Albans side-notched in the southern United States. It has a triangular blade that is corner notched with an expanding base and shoulders that vary from a 90° angle to long drooping barbs.

Calcined bone: Bone that has been heated to a high degree removing most of the organic content and altering it to a chalk-like appearance.

Ceramic temper: Fragments of shell, mineral or sand, mixed with clay during the manufacture of pottery vessels. Occasionally steatite or ground ceramic fragments (grog) are used.

Chert/Chalcedony: A hard, dense or compact form of cryptocrystalline quartz formed in sedimentary rock. It has a tough, splintery to conchoidal fracture and may be white, gray, green, blue, pink, red, yellow, brown, or black. The term flint is essentially synonymous. Chalcedony is the material of much chert.

Chipping debris/debitage: The residue created during the manufacture or sharpening of stone tools. This category includes flakes, shatter, and chunks.

Contact Period: The era when Native American populations and European explorers and traders came into contact, around 450 to 300 years ago.

Core: A chunk or nodule of stone suitable for removal of flakes or pieces that can be used to make tools. Cores usually show scars where two or more flakes have been removed.

Cortex: The outside surface remnant on stone debitage or tools.

Cultural resources: Districts, sites, buildings, structures, and objects relating to American history, architecture, archaeology, engineering, and culture.

Data recovery program: If a significant archaeological site is to be impacted by a construction project, mitigating these impacts often means excavating or collecting data from a site or portion of a site during a data recovery program.

Depositional event: The activities of a group, during their occupation or use of an area, that creates a site visible in the soil horizons.

Diagnostic artifacts: Artifacts that possess distinct characteristics that occasionally allow them to be used as temporal markers. Generally includes projectile points and ceramics.

Disturbance: Natural or cultural activities that adversely affect the physical condition or integrity of a site. These can include erosion or construction activities.

Early Archaic Period: The prehistoric period from ca. 10,000 to 7500 years ago and characterized by such diagnostic artifacts as bifurcate-base, Kirk, and Hardaway-Dalton projectile point types in southern New England and the Eastern Seaboard.

Early Woodland Period: The prehistoric period ranging from ca. 3000-1600 years ago. Typical artifacts include Small Stem, Meadowood projectile points and thick, cord marked ceramics.

Feature: A visually discrete, non-portable deposition produced during an activity associated with the occupation of a site. Can include a cooking/heating hearth, pits for storage and trash disposal, living surfaces, shell middens, and burials.

Felsite: A generally light colored stone of volcanic origin containing larger grained crystals or phenocrysts. Outcrops of this material have been identified at several locations in eastern Massachusetts and it also occurs as cobbles in glacial drift.

Flakes: Chipping debris with evidence of a striking platform, or bulb of percussion, with identifiable ventral (front) and dorsal (back) surfaces. Includes trimming flakes from biface reduction and primary flakes from cobble or quarry blank.

Fluted points: Diagnostic of the PaleoIndian Period (12,500-10,000 B.P.). Lanceolate blade with a base thinned by long flakes or flutes extending from just the lower portion of the blade to nearly the entire length of the blade. Also known as Clovis type point in various regions of the United States.

Gouge: Pecked and ground stone tools that are not grooved to less than ½ grooved with a concave-convex cross-section. A woodworking tool.

Horticulture: The practice of planting and maintaining crops without the use of a plow.

Intensive archaeological survey: An intensive archaeological survey is designed to locate and identify any cultural resources located within an area.

Judgmental testing: Subsurface testing conducted during an archaeological investigation that is placed to test a particular environmental or cultural feature.

Late Archaic Period: The period of time between 5000 to 3000 years B.P. Diagnostic artifacts include Brewerton, Squibnocket Triangle, Small Stemmed and Atlantic or Wayland Notched projectile points. Cultural traditions active in this period were the Laurentian, Small Stemmed, Susquehanna traditions.

Laurentian Tradition: The earliest tradition of the Late Archaic period, about 5500 to 4000 years ago; characterized by diagnostic Vosburg, Otter Creek, and Brewerton projectile points.

Levanna projectile point: Diagnostic artifact of the late Middle to Late Woodland Period (1300-400 B.P.). A large equilateral triangle projectile point with a concave, or occasionally straight, base and asymmetrical tangs.

Lithic: Made of or using stone as a raw material.

Lithic workshop: An area where stone tools were manufactured, characterized by moderate to large quantities of chipping debris, broken tools, partially completed, and completed tools.

Locus of activity: A small concentration of cultural material where a tool was manufactured or sharpened.

Midden: A feature characterized by darker soils and different textures which contain refuse from food processing activities, such as shell and bone, and other processing features such as hearths and pits. Animal and human burials are occasionally interred in midden deposits.

Middle Archaic: Prehistoric era from ca. 7,500-5000 years ago. Diagnostic artifacts include Neville and Stark projectile points.

Middle Woodland Period: Prehistoric era from ca. 1600 to 1000 years ago. Diagnostic artifacts include Jack's Reef and Fox Creek projectile points and various types of ceramics.

Multicomponent site: Evidence of more than one occupation at a site, generally indicated by the presence of a range of diagnostic artifacts.

Neville point: Diagnostic of the Middle Archaic Period (8000-6000 B.P.). A stemmed triangular blade with a narrow stem and shoulder angles that approach 90 degrees.

National Register of Historic Places: A list of nationally significant cultural resources in the country that is maintained by the US Department of the Interior.

PaleoIndian Period: The period between ca. 12,500-10,000, representing the earliest occupation of humans in North American prehistory.

Perforators: Type of stone tool also referred to as drills or awls in archaeological literature.

Period: A broad and general arbitrary chronological unit defined for a region, based on artifact assemblages or industries and used in cultural historical interpretation.

Prehistoric period: The era before written records. In New England, it refers to the time before Europeans arrived.

Projectile point: The stone, bone, or metal tip of a spear or arrow.

Quartz: An important rock forming mineral occurring in transparent crystals or colored by impurities. Forms the major portion of sands and has a widespread distribution in igneous, metamorphic, and sedimentary rocks.

Quartzite: A very hard metamorphic or sedimentary rock consisting mainly of quartz.

Radiocarbon dating: A means of dating the amount or ratio of radioactive Carbon 14 (C-14), which forms in the atmosphere and is circulated throughout living plant and animal matter.

Reconnaissance survey: A reconnaissance survey is designed to identify archaeologically sensitive areas within a project area.

Sherd: A pottery fragment.

Site: A spatially discrete area where human activity has occurred. The spatial clustering of archaeological data, comprising artifacts, ecofacts, and features.

Site examination: After archaeological sites have been identified, they must be evaluated for significance. A site's significance is based on size, contents, structures, age, condition, and socio-economic function. Research questions posed by the data and importance of the site in relation to known sites in the area, are also considered.

Small Stemmed point: Diagnostic of the Late Archaic and Early Woodland periods (5000-2000 B.P.). Other names include Bare Island and Squibnocket Stemmed in the northeastern United States. A narrow triangular blade with nearly square to rounded base.

Small Stemmed Tradition: One of the most widespread traditions in New England prehistory. Largely defined by a projectile point style that spans the Late Archaic and Early Woodland traditions. Found in a wide variety of environmental settings and characterized by site types ranging from temporary camp to large semi-permanent settlements.

Soil profile: A vertical section of soil beginning at the ground surface and extending down through the unconsolidated material to a depth of 60 inches. The physical and chemical characteristics observed within the soil profile are the basis for differentiating one soil horizon (A, B, and C) from another.

Stark point: Diagnostic of the Middle Archaic Period (7500-6500 B.P.). A stemmed triangular blade with a rounded or pointed contracting stem and obtuse shoulder angles.

Subsistence pattern: The way in which a group disperses itself spatially across the landscape to obtain food and material resources.

Susquehanna Tradition: A Late/Transitional Archaic period (3600-2500 B.P.) cultural tradition characterized by a larger concentration of site locations in coastal areas and elaborate cremation burials. Diagnostic artifacts include Atlantic and Susquehanna/Wayland Notched points and Mansion Inn blades.

Systematic testing: Subsurface archaeological investigation conducted in a regular pattern, such as on a grid, within a project area.

Temporary camps: Prehistoric site type characterized by small size, low degree of internal variability, short duration of overnight occupation (overnight), and limited variation of activities. Only one or two features found.

Test pit: Square unit of excavation used by archaeologists. Generally measuring 50 x 50 cm and excavated down to sterile subsoils

Tradition: Term used to denote archaeological manifestations that exhibit great time depth over a large region.

Transect: A course across a project area along which information about the cultural and natural environment is collected either during a walkover or by excavating test pits at regular intervals.

Transitional Archaic Period: The period of time between ca. 3600-2500 B.P. Diagnostic artifacts include the Atlantic, Susquehanna, and Coburn points. Also characterized by use of steatite vessels and complex burials.

Unifacial: Tool or flake modified or chipped along one face or edge.

Volcanic rocks: A generally crystalline textured or glassy igneous rock, such as rhyolite.

NOTES