Report on the Analysis of Flotation and Waterscreen-recovered Archeobotanical Remains from the South Grove Midden, Mount Vernon. 44FX762/17
Cumulative Results of the 2011-2012 Laboratory Research Effort

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INTRODUCTION
This report details the results the 2011-2012 survey and assessment of archeobotanical materials recovered from the South Grove Midden at George Washington’s Mount Vernon. Analysis of archaeologically-preserved plant remains provides insight into the nature of midden development, the types of wild and cultivated plant foods deposited there, and the cultural choices made by myriad Mount Vernon residents over a long period of history. Archeobotanical information makes an essential contribution to our understanding of the cultural and landscape history of Mount Vernon.

A two-year phased approach was devised to accomplish the analysis and reporting of the South Grove Midden macro-botanical samples (McKnight 2010). This staged approach allowed for a comprehensive assessment of carbonized plant macro-remains preserved within the midden. Two hundred thirty-three archeobotanical samples collected through soil flotation and/or waterscreening were submitted for consideration. The selected samples derive from three identified phases of occupation spanning ca. 1735-1800, and from a cobble/rubble deposit that caps the midden area and from a buried topsoil horizon (with undetermined relationship to the midden) (see Table 01).

Archaeology of the South Grove Midden has identified occupational phases (Breen 2003) which have been assigned to three levels of research priority: “First Priority” samples (associated with ca. 1735-1758 and 1759-1775 use of the midden), “Second Priority” samples (from Phase III ca. 1775-1800), and “Third Priority” samples (from the Cobble and Rubble and Buried Topsoil deposits). Excel Table 02 provides details about specific samples and sample counts associated with these occupational phases.

YEAR 1
Introduction
The Year 1 (2011) research effort included a preliminary assessment of all 233 samples. This initial survey provided baseline information about the midden deposit, included a documentary presence/absence study of lower-priority samples and targeted specific, high-priority samples for a full-scale macro-botanical analysis. Sample selection criteria included: 1). Level of research interest (i.e. floral materials associated with the nineteenth century Cobble and Rubble layer were a lower priority than those associated with the eighteenth century deposits). And 2). The presence of comestible plant remains or ornamental species. Eight samples were omitted from the study because of their
intrusive nature (Table 3).

Table 01: Summary of archeobotanical samples.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Household</th>
<th>Analysis Priority</th>
<th>n of samples submitted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobbles and Rubble, 19th century</td>
<td>Bushrod Washington; John Augustine Washington, III</td>
<td>3RD</td>
<td>8</td>
</tr>
<tr>
<td>Buried Topsoil, unk relationship to midden</td>
<td>undetermined</td>
<td>3RD</td>
<td>5</td>
</tr>
<tr>
<td>Phase III: ca. 1776-1800</td>
<td>late George and Martha Washington</td>
<td>2ND</td>
<td>11</td>
</tr>
<tr>
<td>Phase II: ca. 1759-1775</td>
<td>early George and Martha Washington</td>
<td>1ST</td>
<td>53</td>
</tr>
<tr>
<td>Phase I: ca. 1735-1758</td>
<td>Lawrence Washington</td>
<td>1ST</td>
<td>148</td>
</tr>
<tr>
<td>delivered samples omitted from study</td>
<td></td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td>233</td>
</tr>
</tbody>
</table>

Table 03: Samples omitted from study.

<table>
<thead>
<tr>
<th>Test Unit</th>
<th>309</th>
<th>328</th>
<th>328</th>
<th>328</th>
<th>328</th>
<th>328</th>
<th>929</th>
<th>8 samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strat</td>
<td>FFF</td>
<td>F</td>
<td>CC</td>
<td>PP</td>
<td>TT</td>
<td>WW</td>
<td>EEE</td>
<td>DDD</td>
</tr>
<tr>
<td>Flotation light fraction</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>6 samples</td>
</tr>
<tr>
<td>“H2O and Flot” n of bags</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>3 samples</td>
</tr>
</tbody>
</table>

Thirty-nine samples from the “First Priority” contexts offering the greatest research potential were selected for a full, quantitative analysis (slated for Year 2). See Excel Table 04.

The remaining samples -- comprised of archeobotanical materials from 186 discrete proveniences within the South Grove Midden -- were subjected to a documentary presence/absence analysis aimed at identifying the kinds of plant materials present and their preservational condition.
Methods

Each of the 186 samples was passed through geologic sieves ranging from 0.5 to 4 millimeters in size to provide standard divisions to facilitate analysis. Materials were examined with a binocular microscope under low magnification (10X to 40X) and generally described. Botanical identifications were attempted on all carbonized seed, nut, crop plant remains and miscellaneous plant parts recovered. The presence of wood was noted, but wood identifications were not attempted. Individual plant artifacts were not separated from sample matrices, nor were they quantified by weight or fragment count. All identifications were made under low magnification (10X to 40X) with the aid of standard texts (Kozlowski 1972; Martin and Barkely 1961; Panshin and deZeeuw 1980) and checked against plant specimens from a modern reference collection representative of the historic flora of Northern Virginia. 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. Individual analysis forms were filed for each of the 186 samples submitted to the presence/absence study. PDF’s of these forms are submitted as part of this report. Handling and packaging of materials was carried out according to archival standards.

The results of the documentary presence/absence analysis of 186 samples from the South Grove Midden are detailed in Excel Table 05. The samples contained an array of burned and unburned plant macro-fossils, including the remains of wood, nutshells, seeds, cultivated plants, and vegetal miscellany. In addition to the plant remains, a variety of non-botanical artifacts and ecofacts were also observed. The presence of different classes of non-plant material is noted in green type within Table 05.

Wood charcoal comprised the most ubiquitous and abundant class of plant macro-remain observed in the presence/absence assemblage. The abundance of wood across a range of midden contexts suggests that fuel-wood disposal was a consistent activity associated with the South Grove Midden throughout all periods of use. Nutshells, including both carbonized (walnut family [JUGLANDACEAE] and black walnut [Juglans nigra]) and uncarbonized (pecan [Carya illinoinsis]) were observed. Carbonized seeds observed within these samples included goosefoot (Chenopodium sp.), persimmon (Diospyros virginiana), peach (Prunus persica) and grape (Vitis sp.). Uncarbonized seeds included goosefoot (Chenopodium sp.), strawberry (Fragaria sp.), yellow poplar (Liriodendron tulipifera), gum (Nyssa sylvatica), poke (Phytolacca americana), knotweed/dock (Polygonum/Rumex), cherry (Prunus sp.), black locust (Robinia pseudoacacia), blackberry or raspberry (Rubus sp.), grape (Vitis sp.), daisy (COMPOSITAE), and grass (POACEAE). The carbonized remains of field crops, including maize (corn) (Zea mays), beans (Phaseolus vulgaris) and bread wheat (Triticum aestivum) were well represented. Miscellaneous carbonized plant materials observed within the samples included amorphous carbon, fungi, unidentifiable starchy tissue, an eroded unknown item, and buds.

Summary

This Year 1 survey and presence/absence study of 186 archeobotanical samples
documents a wide range of wild and cultivated plant products employed at Mount Vernon across nearly two centuries of plantation life. The presence of plant comestibles in combination with abundant wood charcoal indicates the consistent disposal of kitchen refuse on the South Grove Midden.

YEAR 2
Introduction
The Year 2 (2012) research effort included the quantitative analysis of plant materials contained within 39 high-priority samples identified during the preliminary survey. Identification of wood charcoal provides information on fuel wood preference, changes in fuel patterns through time, and the Mount Vernon landscape during the different phases of midden development. The quantitative analysis of seeds, nuts, and crop plant remains offers statistically significant data which can be compared to other archeobotanical datasets from Mount Vernon (Shick 2004), and from across the Chesapeake region.

Methods
Each of the 39 selected samples was passed through a 2mm geological sieve, yielding fractions of 2 different sizes for analysis. Weights and sample descriptions of the resulting greater-than or equal-to 2mm and less-than 2mm fractions were recorded. The greater-than or equal-to 2mm botanical specimens were examined under low magnification (10X to 40X) and sorted into general categories of material (i.e. wood, nutshell, carbonized seeds, cultigens, etc.). Descriptions were recorded for each category of the greater-than or equal-to 2mm material. The less-than 2mm size fractions were examined under low magnification, their general composition recorded, and any seed or cultivated plant remains encountered were removed for identification.

Identifications were routinely attempted on all seed, nut, cultigen and miscellaneous plant remains, 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 2000). Identifications of all classes of botanical remains were made to the genus level when possible, to the family level when limited diagnostic information 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 as to prevent their complete examination or recognition, a variety of general categories were used to reflect the degree of 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 a porous arrangement was apparent; 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 in this report to classify burned plant remains which lacked any identifiable characteristics whatsoever.

All identifications were made under low magnification (10X to 40X) with the aid of standard texts (Edlin 1969; Kozlowski 1972; Martin and Barkely 1961; Panshin and deZeeuw 1980; Schopmeyer 1974), and checked against plant specimens from a modern
reference collection representative of the Coastal Plain region of Virginia.

Individual analysis forms were filed for each of the 39 samples subjected to a full quantitative analysis. PDF’s of these forms are submitted as part of this report. Handling and packaging of materials was carried out according to archival standards.

Results
Thirty-nine individual floral samples were derived from the flotation processing of 265 liters with additional plant remains collected through waterscreening (a total of 3,203.25 liters). A total of 229.54 grams of carbonized plant macro-remains were collected and subjected to study. This suite of samples contained an array of burned and unburned plant macro-fossils, including the remains of wood, nutshells, seeds, cultivated plants, and miscellaneous plant materials. An inventory is presented by individual sample in Excel Table 06. In addition to the plant remains, a variety of non-botanical artifacts and ecofacts were also observed. The presence of different classes of these materials is noted in green type within Table 06.

The processed flotation samples yielded both carbonized and uncarbonized remains. Uncarbonized plant remains observed in the flotation-derived botanical assemblage included root fibers, deciduous leaf fragments, oak flowers, pecan nutshell fragments and uncarbonized seeds. The seeds occurred in 62 percent of the samples analyzed. Uncarbonized seeds and nutshells were identified, but were not picked from the sample matrices or quantified. It is highly unlikely that the uncarbonized plant specimens were interred concurrent with period artifacts and the carbonized macro-botanical remains. Although the persistence of uncarbonized plant remains from rare contexts such as consistently xeric or water-saturated environments does occur (Hastorf and Popper 1988; Minnis 1981; Pearsall 2000), such preservational conditions do not characterize the South Grove Midden. Uncarbonized plant remains occurring within archaeological soil samples from similar open-site environments are usually considered to be intrusive modern specimens (Minnis 1981; Keepax 1977). The recovery of uncarbonized plant remains may reveal specific contamination episodes associated with animal (i.e. rodent, insect, gastropod) burrowing, the action of root growth and decay, aeolian or fluvial processes, or by the combined effects of these factors. While it is highly improbable that the recovered uncarbonized remains date to historic deposition of the midden, understanding the composition and distribution of uncarbonized plant remains can help to better understand post-depositional processes influencing the archaeological deposit.

Wood Charcoal
Wood charcoal occurred within 100 percent of the 39 floral samples analyzed. A total of approximately 20,359 fragments of carbonized wood (>2mm in diameter) weighing 211.24 grams was recovered (accounting for 92 percent of the entire flotation-recovered plant carbon, by weight). Of the total wood charcoal, a sub-sample of 781 fragments (a maximum of 20 fragments per sample) was randomly selected for identification. This sub-sample revealed a predominance of oak species (white oak \( \text{Quercus spp. LEUCOBALANUS group} \)) (63 percent of the selected sub-sample, by fragment count), red oak (\( \text{Quercus spp. ERYTHROBALANUS group} \)) (17 percent), hickory (\( \text{Carya spp.} \)) (10 percent), and small amounts of maple (\( \text{Acer sp.} \)), American chestnut (\( \text{Castanea} \))
dentata), pine (*Pinus sp.*), black locust (*Robinia pseudoacacia*) and elm (*ULMACEAE*) (each 1 percent). Wood specimens which were too minute or which exhibited incomplete morphology were assigned to the categories ‘diffuse porous’ (two percent), ‘ring porous’ (one percent), ‘deciduous’ (less-than one percent) and ‘unidentifiable’ (less-than one percent). The percent composition of flotation-recovered wood charcoal is illustrated in Figure

![Composition of wood charcoal](image)

**Figure 01:** Compositions of wood charcoal from the 39 samples.

**Nutshell**

One hundred sixteen fragments of carbonized nutshell weighing 5.09 grams were recovered. Nut remains were present in 33 percent of the samples, and account for two percent of the recovered carbonized plant macro-remains (by weight). Black walnut (*Juglans nigra*) (109 fragments), and walnut family (*JUGLANDACEAE*) (7 fragments) were identified.

**Carbonized Seeds**

A site total of 111 carbonized seed/seed fragments weighing 1.605 grams were encountered within this assemblage. Seeds occurred in 54 percent of the samples analyzed. Seven taxa were identified, along with various unidentifiable specimens. Peach (*Prunus persica*) pit fragments were common (75 specimens or 68 percent of the total seed remains based on specimen count), with persimmon (*Diospyros virginiana*) (12 seed or seed fragments) (Figure 02), cherry (*Prunus sp.*) (four pit fragments), American holly (*Ilex opaca*) (two seeds), sumac (*Rhus spp.*) (one seed) (Figure 03), daisy
(ASTERACEAE) (one seed), and tentatively identified violet (Viola sp.) (one seed). Fifteen seeds or seed fragments were unidentifiable.

Figure 02: Persimmon (Diospyros virginiana) seed recovered from 309 GG. Scale = 1mm grid.
Figure 03: Sumac (*Rhus sp.*) recovered from 929XX. Scale= 1mm grid.

Table 07: Summary of recovered carbonized seeds.

<table>
<thead>
<tr>
<th>Seed (carbonized) n of specimens</th>
<th>111</th>
</tr>
</thead>
<tbody>
<tr>
<td>total weight (grams)</td>
<td>1.605</td>
</tr>
<tr>
<td><em>Diospyros virginiana</em> (persimmon) seed</td>
<td>2</td>
</tr>
<tr>
<td>seed fragment</td>
<td>10</td>
</tr>
<tr>
<td><em>Ilex opaca</em> (American holly)</td>
<td>2</td>
</tr>
<tr>
<td><em>Prunus persica</em> (peach) pit fragment</td>
<td>75</td>
</tr>
<tr>
<td><em>Prunus sp.</em> (cherry) pit fragment</td>
<td>4</td>
</tr>
<tr>
<td><em>Rhus sp.</em> (sumac) seed</td>
<td>1</td>
</tr>
<tr>
<td>cf. <em>Viola sp.</em> (violet)</td>
<td>1</td>
</tr>
<tr>
<td><em>ASTERACEAE</em> (daisy family) seed</td>
<td>1</td>
</tr>
<tr>
<td>unidentifiable</td>
<td>15</td>
</tr>
</tbody>
</table>

**Field Crop Remains**
The class of cultivated field crops was well-represented within the 39 samples selected for complete analysis. Cultigen remains were present within 82 percent of the analyzed samples. The Native American crops were best-represented, with maize (*Zea mays*) (383 elements) (Figures 04, 05, 06), beans (*Phaseolus vulgaris*) (51 elements) (Figure 07) and squash (*Cucurbita sp.* (two elements) (Figure 08) documented. Bread wheat and oats/wheat (*Triticum aestivum* and *Avena/Triticum*) were also present (14 elements) (Figure 09, 10). A summary of cultivated field crop remains is offered in Table 08.

Table 08: Summary of recovered field crops.

<table>
<thead>
<tr>
<th>Field Crops (carbonized) n of specimens</th>
<th>450</th>
</tr>
</thead>
<tbody>
<tr>
<td>total weight (grams)</td>
<td>10.39</td>
</tr>
<tr>
<td><em>Zea mays</em> (maize) total elements</td>
<td>383</td>
</tr>
<tr>
<td>kernel</td>
<td>22</td>
</tr>
<tr>
<td>kernel fragment</td>
<td>263</td>
</tr>
<tr>
<td>cupule fragment</td>
<td>66</td>
</tr>
<tr>
<td>cupule</td>
<td>26</td>
</tr>
<tr>
<td>embryo</td>
<td>4</td>
</tr>
<tr>
<td>glume</td>
<td>2</td>
</tr>
<tr>
<td><em>Phaseolus vulgaris</em> (bean) total elements</td>
<td>51</td>
</tr>
<tr>
<td>entire seed</td>
<td>4</td>
</tr>
<tr>
<td>cotyledon</td>
<td>17</td>
</tr>
<tr>
<td>cotyledon fragment</td>
<td>30</td>
</tr>
<tr>
<td><em>Cucurbita sp.</em> (squash/pumpkin) seed fragment</td>
<td>2</td>
</tr>
<tr>
<td><em>Oats/Wheat</em> (Avena/Triticum) total elements</td>
<td>14</td>
</tr>
<tr>
<td><em>Avena/Triticum</em> (oat/wheat) kernel</td>
<td>10</td>
</tr>
<tr>
<td><em>Avena/Triticum</em> (oat/wheat) kernel fragment</td>
<td>1</td>
</tr>
<tr>
<td><em>Triticum aestivum</em> (wheat) kernel</td>
<td>3</td>
</tr>
</tbody>
</table>

**Miscellaneous Plant Remains**
Miscellaneous archeobotanical materials total 384 specimens weighing 6.305 grams. One small bud, 25 fungal fructification fragments and 358 fragments of amorphous carbon were identified.

**Uncarbonized Seeds and Nuts**

The remains of uncarbonized seeds and nuts were present in 64 percent of the flotation samples analyzed. Eleven taxa were represented – tulip poplar (*Liriodendron tulipifera*), pecan hickory (*Carya illinoensis*), poke (*Phytolacca americana*), black locust (*Robinia pseudoacacia*), grape (*Vitis sp.*), grass (*POACEAE*), purselane (*Portulaca oleracea*), cherry (*Prunus sp.*), raspberry or blackberry (*Rubus sp.*), clover (*Trifolium sp.*), and an unknown seed type. Table 09 provides the percentage presence of these taxa within the assemblage. While many of these plants have useful cultural application as food and landscape elements, it is the opinion of the analyst that they are not a product of historic activities associated with midden development during Lawrence Washington and George and Martha Washington's occupation of Mount Vernon.

Table 09: Percentage presence of uncarbonized seeds and nuts within the analyzed samples.

| presence of uncarbonized seeds and nuts | 64% |
| Seed (presence) | 62% |
| *Liriodendron tulipifera* (yellow poplar) | 28% |
| *Phytolacca americana* (poke) | 21% |
| *Portulaca americana* (purselane) | 3% |
| *Prunus sp.* (cherry) | 3% |
| *Robinia pseudoacacia* (black locust) | 21% |
| *Rubus sp.* (blackberry or raspberry) | 3% |
| *Trifolium sp.* (clover) | 3% |
| *Vitis sp.* (grape) | 5% |
| *POACEAE* (grass family) seed | 5% |
| unknown seed type 1 | 10% |

| Nutshell (presence) | 26% |
| *Carya illinoensis* (pecan hickory) nutshell fragments | 26% |
Figure 04: Maize (*Zea mays*) kernel (embryo absent) recovered from 929X. Scale = 1mm grid.

Figure 05: Maize (*Zea mays*) cupule recovered from 348 DD. Scale = 1mm grid.
Figure 06: Maize (*Zea mays*) cupule recovered from 929 XX. Scale = 1mm grid.

Figure 07: Bean (*Phaseolus vulgaris*) seed recovered from 329 TTT. Scale = 1mm grid.
Figure 08: Squash/pumpkin (*Cucurbita sp.*) seed fragment recovered from 929 C. Scale = 1mm grid.

Figure 09: Oats or Wheat (*Avena/Triticum*) recovered from 328 YY. Scale = 1mm grid.
Discussion

Archeobotanical Patterns

Archaeology of the South Grove Midden has identified the occupational periods of Lawrence Washington (ca. 1735-1758) and the early years of George and Martha Washington (ca. 1759-1775) as research areas of the highest priority. Examination of the archeobotanical assemblage from these occupational phases reveals interesting patterns that inform our understanding of household economy, plantation landscape and the expression of identify at Mount Vernon.

The results produced from a quantitative analysis of 39 samples provide an opportunity to contrast patterns of historic plant use associated with the early periods of midden development. A dramatic difference in the density of carbonized plant macro-remains is evident between the Lawrence Washington and early George and Martha Washington households (Figure 11). A 50 percent reduction in carbon density is apparent during the early George and Martha Washington period. This decrease appears to be not simply a result of wood charcoal densities, but a wholesale difference in all classes of plant macro-remains (see Table 010. This shift in plant material densities coincides with a change in household management and evidences different habits of kitchen waste disposal that coincide with the time period when George and Martha Washington assume their residency at Mount Vernon.
Figure 11: A comparison of the density of carbonized plant materials recovered from First Priority contexts.

The deposition of edible plant products can be scrutinized using the measure of material fragments per liter of midden fill (Figure 12) and by measuring the ratio of comestible fragments to wood charcoal fragments across the two households (Figure 13). Similar patterns are revealed using both abundance indices. Field crop remains are notably abundant within the deposits associated with Lawrence Washington’s time (ca. 1735-1758). Low quantities of nuts and seed remains are present within both occupational periods. The ubiquity of edible plants is explored in Figure 14. The richness of edible plant remains deposited on the midden decreases over time. During Lawrence Washington’s tenure, maize is conspicuously ubiquitous, occurring in 81 percent of sample contexts. Oak and hickory dominate the wood assemblages from both occupational periods (Figure 15).
Beans were present in 48 percent of botanical samples analyzed, and peaches were somewhat ubiquitous, occurring in 22 percent of samples attributed to Lawrence’s household. In deposits associated with the early years of George and Martha Washington, maize, persimmon, peach, and oats and wheat were documented in 33 percent of sampled contexts (interestingly, not in the same samples).
Figure 14: Ubiquity of comestibles by occupational period.
Preservation

Archaeology of the South Grove Midden resulted in the recovery of kitchen-associated remains in proximity to the mansion house supported by tight cultural chronology and bolstered by historical records. A rich assemblage of archeobotanical remains was anticipated within the Midden, and excavated soils were subjected to a rigorous program of soil flotation and waterscreening for their recovery. Despite a generous floral sampling strategy and careful processing and analysis, the recovered archeobotanical remains were not as abundant or diverse as expected.

This result may simply be an artifact of preservation: Only a small fraction of plant remains originally deposited in the ground is available for study hundreds of years later. Those plants materials subjected to burning (carbonization) better resist decay, and it is these remains that we rely upon for archeobotanical analysis. The closest source of fire to the South Grove Midden would have been the kitchen – and the distance between the midden and the kitchen fire may explain the limited quantity and diversity of plant remains recovered. Fireplace ash (in which food remains accidentally dropped might preserve), may have been disposed of elsewhere – perhaps as a soil amendment.

The underwhelming archeobotanical assemblage may also be understood by examining the nature of middens generally: Middens are biologically active mediums, and the combined effects of decomposition, weathering, rot, and recycling by farm animals and vermin would have significantly reduced the plant remains originally deposited on the South Grove Midden.

The abundance and ubiquity of uncarbonized plant remains – many or which derive from species visible or recently extant in the immediate vicinity of the midden – strengthen the
interpretation of biological activity within the midden. For example, the pecan nutshell fragments recovered from the midden (Units 309, 328, 329, 348, 349, 929) probably derive from the large pecan trees featured in the vicinity of the excavation area. Two of these persist today. The largest pecan was felled in 2004 after it sustained damage in Hurricane Isabel. The tree, while old, did not date to Washington’s lifetime. It was probably planted in the 1860’s.

**Landscape**
Layers within the midden which are of particular research interest coincide with the period of Lawrence Washington’s ownership of Mount Vernon ca. 1735-1758 and the early years of George and Martha Washington’s tenure (ca. 1759-1776). The intensively studied midden strata (the 39 selected samples) immediately precede Washington’s large-scale reorganization of the plantation’s landscape (White 2006). This reorganization involved the creation of the south lane (ca. 1775), the construction of new buildings and the development of the south lawn as an ornamental grove of trees and flowering shrubs beginning in 1776. These changes to the landscape of the south end of the mansion undoubtedly involved changes in the function and use of the midden and necessitated the disposal of trash at a new location.

**Foodways**
A range of comestible plants were represented within the South Grove Midden assemblage, including field crops, fruits, and nuts. An overview of edible taxa is provided below:

**Wheat, Wheat/Oats**
These cereal grains were domesticated in the Levant region of the Near East and were introduced to North America through Europe at the time of the colonial encounter. Wheat and oats, along with their close relatives barley, rye and spelt, were cultivated extensively at Mount Vernon, especially by the middle 1760’s when George Washington shifted his agricultural focus from tobacco to growing wheat as a main cash crop. Washington’s diary makes many references to farming cereal grains, and to experiments regarding maximizing production (Jackson and Twohig 1976). Washington built (1771) and operated a thriving mill to process flour and cornmeal for export, and constructed an adjacent distillery (1797) which produced large quantities of grain whiskey.

**Maize/Corn**
Although maize was introduced to some areas of North America by A.D. 200 (Ford 1987; Chapman and Crites 1987) it appeared to have been a minor cultigen (perhaps serving a ceremonial role) until after A.D. 800. Evidence for a shift to maize-centered agriculture in the East comes from a marked increase in archaeological maize remains from A.D. 800 to A.D. 900 and changing human bone isotope values which indicate a substantial increase in maize consumption from this period through about A.D. 1100. Colonists to the Middle Atlantic region were introduced to maize cultivation by Native Americans and quickly appropriated the consumption and cultivation of this starchy grain upon settling. Along with other field crops, maize thrived in Virginia’s fertile coastal plain. It has been suggested that Washington’s principal maize variety was Virginia Gourdseed, a late
flowering, tall dent type with a red cob and many rows of deep, starchy kernels. There is evidence among Washington’s papers that he also cultivated a northern flint variety which could be planted earlier in the growing season (Jackson and Twohig 1976:279). Washington built (1771) and operated a thriving mill to process cornmeal and flour for local sale and for export to England, Europe and the West Indies. Archeobotanical study of the South Grove Midden and the House for Families (Shick 2004) tell us that maize was the most-provisioned starchy staple for both the Washington and slave households.

Squash
Squashes were cultivated in Meso-America almost 10,000 years ago, some species were independently domesticated in Eastern North America (Smith 1997). Colonists to Virginia assimilated the cultivation of a variety of squashes - along with other plants including beans, maize and sunflowers - from Native American gardeners, and relied heavily on these indigenous American crops. Squashes were included in Washington's schedule of crop rotation (Jackson and Twohig 1976:27).

Bean
The common bean (Phaseolus vulgaris) was introduced from Meso-America to some regions of the Eastern Woodlands by AD 1000 to 1200, but was not well-established in the east until the 13th century AD (Hart et al. 2002; Hart and Scarry 1999). Colonists to Virginia adopted the cultivation of beans - along with squashes and maize - from Native American gardeners, and relied heavily on these indigenous cultigens. Washington cultivated a variety of bean types at Mount Vernon, including red and white varieties of both bush and pole beans. (Jackson and Twohig 1979:150). From archival records, we know that Washington cultivated other members of the bean family, including the Lima bean and the Fava bean (also called the Broad, Windsor or Horse bean).

Cherry
The cherry is the fleshy stone fruit of a variety of trees of the genus Prunus. Edible wild cherries are native to Virginia, but it is likely that the pit fragments recovered from the South Grove Midden derive from one of the many cherry cultivars grown at Mount Vernon. Washington’s diary mentions the propagation of numerous cherry varieties in his fruit garden during the pre-1776 period, including Bullock Heart, Duke, and May (Jackson and Twohig 1976:327).

Peach
The familiar peach originated in China but introduced to North America via Europe – probably through Florida - in the early 1560’s. Peaches were an important and highly desired fruit tree in the eighteenth century landscape. Peach trees were propagated from stones sent to and traded among the early settlers, and were highly regarded by Native Americans as well (Leighton 1986:259). Peach trees naturalized into the landscape so completely that the earliest natural histories list the peach as a native species. The popularity of the peach increased in the eighteenth and nineteenth centuries, as evidenced in the considerable growth in available varieties (from 21 types in 1629 to over 250 by 1850). Washington mentions three different types at Mount Vernon, and describes the sharing of peach scions with other plantation owners in the region. The harvesting of
peaches specifically for producing brandy is described at Mount Vernon (Jackson and Twohig 1976:332). In 1797, Washington built and operated a commercial distillery at Mount Vernon that produced marketable quantities of cider and peach brandy in addition to grain alcohol.

Sumac
Sumac is any one of numerous species of shrubs and small trees native to Virginia and common to forest fringes and field margins at Mount Vernon. Sumac belongs to the cashew family, and its fruits are formed in dense clusters of reddish drupes. These fruits, when ground or steeped to make a tea, yield a lemony taste. The drupes can also be used to produce a dye, and have been used as a medicine.

Persimmon
Persimmon is the edible fruit of a native, deciduous tree common to the Mount Vernon landscape. The persimmon is sticky, sweet and slightly tangy, and is edible only after fully ripening – usually following a hard frost in November. Unripe persimmons contain a tannin that is disagreeable to taste. Persimmons dry easily – like prune or fig – for storage, and were widely used during colonial times. Persimmon seeds were recovered from the South Grove Midden and from the House for Families (Shick 2004), which suggests that the fruits contributed to the table of both slaves and plantation owners at Mount Vernon.

Black Walnut
The black walnut is a large native tree growing to 125 feet in height and with a broad, spreading crown. The wood of the black walnut is prized, being a unique purple-brown and preferred for fine woodworking, and has been referred to as “Unquestionably our finest domestic cabinet wood” (Panshin and deZeeuw 1970:540). Historically, black walnut was favored for exacting work requiring stability and strength, as in the construction of fine furniture, gunstocks and cabinetry. The black walnut produces a sweet, oily and edible nutmeat in a durable shell encased in a fleshy husk. Husks of the black walnut provide a rich, durable purple/brown dye for fabric, leather and basketry (Brooklyn Botanic Garden 1964:29).

Ethnobotany of Mount Vernon
A growing dataset of systematically collected and analyzed archeobotanical information from Mount Vernon (Shick 2004; Holt 1991; McKnight 2004, 2006) is building a better understanding of the relationship between people and plants over nearly three centuries of historic occupation. The extensive archival record available to us from George Washington’s time at Mount Vernon provides a wealth of detail regarding farm operations and the development of the landscape, gardens and orchards. But just as other areas of archaeology do, the archeobotanical record provides another source of information that is independent of the perspective of the man and his time. Together, multiple lines of evidence develop a stronger picture of the ethnobotanical history of the land and the people who lived there.

A comparison of the various assemblages studied at Mount Vernon allows for a
comparison of households. Extensive archaeology at the House for Families slave quarter included the excavation of a 6' by 6' brick-lined storage cellar which yielded a rich association of domestic refuse ca. 1760-1792 or 1793 (Pogue and White 1991). Plant macro-remains were collected via soil flotation and waterscreening from this cellar. A preliminary analysis by Cheryl Holt (1991) identified food plants including cherry, pecan, maize, lima bean, peach, pea and black walnut. A more rigorous study of the cellar deposits by Laura Shick (2004) focused on the analysis of seeds and nuts measuring greater-than or equal to 1/8” diameter. Shick’s work reveals the predominance of maize and persimmon within the cellar, and documents the presence of black walnut, walnut, peach, cherry, bottle gourd, common bean, wheat and bean or pea. While the House for Families dataset is biased in terms of artifact dimension (only large edible plant parts were included in the analysis) and is limited by the absence of wood data or soil volumetrics to standardize the sample for comparison, the assemblage provides valuable information regarding slave diet, food production, and provisioning at Mount Vernon.

Table 11: Comparison of comestible plant remains from studied contexts at Mount Vernon.

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<tbody>
<tr>
<td>NUTS</td>
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<tr>
<td><em>Carya illinoensis</em> (pecan)</td>
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<tr>
<td><em>Juglans nigra</em> (black walnut)</td>
<td>x</td>
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<tr>
<td><em>JUGLANDACEAE</em> (walnut family)</td>
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<tr>
<td>FRUITS</td>
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<tr>
<td><em>Diospyros virginiana</em> (persimmon)</td>
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<tr>
<td><em>Prunus persica</em> (peach)</td>
<td>x</td>
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<td>x</td>
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<tr>
<td><em>Prunus sp.</em> (cherry)</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<td><em>Rhus sp.</em> (sumac)</td>
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<tr>
<td>FIELD CROPS</td>
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<tr>
<td><em>Zea mays</em> (maize)</td>
<td>x</td>
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<tr>
<td><em>Phaseolus vulgaris</em> (common bean)</td>
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<td><em>Phaseolus lunatus</em> (lima)</td>
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<tr>
<td><em>FABACEAE</em> (bean or pea)</td>
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<td>x</td>
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<tr>
<td><em>Cucurbita sp.</em> (squash/pumpkin)</td>
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<td><em>Pisum sativum</em> (pea)</td>
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<tr>
<td><em>Avena/Triticum</em> (oat/wheat)</td>
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<tr>
<td><em>Triticum aestivum</em> (wheat)</td>
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<tr>
<td><em>Lagenaria siceraria</em> (bottle gourd)</td>
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</table>

The combined dataset from the House for Families and the South Grove Midden provides a rare opportunity to compare plant food remains from (roughly) contemporaneous households of slave and master. Despite differences in sampling methodologies, the
Assemblages exhibit some striking similarities (Table 11). Maize was the most common plant food type represented in both assemblages, and persimmon and peach were the most abundant and ubiquitous fruit remains recovered at both locations. Interestingly, a more diverse suite of edible plants is represented within the House for Families cellar (13 taxa vs. 11 taxa from the South Grove Midden). Subtle differences in the kinds of comestibles is evident as well: Pecan, gourd, lima bean and pea were present in the House for Families feature, but absent within the South Grove Midden; Squash and sumac are present in the South Grove Midden, but are absent from the slave cellar.

**Regional Perspective**

While archeobotanical information from eighteenth century Chesapeake plantation sites remains meager, an increasing emphasis on archeobotanical sampling at some sites is growing the regional dataset (McKnight 2000, 2003; Raymer 1996, 2003; Bedell 2003; Mrozowski et al. 2008; Garrow et al 1986; Gibb 2002).

Review of six archeobotanical assemblages contemporaneous with the Lawrence Washington and early George and Martha Washington layers of the South Grove Midden provides a comparative perspective on plantation ethnobotany in Virginia.

A rigorous archeobotanical analysis was conducted on a slave quarter (Structure 1) at the Rich Neck Site (ca.1740-1779’s) (Mrozowski et al. 2008). Field crops (maize, rye, wheat), garden products (bean, cowpea, lima, peanut, melon, squash), edible herbs, tree fruits (cherry and honey locust) and nuts (hickory, walnut, and black walnut) were well-represented. The assemblage provides evidence of food provisioning, production and foraging.

Period I deposits at the Wilton Plantation site (ca. 1750-1790) derive from a root cellar associated with a slave quarter associated with the extensive tobacco plantation of the Randolph family (Higgins et al. 2000). Recovered archeobotanical remains evidence a reliance on field crops (maize, oats, wheat, beans), sweet potato, fleshy fruits (cherry, blackberry/raspberry), edible herbs, and nuts (hickory, black walnut) (McKnight 2000). Provisioned staples as well as wild-gathered edibles and vegetables cultivated on a small-scale were documented within the Wilton assemblage.

North Hill 1770-1785 was part of Thomas Jefferson’s Poplar Forest, and sampled contexts there represent a single household of enslaved Africans who worked as field hands (Raymer 2003; Heath 2007). A rich and abundant assemblage of comestible plant remains from this site includes wild and cultivated fruits (peaches, blackberry/raspberry, persimmon, sumac, elder, grape, strawberry), field crops (maize, oats, rye, sorghum, sunflower), abundant herb seeds (many from edible taxa) and nuts (hickory and acorn).

Southall’s Quarter (ca. 1750-1800) (Pullins et al. 2003) in Williamsburg, Virginia produced an archeobotanical assemblage associated with slave/servants who worked the plantation for an absentee landowner. Recovered plant remains include the remains of crops (bean, maize, wheat and/or oats, sunflower), persimmon fruits, and nuts (walnut, hickory and black walnut) (McKnight 2003).
Just across the Potomac River from Mount Vernon, Data Recovery investigations at Oxon Hill Manor/Addison Plantation provide an interesting comparative floral assemblage. Five general contexts associated with owner/planter domestic life were rigorously sampled, including a cellar, meathouse, several structural features, and a deep well associated with the main house. Analysis was limited to seeds, and the seed assemblage was predominantly uncarbonized (25,097 seeds), with only 25 carbonized seeds recovered sitewide. The Area 1 Well offered excellent organic preservation: The well measured more than 13 meters deep, and much of the feature was beneath the water table, providing anaerobic soil conditions conducive to organic preservation. Archaeological evidence suggests that the well coincides with the Addison family’s tenure of the property (ca. 1710 to 1810), and recovered artifacts produced a mean ceramic date of 1753.75 (Garrow et al. 1986:214-217). The most interesting discovery within the well was a concentration (22,017 specimens) of flax seeds, which evidence flax production on the plantation. Fleshy fruits (peach, grape, blackberry, elder, cherry, strawberry, plum), nuts (walnut, hickory), garden products (purslane, sweet pea, sorrel, coriander, delphinium/larkspur, violets, squash), and common and ornamental trees were well represented. Maize and small grains (wheat/oat/barley) are conspicuously absent from the Oxon Hill Manor assemblage. While grossly different preservational conditions characterize the most botanically-rich features sampled at Oxon Hill Manor, the assemblage provides insight into mid to late eighteenth century ethnobotany in the region.

Archaeology at the Belair Mansion, a mid eighteenth-century Palladian-style mansion in Prince Georges County, Maryland reveals domestic and landscape architecture that was conceptually similar to Addison’s Plantation and Washington’s Mount Vernon (Gibb 2002). Archeobotany associated with the data recovery effort at Belair included the study of flotation-recovered remains from post molds and midden areas associated with the main house. Wood charcoal was dominated by oaks, hickory, ash and maple. Nutshell was extremely scant, and carbonized seeds were not recovered. Wheat and maize remains were documented. The archeobotanical dataset from Belair Mansion is limited in size, but comparison with the South Grove Midden reveals some noteworthy patterns: Wood charcoal patterns are relatively consistent between the two assemblages; Field crops (wheat and maize) provide a dietary starchy base at both sites; Fruit remains – which are prevalent at Mount Vernon – are strikingly absent from the Belair Mansion samples. The floral results detailed from Rich Neck, Wilton, North Hill and Southall’s Quarter derive from features associated with slave households, and, considered alongside the House for Families assemblage from Mount Vernon extends our understanding of slave foodways. Interestingly, there are striking similarities between these assemblages and the South Grove Midden at Mount Vernon. The eighteenth century was a time when considerable overlapping of slave/planter domestic life, and it is possible that the South Grove Midden represents mixed debris from both the Washington’s and the enslaved/servant population living in close proximity to one another. Maize emerges as a frequently used plant-food staple at all of these loci. Other similarities include a complement of both wild and cultivated plant foods to the diet at all sites, perhaps indicating a need for economy and a desire for diversity in the diet. The data from each
of these sites reveal that garden-produced and wild-gathered foods complement a starchy base of cereals and beans.

Floral data from Oxon Hill Manor/Addison Plantation are difficult to compare due to preservational biases, but plant remains recovered in direct association with the home of a wealthy, eighteenth-century plantation owner offers an important contrast to the South Grove dataset from Mount Vernon. Domestic production of flax, cultivation of ornamental trees, herbs and flowers, and the careful shaping of plantings associated with the manor house are documented. Similarities between the South Grove Midden and Oxon Hill Manor Well assemblages include a predominance of fleshy fruits, a cultural reliance on nuts, and the . Unfortunately, soil conditions within the South Grove Midden did not allow for the (unusual) preservation of garden species (which are rarely exposed to the preserving effects of carbonization).

Collectively, the archeobotanical data from these Virginia and Maryland sites provide details of diet and plantation economy during the latter part of the eighteenth century.

**SUMMARY**

Archaeology of the South Grove Midden at Mount Vernon included the collection of a generous 233 archeobotanical samples derived from soil flotation and waterscreening. The recovered archeobotanical remains are closely tied to other classes of material culture from the midden, and their interpretation benefits from a tight chronology of households and rich archival documentation from the site.

A two year, phased approach to sample evaluation and analysis enabled researchers to prioritize samples for study in order to maximize the recovery of ethnobotanical information from the feature. A presence/absence study of 186 archeobotanical samples from post-1776 occupational layers of the South Grove Midden documented the use of a wide range of wild and cultivated plant products associated with kitchen activities and architectural construction/demolition. In addition, thirty-nine samples from high-priority contexts (ca. 1735-1775) offering the greatest research potential were selected for a full, quantitative analysis. A total of 229.54 grams of carbonized plant macro-remains were collected through flotation of 265 liters of soil, with additional plant remains collected through waterscreening (a total of 3,203.25 liters). Analysis revealed an array of burned and unburned plant macro-fossils, including the remains of wood (fuel remains and possibly construction debris), nutshells, seeds, field crops (maize, beans, squash, wheat/oats), and miscellaneous plant materials. The remains of purely ornamental species were conspicuously absent from the assemblage, confirming that midden development occurred prior to the improvement of the South Grove area as a groomed landscape.

A greater degree of archeobotanical richness was anticipated within the South Grove Midden than was realized. The recovered assemblage suggests that conditions of midden deposition were haphazard, and that following discard, organic refuse was exposed to the elements and subjected to scavenging. While a range of plant products were documented within the midden, they were not abundant, nor do they by any means reflect the full range of plant products known to have had cultural and economic import
at Mount Vernon.

The South Grove Midden archeobotanical study builds on the plantation’s floral dataset, augments the rich archival resources available for the property, and enhances our knowledge of the many ways in which people and plants were interconnected at Mount Vernon. A valuable comparison between archeobotanical assemblages from slave and mansion households was possible with this new data set and the results inform our understanding of plantation social dynamics and resource allocation. Interestingly, we learn that strong similarities exist between the South Grove Midden and the House for Families slave quarter.

Archeobotanical data from the South Grove Midden contribute to our understanding of how Washington and his family, household, slaves and servants used, relied upon and modified the landscape of Mount Vernon and its resources.

**FUTURE DIRECTIONS**

It is the opinion of the analyst that this work effort has maximized the research potential of the South Grove Midden, and that further macro-botanical analysis is not warranted at this time. Differences between two eighteenth century phases of midden development were apparent within the South Grove assemblage, and it will be important to integrate other aspects of site archaeology to confirm or challenge the patterns seen in the archeobotanical dataset.

One of the most interesting results of this research was the discovery of strong similarities between the South Grove Midden and the House for Families assemblages. Results suggest that more research is needed to explore the degree to which the domestic lives of slave and planter overlapped during the eighteenth century. The integration of other artifact datasets (i.e. faunal remains, tools and objects of personal adornment), and a broadening of archeobotanical studies from other loci within Washington’s plantations may help to inform our understanding of the social interactions reflected in mixed archaeological deposits (like the South Grove Midden).

The preliminary study of floral remains from Mount Vernon’s House for Families (Shick 2004; Holt1991) documented a rich and important collection of plant artifacts, and suggests that is essential to fully understanding the lives of Washington’s slaves and the ethnobotany of Mount Vernon. A full-scale, quantitative analysis of archeobotanical samples from the House For Families would provide a measurable and statistically significant data set which would allow for a more rigorous comparative analysis with the South Grove Midden as well as with other sites in the region).
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