APPENDIX I:

ARCHAEOBOTANICAL ANALYSES

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RESULTS OF ARCHAEOBOTANICAL ANALYSIS

Introduction

A total of 12 soil samples from a variety of cultural features encountered at the Sandom Branch Site Complex were selected for preliminary flotation processing and analysis in an effort to assess the degree of organic preservation and the recovery potential of plant macro-remains at the two sites.

Six soil samples were submitted from Features 5, 19, 30, 35, 36 and 40 at 7NC-J-227. An additional 6 soil samples from Features 1, 7, 21, 34, 39 and 43 were submitted from 7NC-J-228.

Methods

Two-liter soil samples were routinely collected during feature excavation. Samples were obtained from unscreened fill secured from across the base of stratigraphic levels. Soil samples were thoroughly dried, then packed for storage in vinyl bags.

Soil samples were individually processed using a Flote-Tech machine-assisted flotation system equipped with 0.325mm fine fraction and 1.0mm coarse fraction screens. The Flote-Tech system is a multi-modal flotation system that facilitates the separation and recovery of plant remains from the soil matrix via agitation in water, combined with forced air delivered through submerged pipes. Processing resulted in two size fractions (heavy and light). Resulting floted portions were air-dried.

Each processed sample was passed through geologic sieves to separate size fractions of recovered plant remains. The greater-than-or-equal-to 2 mm fraction was examined with a binocular microscope under low magnification (10X to 40X) and sorted into broad categories of material. Non-botanical and non-carbonized plant remains were separated as an aggregate and not further categorized. Carbonized plant remains were sorted into taxonomic categories (wood, seed, nutshell, etc.). The less than 2 mm fraction was examined under low magnification and the remains of seeds were removed for analysis. Each category of vegetative material was quantified by weight and fragment count.

Identifications were attempted on all seed and nut remains and miscellaneous plant materials recovered, and on a sub-sample of twenty randomly selected wood fragments from each flotation sample, in accordance with standard practice (Pearsall 1989). Identifications of all classes of botanical remains were made to the genus level when possible, to the family level when limited diagnostic morphology was available, and to the species level only when the assignment could be made with absolute certainty. When botanical specimens were found to be in such eroded or fragmentary condition that complete examination or recognition was impossible, a variety of general categories were used to reflect the degree identification possible: General wood categories within the analyzed assemblages include *'ring porous'*, where specimens exhibited differences between early and late wood growth; *'diffuse porous'* where no difference between early and late wood growth was apparent, *'deciduous taxa'*, where specimens could be identified as having a porous vessel arrangement reflecting deciduous trees rather than a trachid arrangement indicative of coniferous taxa; and

'unidentifiable', where specimens were so fragmentary or minute that no clear section could be obtained upon which to base identification. The category *'amorphous carbon'* was used to classify carbonized remains which lacked any identifiable characteristics whatsoever.

All identifications were made under low magnification (10X to 30X) with the aide of standard texts (Martin and Barkely 1961; Panshin and deZeeuw 1980; USDA 1956; Hoadley 1990), and checked against plant specimens from a modern reference collection representative of the flora of New Castle County, Delaware. Specimens were weighed using an electronic balance accurate to 0.01 grams.

Results of Analysis: 7NC-J-227

Flotation processing of 12 liters of feature soil from 7NC-J-227 yielded 2.88 grams of charcoal, or an average density of 0.24 grams of charcoal per liter of feature fill. Sample matrices were consistently composed of quartzitic gravel and heavy sands. Fresh rootlets were abundant in all processed samples, and insect egg cases and body fragments were noted. Recovered plant remains include native deciduous wood, hickory and acorn nutshell, a single carbonized grass seed, non-carbonized seeds, papery rind-like material, monocot stem fragments, an unidentifiable plant part, and unidentifiable amorphous charcoal. Table I-1 presents an inventory of flotation-recovered plant remains from 7NC-J-227.

Wood charcoal was the most ubiquitous and abundant class of plant remain recovered, occurring in 100 per cent of the samples analyzed, and comprising 81 percent of the site macro-botanical remains (by weight). A total of 218 carbonized wood fragments weighing 2.33 grams was recovered. Of this total, 98 fragments (a maximum of 20 fragments per sample) were randomly selected for identification. The identified wood sub-sample revealed the presence (in order of abundance) of white oak *(Quercus sp.) (LEUCOBALANUS group)*, red oak *(ERYTHROBALANUS group)*, unspecified oak *(Quercus sp.)*, sweetgum *(Liquidambar styraciflua*), maple *(Acer sp.)*, yellow poplar *(Liriodendron tulipifera*), ash *(Fraxinus sp.)*, and black walnut *(Juglans nigra*) (tentative identification). This wood assemblage suggests the utilization of locally available dominant forest taxon and a preference for high-caloric woods for fuel (Eyre 1980; Graves 1919; Tatnall 1946).

A thick-walled hickory *(Carya sp.)* and an acorn *(Quercus sp.)* nutshell fragment were identified.

Non-carbonized seeds were encountered within 2 of the 5 samples analyzed from 7NC-J-227. Spurge *(Euphorbia sp.)*, grape *(Vitis sp.)* and knotweed family *(POLYGONACEAE)* seeds were identified.

A single unidentified carbonized seed was encountered. The seed was classified as being a member of the grass family *(POACEAE)*, but its eroded condition prohibited further identification.

Miscellaneous plant-related materials included 77 fragments of papery, rind-like material, two fragments of monocot stem, a single fragment of unidentifiable plant material and 22 pieces of amorphous carbon. In addition, unidentifiable spherical carbon residue (a material

produced during the burning of plant material high in silica) was common throughout all samples analyzed.

Results of Analysis: 7NC-J-228

Flotation processing of 12 liters of feature soil from 7NC-J-228 yielded 0.56 grams of charcoal, or an average density of only 0.05 grams of charcoal per liter of feature fill. Sample matrices were consistently composed of quartzitic gravel and heavy sands with abundant non-carbonized (modern) root material. Insect remains were noted in many samples. Eighty-three percent of the samples analyzed yielded archaeobotanical remains. Recovered plant remains include native deciduous wood, a variety of non-carbonized seeds and unidentifiable amorphous charcoal. Table I-2 presents an inventory of flotation-recovered plant remains from 7NC-J-228.

Wood charcoal was present in five of the six analyzed samples, and accounted for 80 percent (by weight) of the macro-botanical material recovered from 7NC-J-228. A total of 46 carbonized wood fragments weighing 0.45 grams was recovered. The identified wood sub-sample revealed the presence (in order of abundance) of white oak *(Quercus sp.) (LEUCOBALANUS group)* and maple *(Acer sp.)*. The wood assemblage from Site 7NC-J-228, while small, may reveal the selection of high-caloric woods for fuel. The wood species identified would have been common to the mixed hardwood forest native to Delaware's Coastal Plain.

Non-carbonized seed remains were recovered from five of the six flotation samples analyzed from 7NC-J-228. Species identified include goosefoot *(Chenopodium sp.)*, spurge *(Euphorbia sp.)*, sheep sorrel *(Oxalis stricta)*, panic grass *(Panicum sp.)*, knotweed or dock *(Polygonum /Rumex)*, raspberry or blackberry *(Rubus sp.)* and clover *(Trifolium sp.)*.

Fifteen fragments of amorphous carbon and unidentifiable spherical carbon residue (common) were also recovered from the 7NC-J-228 flotation samples.

Summary and Recommendations

Analysis of this preliminary suite of 12 flotation samples from Sandom Branch Site Complex documents the persistence of economically important wild plant resources from two closely-related archaeological sites, evidences a reliance on high-calorie fuel resources, and serves to document the composition of local forests during prehistoric times.

Both carbonized and non-carbonized seeds were encountered within the Sandom Branch flotation assemblages. The presence of non-carbonized seed remains within prehistoric flotation samples from open-site environments is usually considered evidence of modern seed contamination (Minnis 1981; Keepax 1977; Smith 1985). Non-carbonized seeds are a common constituent of archaeobotanical assemblages from prehistoric sites across Delaware (Custer, Watson and Silber 1996; Custer, Riley and Mellin 1996; LeeDecker et al. 1998) and these preliminary data from the Sandom Branch Site Complex concur with this troublesome pattern. All identified seeds represent plants common to disturbed environments and moist floodplain or forest edge settings. Both native and non-native taxa are represented.

Table I-2. Inventory of flotation-recovered plant remains from 7NC-J-228

7NC-J-228 Soil Sample Number	**5008**	**5013**	**5015**	**5054**	**5056**	**5058**	**TOTAL**
Block	**A**	**A**	**A**	**A**	**A**	**A**	**6 samples**
Provenience	**N234 E450**	**N229 E445**	**N229 E448**	**N225 E447**	**N226 E444**	**N228 E444**	
Feature	**1**	**7**	**21**	**34**	**39**	**43**	
Strata	**I**	**I**	**I**	**I**	**I**	**I**	
Level	**1**	**3**		**3**		**1-2**	
Soil Sample Volume (liters)	**2**	**2**	**2**	**2**	**2**	**2**	**12**
Total Charcoal Weight (grams)	**0.08**	**0.17**	**0.08**	**0.16**	**0**	**0.07**	**0.56**
WOOD CHARCOAL (total cou	10	16	7	12	0	1	**46**
total weight (grams)	0.07	0.14	0.08	0.15	0	0.01	**0.45**
Acer sp. (maple)	*0*	*2*	*0*	*0*	*0*	*0*	**2**
Quercus sp. (white group)	*0*	*3*	*0*	*3*	*0*	*1*	**7**
Ring porous	*0*	*6*	*7*	*0*	*0*	*0*	**13**
Deciduous taxa	*0*	*5*	*0*	*0*	*0*	*0*	**5**
Unidentifiable	*10*	*0*	*0*	*9*	*0*	*0*	**19**
total fragments identified	**10**	**16**	**7**	**12**	**0**	**1**	**46**
NON-CARBONIZED SEED REMAINS (total coun	10	2	5	2	0	5	**24**
Chenopodium sp. (goosefoot)	*0*	*0*	*0*	*0*	*0*	*2*	**2**
Euphorbia sp. (spurge)	*3*	*0*	*2*	*1*	*0*	*3*	**9**
Oxalis stricta (sheep sorrel)	*0*	*0*	*1*	*0*	*0*	*0*	**1**
Panicum sp. (panic grass)	*5*	*0*	*0*	*1*	*0*	*0*	**6**
Polygonum/Rumex (knotweed, dock)	*2*	*0*	*0*	*0*	*0*	*0*	**2**
Rubus sp. (raspberry/blackberry)	*0*	*1*	*3*	*0*	*0*	*0*	**4**
Trifolium sp. (clover)	*0*	*1*	*0*	*0*	*0*	*0*	**1**
OTHER PLANT REMAINS (total co	2	4	0	4	0	5	**15**
total weight (grams)	0.01	0.03	0	0.01	0	0.06	**0.11**
Amorphous carbon	*2*	*4*	*0*	*4*	*0*	*5*	**15**

Some striking differences are apparent between the floral assemblages from the two sites. Overall, archaeobotanical remains were nearly five times more abundant at 7NC-J-227 (based on average density [grams per liter]). Site 7NC-J-227 also exhibited greater variety of plant parts (including nuts, carbonized seeds and miscellaneous materials [monocot stem, rind-like fibers]), and wider species diversity (8 wood taxa vs. 2 taxa from 7NC-J-228).

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