

Appendix F:

ARCHAEOBOTANICAL ANALYSES

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Results of Analysis:

Introduction:

A total of 12 samples of cultural sediment were retained from 12 discrete prehistoric features encountered at the Blackbird Creek Site (7NC-J-195D). These were submitted for flotation processing and macro-botanical analysis. All features sampled were categorized as basin-type features with circular or ovoid plan view and a variety of profiles. Table F-1 details the provenience and morphology of sampled features.

Table F-1: List of Soil Samples Analyzed.

<i>Provenience</i>	<i>Feature</i>	<i>Strata</i>	<i>Level</i>	<i>Sample No.</i>	<i>Comments</i>
N198.80 E442.68	39	I	2	5000	basin, ovoid in plan, gradual sloping to rounded flat base
N211.10 E414.84	52	I	1	320	basin, circular in plan, gradual sloping to rounded base
N212.55 E418.60	95	II	2	5259	bell-shaped basin, steep sides to flat base, oxidized ring, ochre
N210.06 E413	96	I	2	5007	basin, circular in plan, gradual sloping to rounded base
N210.14 E410.58	112	II	1	297	basin, circular in plan, steep sides to undulating base
N211 E422.3	136	I	4	306	basin, circular in plan, gradual sloping/steep side to rounded base
N211.10 E421.20	140	I	2	5080	basin, circular in plan, gradual sloping to rounded base
N203.56 E458.90	145	I	1	5216	basin, ovoid in plan, gradual sloping to rounded bottom
N210 E406.31	159	II	2	5236	basin, circular in plan, steep sides to flat base
N214.47 E431.31	170	I	6	5288	basin, circular in plan, steep sides to irregular flat base
N210.47 E403.55	167	II	3	5240	basin, circular in plan, steep sides to rounded base
N214.3 E428.5	191	I	3	5083	basin, circular in plan, gradual sloping to steep sided to a flat base

Methods:

Standard 2-liter soil samples were routinely collected during feature excavation. Soil samples were obtained from unscreened fill secured from across the base of features, or from the base of each stratigraphic level (in the case of stratified features). Soil samples were thoroughly dried, then packed for storage in vinyl bags.

Water flotation was the technique used to separate plant macro-remains from the soil samples. The Blackbird Creek Site samples were individually processed using a Flote-Tech flotation system equipped with 0.325 mm fine fraction and 1.0 mm coarse fraction screens. The Flote-Tech system is a machine-assisted flotation system, which utilizes water and air to facilitate the

separation and recovery of plant remains from the soil matrix. Processing resulted in two size fractions (heavy and light). Resulting floted portions were air-dried.

Processed samples were passed through a geologic sieve 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 remains were separated as an aggregate and not further categorized. Carbonized plant remains and non-carbonized seeds were sorted into taxonomic categories (wood, seed, nutshell, et cetera.). 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 recovered, and on a sub-sample of twenty randomly selected wood fragments from each sample containing *more* than twenty specimens, 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 classification was impossible, a variety of general categories were used to reflect the degree identification possible: General wood categories within the analyzed assemblage include '*ring porous*', where specimens exhibited differences between early and late wood growth; '*diffuse porous*', where specimens exhibited homogenous growth within annual rings, '*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.

Identifications of plant specimens 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:

Flotation processing of 24 liters of feature soil from the Blackbird Creek Site (7NC-J-195D) yielded 4.14 grams of charcoal, or an average density of approximately 0.17 grams of charcoal per liter of feature fill. Sample matrices were consistently composed of medium-grained to coarse-grained quartzitic gravel. Heavy ferrous incrustations were observed on all wood fragments recovered from Feature 136, but were not apparent in the associated geologic material. All samples processed yielded archaeobotanical remains. Recovered plant remains included deciduous and unidentifiable wood charcoal, carbonized nutshell, a carbonized seed, and non-

Table F-2. Inventory of flotation-recovered plant remains from 7NC-J-195D.

Soil Sample Number	5000	320	5259	5007	297	306	5080
Provenience	N198.80 E442.68	N211.1 E414.84	N212.55 E418.60	N210.06 E413	N210.14 E410.58	N211 E422.3	N211.10 E421.20
Feature	39	52	95	96	112	136	140
Strata	I	I	II	I	II	I	I
Level	2	1	2	2	1	4	2
Soil Sample Volume (liters)	2	2	2	2	2	2	2
Total Charcoal Weight (grams)	0.12	0.5	0.02	0.48	0.53	0.1	0.03
WOOD CHARCOAL (total count)	13	53	6	47	45	12	5
total weight (grams)	0.12	0.47	0.02	0.48	0.53	0.1	0.03
<i>Acer sp. (maple)</i>							
<i>Carya sp. (hickory)</i>	1		1	6			
<i>Castanea dentata (American chestnut)</i>					1		
<i>Liriodendron tulipifera (tulip poplar)</i>				2	3		
<i>Fagus grandifolia (beech)</i>					2		
<i>Juglans nigra (black walnut)</i>							
<i>Quercus sp. (white oak group)</i>			1		5	2	
<i>Quercus sp. (red oak group)</i>		1		2			
<i>Quercus sp. (oak)</i>	3	3					
JUGLANDACEAE					2		
deciduous taxa	4	6		3	3	10	4
diffuse porous				1			
ring porous	5	6	4				
unidentifiable		4		6	4		1
total fragments identified	13	20	6	20	20	12	5
NUTSHELL (total count)	0	8	0	0	1	0	0
total weight (grams)	0	0.03	0	0	<0.01	0	0
<i>Carya sp. (hickory - thick walled type)</i>							
<i>Fagus grandifolia (beech)</i>		8			1		
<i>Quercus sp. (oak)</i>							
CARBONIZED SEED REMAINS (total count)	0	0	0	0	0	0	0
total weight (grams)	0	0	0	0	0	0	0
large grass fragment (POACEAE)							
NON-CARBONIZED SEED REMAINS (total count)	8	16	2	0	0	0	0
<i>Acalypha sp. (three-seeded mercury)</i>							
<i>Amaranthus sp. (pigweed)</i>							
<i>Carex sp. (sedge)</i>		3					
<i>Datura stramonium (jimsonweed)</i>							
<i>Eleusine indica (goose grass)</i>	4	1	1				
<i>Mollugo verticillata (carpetweed)</i>	2		1				
<i>Stellaria media (chickweed)</i>							
AMARANTHACEAE (pigweed family)	1						
POACEAE (grass family)		12					
unidentifiable	1						

Archaeological Investigations at the Blackbird Creek Site

Table F-2 con't. Inventory of flotation-recovered plant remains from 7NC-J-195D.

Soil Sample Number	5216	5236	5288	5240	5083	TOTAL
Provenience	N203.56 E458.90	N210 E406.31	N214.47 E431.31	N210.47 E403.55	N214.3 E428.5	12 samples
Feature	145	159	170	167	191	
Strata	I	II	A(I)	II	I	
Level	1	2	6	3	3	
Soil Sample Volume (liters)	2	2	2	2	2	24
Total Charcoal Weight (grams)	0.16	1.13	0.2	0.72	0.15	4.14
WOOD CHARCOAL (total count)	35	78	18	67	22	401
total weight (grams)	0.14	1.13	0.2	0.7	0.15	4.07
<i>Acer sp. (maple)</i>		11				11
<i>Carya sp. (hickory)</i>					2	10
<i>Castanea dentata (American chestnut)</i>						1
<i>Liriodendron tulipifera (tulip poplar)</i>						5
<i>Fagus grandifolia (beech)</i>						2
<i>Juglans nigra (black walnut)</i>			1			1
<i>Quercus sp. (white oak group)</i>			16	20		44
<i>Quercus sp. (red oak group)</i>		3				6
<i>Quercus sp. (oak)</i>	3					9
JUGLANDACEAE						2
deciduous taxa	8	4			10	52
diffuse porous		2	1			4
ring porous	4				3	22
unidentifiable	5				5	25
total fragments identified	20	20	18	20	20	194
NUTSHELL (total count)	1	0	1	3	0	14
total weight (grams)	0.01	0	<0.01	0.02	0	0.06
<i>Carya sp. (hickory - thick walled type)</i>	1					1
<i>Fagus grandifolia (beech)</i>				3		12
<i>Quercus sp. (oak)</i>			1			1
CARBONIZED SEED REMAINS (total count)	1	0	0	0	0	1
total weight (grams)	0.01	0	0	0	0	0.01
large grass fragment (POACEAE)	1					1
NON-CARBONIZED SEED REMAINS (total count)	33	0	0	0	4	63
<i>Acalypha sp. (three-seeded mercury)</i>	1					1
<i>Amaranthus sp. (pigweed)</i>	1				3	4
<i>Carex sp. (sedge)</i>	2					5
<i>Datura stramonium (jimsonweed)</i>					1	1
<i>Eleusine indica (goose grass)</i>	4					10
<i>Mollugo verticillata (carpetweed)</i>	19					22
<i>Stellaria media (chickweed)</i>	6					6
AMARANTHACEAE (pigweed family)						1
POACEAE (grass family)						12
unidentifiable						

carbonized seeds. Table F-2 presents an inventory of flotation-recovered plant remains from the Blackbird Creek Site.

Wood charcoal was present in 100 percent of the samples analyzed, and comprised over 98 percent of the site macro-botanical remains (by weight). A total of 401 carbonized wood fragments weighing 4.07 grams was recovered. Of these, 194 fragments (a maximum of 20 fragments per sample) were randomly selected for identification. Identified taxa included white oak species (*Quercus sp. LEUCOBALANUS group*) (accounting for 23 percent of the identified sub-sample [by fragment count]), maple (*Acer sp.*) (6percent), hickory (*Carya sp.*) (5percent), unspecified oak (*Quercus sp.*) (5percent), red oak species (*Quercus sp. ERYTHROBALANUS group*) (3percent), tulip poplar (*Liriodendron tulipifera*) (3percent), beech (*Fagus grandifolia*) (1percent), walnut family (*JUGLANDACEAE*) (1percent), black walnut (*Juglans nigra*) and American chestnut (*Castanea dentata*) (<1percent). Wood fragments not minimally identifiable to the family level were classified as ‘deciduous taxa’ (27 percent), ‘ring porous’ (11 percent), ‘diffuse porous’ (2 percent), and ‘unidentifiable’ (13 percent).

Nutshell remains were recovered from five of the 12 samples analyzed (Features 52,112,145,167, 170). A total of 14 fragments of nutshell weighing 0.06 grams was recovered. Three species of native mast were identified: thick-walled hickory (*Carya sp.*) (1 fragment), beech (*Fagus grandifolia*) (12 fragments), and acorn (*Quercus sp.*) (1 fragment).

A single carbonized seed fragment was identified from the Blackbird Creek flotation assemblage. One fragment of a large grass (*POACEAE*) seed was recovered from Feature 145. The specimen was incomplete and generally eroded.

Non-carbonized seeds were encountered in 42 percent of the samples analyzed (Features 39, 52, 95, 145, 191). Carpetweed (*Mollugo verticillata*), goose grass (*Eleusine indica*), chickweed (*Stellaria media*), sedge (*Carex sp.*), pigweed (*Amaranthus sp.*), three-seeded mercury (*Acalypha sp.*), and members of the pigweed (*AMARANTHACEAE*) and grass (*POACEAE*) families were identified. These plant species are common to disturbed environments such as agricultural and forest edge settings.

Summary and Recommendations:

The processing of 24 liters of feature fill from 12 features at the Blackbird Creek Site (7NC-J-195D) yielded an interesting assemblage of archeobotanical remains which provide insight into plant use and landscape conditions on the upper coastal plain of Delaware during the early Woodland I period. The diverse array of native wood species recovered from cultural features reveals forest elements in the local landscape, and documents the selection of high-caloric fuel woods (oak and hickory) and the use of mast-bearing species (oak, hickory and beech). The nut remains recovered from five cultural features suggests that seasonally abundant nut resources were locally available and utilized by site residents. The prevalence of beech nutshell within the Blackbird Creek Site assemblage shows an interesting deviation from the regional pattern where hickory mast dominates. The beech nutshell from Blackbird Creek may reflect

immediate landscape conditions of the site during the early Woodland I Period. Beech often grows in nearly pure stands with a relatively open understory. The species thrives on rich soils well-suited to cultivation (Brown and Brown 1979:64; Peattie 1948:181).

The recovery of non-carbonized and non-native seeds from archaeological contexts indicates that some level of disturbance may have compromised feature deposits at the Blackbird Creek Site. The presence of non-carbonized seed remains within prehistoric flotation samples from open-site environments is usually considered evidence of modern seed contamination resulting from rodent or insect burrowing, root growth and decay, downwashing, or by a combination of factors (Minnis 1981; Keepax 1977; Smith 1985). Non-carbonized seeds are a common constituent of archaeobotanical assemblages from prehistoric sites across the coastal plain of Delaware (Custer, Watson and Silber 1996; Custer, Riley and Mellin 1996; LeeDecker et al. 1998) and these data from the Blackbird Creek Site concur with the regional pattern.

These data allow a general understanding of human-plant interactions at the Blackbird Creek Site. The wood and nut assemblages reveal that the local Upland Coastal Plain landscape was dominated by a mixed hardwood forest in which oak, hickory, American beech, maple tulip poplar, black walnut and American chestnut were common features. Recovered comestibles reveal a reliance on local mast resources (acorns, beech nuts and hickory nuts), the harvest of which may have driven seasonal occupation and migration.

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