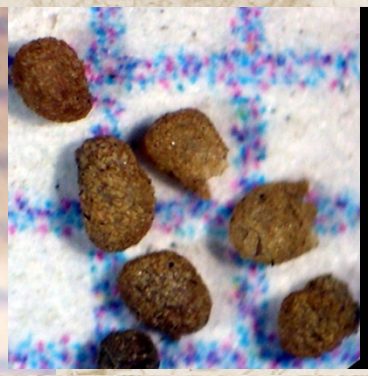
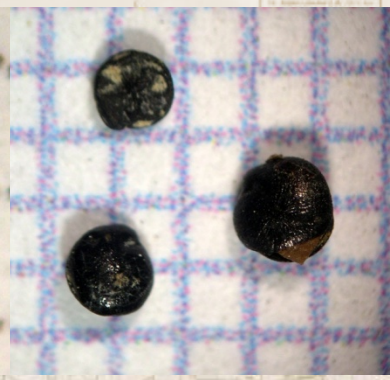
New Perspectives on Human-Plant Histories in Delaware: Acheobotanical Data from the Route 301 Mega Project.

Justine McKnight





Symposium: New Highway Uncovers New Histories: Archaeology Mitigations from the U.S. Route 301 Mega Project in Delaware.

January 9, 2016 SHA Conference, Washington D.C.

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New Perspectives on Human-Plant Histories in Delaware: Acheobotanical Data from the Route 301 Mega Project.

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ABSTRACT: This paper will focus on the interpretation of a large flotation-derived floral dataset produced from seven archaeological mitigations accomplished under the Route 301 Mega Project. A diverse range of features (wells, cellars, smokehouses, root cellars, middens, kilns, slave quarters) were sampled from a variety of domestic, agricultural and small-scale industrial contexts that comprised the social landscape of rural Delaware during the 1700's and 1800's. The collective floral data make a valuable contribution to the project's research themes of site economy, tenancy, and slavery in the post-colonial landscape. The project affords a unique opportunity to explore a wide range of people-plant relationships at a series of diverse but closely tied historic sites. In addition to generating a powerful regional dataset, the archeobotanical studies were significantly enhanced by close collaborative and coordinated research involving multiple CRM firms and government agencies.

INTRODUCTION

(SLIDE 1) This paper describes archeobotanical studies conducted at seven of the sites mitigated under the US Route 301 Mega Project. Over a three year period, I had the opportunity to support four different cultural resource management firms in the analysis of flotation-derived and hand-collected macro-plant remains. In addition to generating a powerful regional dataset, the work was significantly enhanced by standardization of techniques, data sharing and a spirit of close collaboration between participating firms and government agencies.

(SLIDE 2) The project afforded a unique opportunity to explore a wide range of people-plant relationships at a series of diverse but closely tied historic sites. These sites contained the remains of predominantly domestic and agricultural contexts in rural New Castle county that were occupied from the 1720's through the early 20th century. A diverse range of features - including wells, cellars, smokehouses, root cellars, middens, and slave quarters - were sampled for floral remains. Beyond providing baseline information about 18th and 19th century ethnobotany, the collective floral dataset from these sites makes a valuable contribution to the Mega Project's overarching research themes of site economy, tenancy, and slavery in the post-colonial landscape.

PROJECT RESULTS

(SLIDE 3) 200 flotation samples measuring 1200 liters in soil volume were processed from the seven sites, producing over 1,260 grams of carbonized plant macro-fossils for study. 51 hand-collected botanical samples were also analyzed. Collectively, a project total of 129,416 individual botanical artifacts were collected and analyzed. For the most part, the study focused on macro-plant remains preserved through burning (carbonization) – although in the case of well features excavated at five of the sites uncarbonized plant remains were well preserved. While a detailed accounting of macro-botanical results from all seven sites is beyond the scope of this paper, I'd like to provide a quick overview of each and then to highlight some of the most interesting outcomes of the archeobotany program:

(SLIDE 4) The Elkins Site complex (7NC-C-174) includes three proximate and closely connected archaeological components with historic occupations focused during the 18th century. The results from a large domestic cellar excavated were particularly informative, providing strong evidence for a working farmstead where the cultivation of field crops and orchards were important pursuits.

(SLIDE 5) Historic occupations at the Cardon-Holton site (7NC-F-128) were tightly focused during the years ca. 1720 to 1760) and this brief episode of activity may represent

the remains of a short term tenancy. In addition to sampling cultural features, 10 flotation samples from non-cultural control settings at the site provide valuable comparative data.

(SLIDE 6) Occupied by the Armstrong and Rogers families from 1780 through the middle 19th century, the Armstrong-Rogers site (7NC-F-135) describes a rural, roadside working farm. Despite a rigorous program of flotation, floral remains were scant – yet surprisingly informative.

(SLIDE 7) The Noxon Tenancy Site (7NC-F-133) (occupied from 1740-1765) contains the remains of a tenant-occupied farmstead. Maize remains from a variety of cultural contexts attest to the important of field crops to site economy and diet, yet European cereal grains were notably absent at this site.

(SLIDE 8) The Bird-Houston site (7NC-F-138) operated as a rural tenancy from the 1770's through the early 1920's. The site was probably occupied by African Americans who farmed a small portion of the property – perhaps to supplement outside income. Recovered maize, peach and black walnut provided a subsistence base.

(SLIDE 9) The Houston-LeCompte site (7NC-F-139) includes the remains of a rural farmstead occupied from the late 18th through early 20th centuries by the owner families and their tenants. A focus on maize agriculture, with minor wheat or oat presence, and a diverse plant food economy that included nuts and wild fleshy fruits is indicated.

(SLIDE 10) The Rumsey/Polk Tenant site (7NC-F-112) describes the archaeological remains of a ca. 1760-1853 tenant farmstead. This site provided a rich assemblage of agricultural products – including maize, beans, cereal grains and tobacco (the tobacco occurring in subfloor pits associated with slave quarters).

ETHNOBOTANY OF THE HISTORIC CORRIDOR

So, collectively what do the results from these sites tell us about historic plant use within corridor? The 18th and 19th centuries span a time period characterized by

widespread changes to Delaware's landscape as native forests were cleared, land drained and the expansion of colonial infrastructure increased settlement, farming and trade across the state.

(SLIDE 11) The Mega Project floral assemblages tell us a lot about the history of farming in central Delaware. The data reveal a firm reliance on both old world and new world cereal grains and legumes: Maize and wheat are best represented, along with oats, beans, peas, and – importantly – the first archeobotanical evidence of tobacco in Delaware.

Cultivated orchard fruits and nuts – especially peaches – along with grape, hazel (at Elkins) – are well represented at four of the seven study sites. Foods of indeterminate status – (either wild-gathered or cultivated) include cane berries, cherry, strawberry, huckleberry and chokeberry. Herbs with edible foliage and possible medicinal or ornamental uses include jimsonweed, pigweed, morning glory, knotweed, sedge, ragweed, mint and grasses. Wild-gathered products native to the project area include hickory, sumac and walnut.

(SLIDE 12) Valuable information about historic forest resources and wood selection is made available through the charcoal data. Flotation samples from all seven sites in the study corridor were dominated by wood charcoal (which collectively comprised over 93% of the total flot-recovered material). White oak species predominate at all sites, followed by a mix of hickory and red oak species. Results reveal the cultural selection of woods for particular applications (high calorie oaks and hickories for fuel as well as for strength in construction). It is noteworthy that pine – while a dominant tree in local forests, is not well-represented archaeologically.

In addition to revealing the kinds of plants historically utilized at the study sites, the data inform our understanding of broader patterns in feature development, farming practices, landscape, and occupancy. For example:

(SLIDE 13) At the Noxon Tenancy , Bird-Houston, Houston-LeCompte (3), Cardon-Holton and Armstrong-Rogers (2) sites, a series of wells were excavated – floral data recovered from these contexts include 1) wood types used in construction (revealed to be

predominantly white oak and pine species) and 2) flotation samples that provide evidence of local flora and seasonality Flotation samples from the Cardon-Holton well (ca. 1720-1740) were particularly informative, with a large assemblage of seeds revealing an episode of rapid-infilling during the summertime that included local weedy vegetation.

(SLIDE 14) An analysis of recovered plant artifacts reveals strong patterns of change in the operation of the rural landscape over time- including trends in farming. Maize and beans appear to be crop staples from the earliest occupations throughout the historic period. Tobacco was most abundant and ubiquitous within 18th century contexts. While wheat and oats are archaeologically visible from 18th century contexts, the data suggest that the widespread farming of European cereal grains was a 19th century phenomenon within the project corridor. A regional trend toward the growing of cereal grains for profit by the end of the 1800's is apparent in the archival record and corroborated by the macro-botanical data. By the turn of the 19th century, farmers throughout the region were diversifying their agricultural options for export and cereal grains (wheat, most importantly) supplanted tobacco as the predominant cash crop. This shift in agricultural commodities had far-reaching effects on both farm culture and ecology: The plow replaced the hoe, creating the need for cleared fields rather than slash-and burn tobacco gardens. Labor requirements for the two crops were also very different. Tobacco culture employed large gangs of enslaved field hands to convert forest to tobacco plots and to plant and manage the crop. Cereal grain farming created the need for smaller, more specialized groups of workers engaged in a wider variety of farm activities.

(SLIDE 15) Details of landscape management are revealed in the Armstrong-Rogers floral assemblage, where a paucity of remains from a busy site core exposes a pattern of yard maintenance and waste disposal. Cultural practices of site cleanliness and the maintenance of food processing areas and public spaces (those fronting an historic road) strongly influenced the deposition and preservation of plant remains in the archaeological record. These results differ from the pattern observed at the other six study sites – where the seeds of ruderal, weedy plants were more abundant, suggesting farmyard settings that were less fastidiously maintained.

(SLIDE 16) PATTERNS OF OCCUPANCY. All seven study sites represent predominantly domestic occupations, but a spectrum of occupant types – including landowners, tenants and enslaved workers – are represented.

At the Bird-Houston site (ca. 1770-1830), flotation data from a household of African-American tenants reveal a diversity in plant foods that suggest sufficiency in the production of maize and orchard fruits and the collection of wild fare – especially during the early period of occupation. Patterns in wood charcoal at the site – trending from white oak predominance in early contexts to an admixture of pine and understory taxa in later contexts - also reflect shifts in land management and resource availability over time.

(SLIDE 17) At the Rumsy/Polk site, African ceremonial or spiritual traditions are suggested by the presence of tobacco within a series of subfloor pits associated with the homes of enslaved workers. 172 uncharred tobacco seeds were recovered. The presence of tobacco in these contexts conforms to an emerging pattern at a growing number of 18th and 19th century sites in Maryland, Virginia and New York.

And finally - **A comparison of flotation data from the seven sites brings into focus various issues of taphonomy, preservation and approach that are – I think- universal to ongoing research in the region:**

(SLIDE 18) The presence of uncarbonized weed seeds of probable modern origin within archaeological features throughout the Rte 301 study sites accords with the pattern observed at other historic sites. There is consistency in the uncarbonized seed types recovered from historic flotation samples from Delaware: Both native and naturalized Eurasian weeds are well represented, all are opportunistic colonizers of disturbed ground, and all are common to agricultural settings. There is strong similarity in the types of uncarbonized seeds represented despite significant differences in site location, soil conditions, field sampling procedures, flotation equipment, analysts and temporal association. A variety of factors have been credited for this phenomenon: A prolonged history of plowing, agriculture, the porosity of coastal plain soils, material transport by insects and rodents are all likely culprits.

I'M IMPRESSED BY WHAT WE SEE WHAT WE DON'T. The collective floral datasets from these sites reveals similarities in the types of plant materials documented archaeologically (wood, field crops and fleshy fruits, nuts and weeds). The project produced little evidence of plants clearly linked to medicinal use, there was a total absence of garden vegetables, no fiber crops, few ornamentals, and carbonized small seeds area (in general) are poorly represented. All classes and all taxa are represented in relatively low densities. These results are likely a product of taphonomic processes that generate biases in the data: some kinds of materials are more readily preserved, persist longer archaeologically, and are offer identifiable archaeological signatures.

At the Cardon-Holton site (Hunter Research, Inc.) non-cultural control samples (n=10) provided an opportunity to contrast the flotation results and inform our understanding of depositional processes and 'seed rain'. I'd like to take this opportunity to urge excavators to secure control samples as part of any program of flotation.

(SLIDE 19) The Rte 301 Mega Project provides a great example of the benefits of coordinated research: Standardization of collection, processing and analytical techniques steamlined the project and strengthened its results. The aggregation of data, sharing information and close collaboration enhanced both the process and product of this highway archaeology project. Thank You.

Sites sampled for macro-botanical remains Rte 301 Mega Project

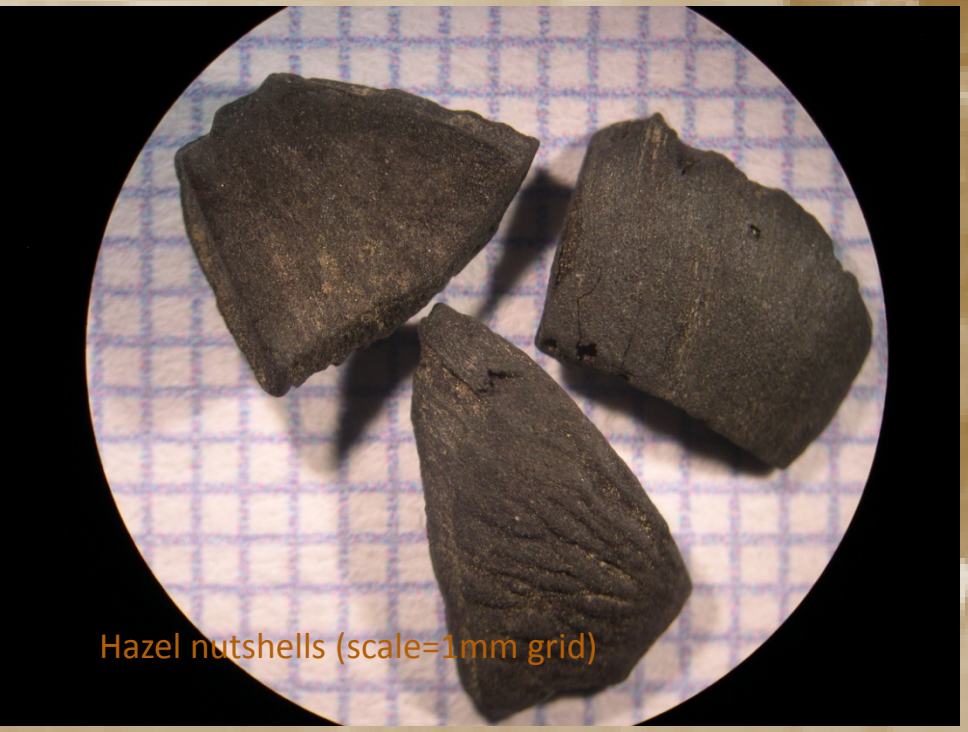
Site	CRM firm	Historic occupation
Rumsey/Polk (7NC-F-112)	RGA	1770's-1850's
Bird-Houston (7NC-F-138)	LBA	1770-1830 and 1830-1920
Noxon Tenancy (7NC-F-133)	LBA	1740-1765
Armstrong-Rogers (7NC-F-135)	Dovetail	1780-mid 19th century
Houston-LeCompte (7NC-F-139)	Dovetail	Late 18th-early 20th century
Cardon-Holton (7NC-F-128)	Hunter	1720-1760
Elkins (7NC-G-174)	Hunter	1720-1780

U.S. Route 301 Mega Project Archeobotany

- Seven sites
- Occupations spanning 1720's-early 20th century
- 200 flotation samples
- 51 hand-collected floral samples
- 129,416 archeobotanical specimens

Elkins (7NC-G-174)

N hand-collected samples	N flotation samples	Soil volume	Weight carb material	Density (grams per liter)	N of specimens
34	16	654.3	931.6	1.4238	99,497



Hazel nutshells (scale=1mm grid)

Bread wheat kernels (scale=1mm grid)

Cardon-Holton (7NC-F-128)

N flotation samples	Soil volume	Weight carb material	Density (grams per liter)	N of specimens
27	69.2	20.885	0.3018	3438

Bread wheat kernels recovered from smokehouse (scale=1mm grid)

Uncharred raspberry/blackberry seed from well (scale=1mm grid)

Armstrong-Rogers (7NC-F-135)

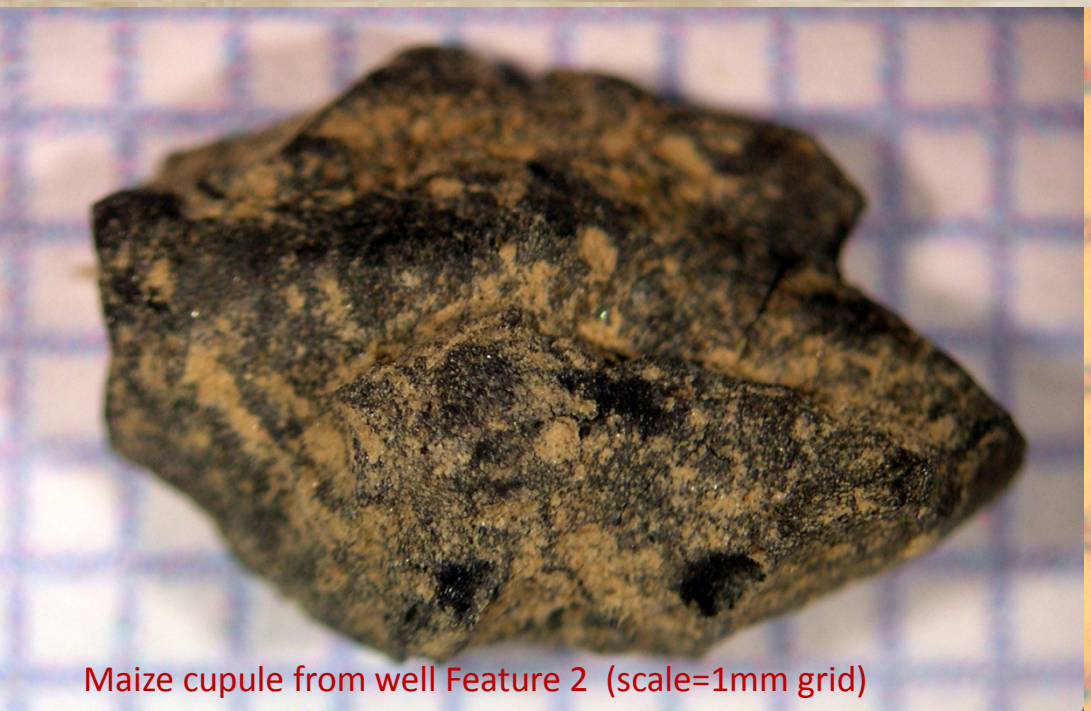
N hand-collected samples	N flotation samples	Soil volume	Weight carb material	Density (grams per liter)	N of specimens
5	37	69.25 liters	37.78 grams	0.5456	4,521

Maize cupule (scale=1mm grid)

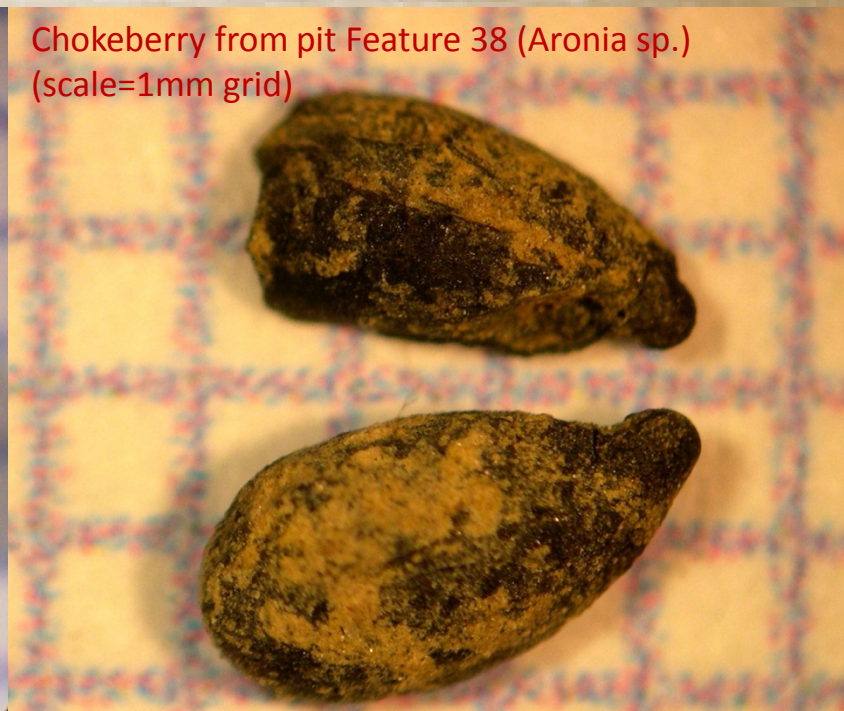
Pokeweed (Phytolacca americana)

Noxon Tenancy(7NC-F-133)

N flotation samples	Soil volume	Weight carb material	Density (grams per liter)	N of specimens
13	93.75	77.925	0.8312	7,861



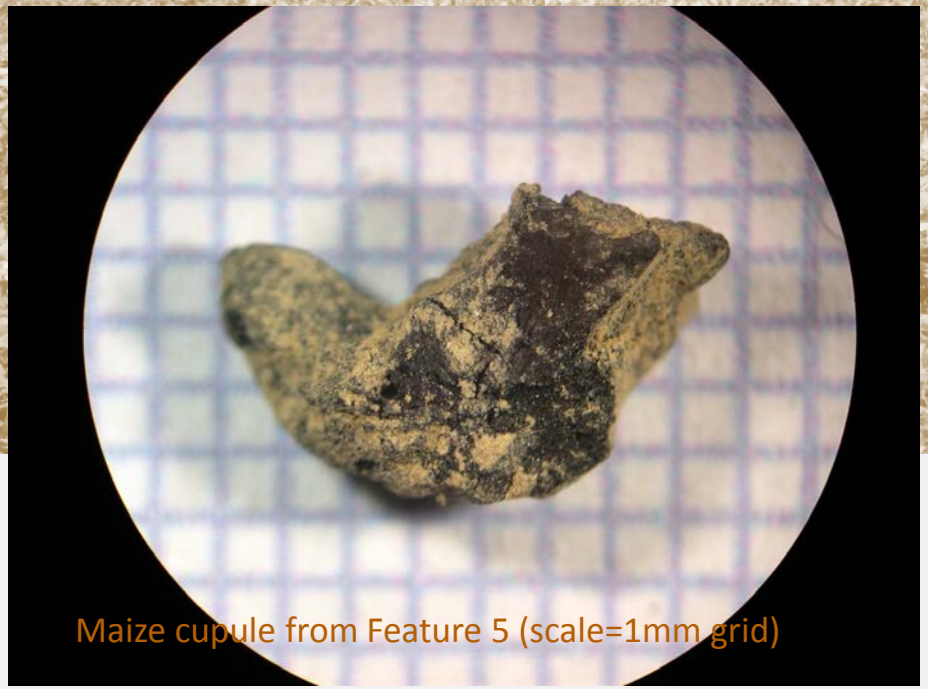
Maize cupule from well Feature 2 (scale=1mm grid)



Chokeberry from pit Feature 38 (Aronia sp.) (scale=1mm grid)

Bird-Houston (7NC-F-138)

N hand-collected samples	N flotation samples	Soil volume	Weight carb material	Density (grams per liter)	N of specimens
6	13	79 liters	31.86 grams	0.4033	3,643

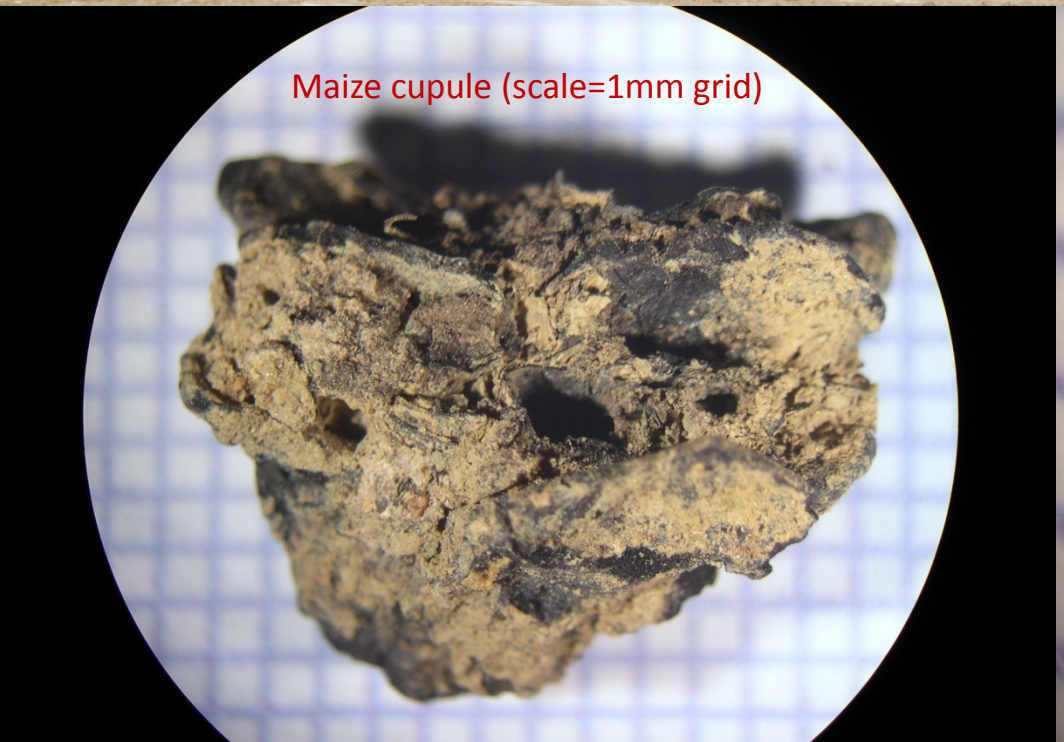


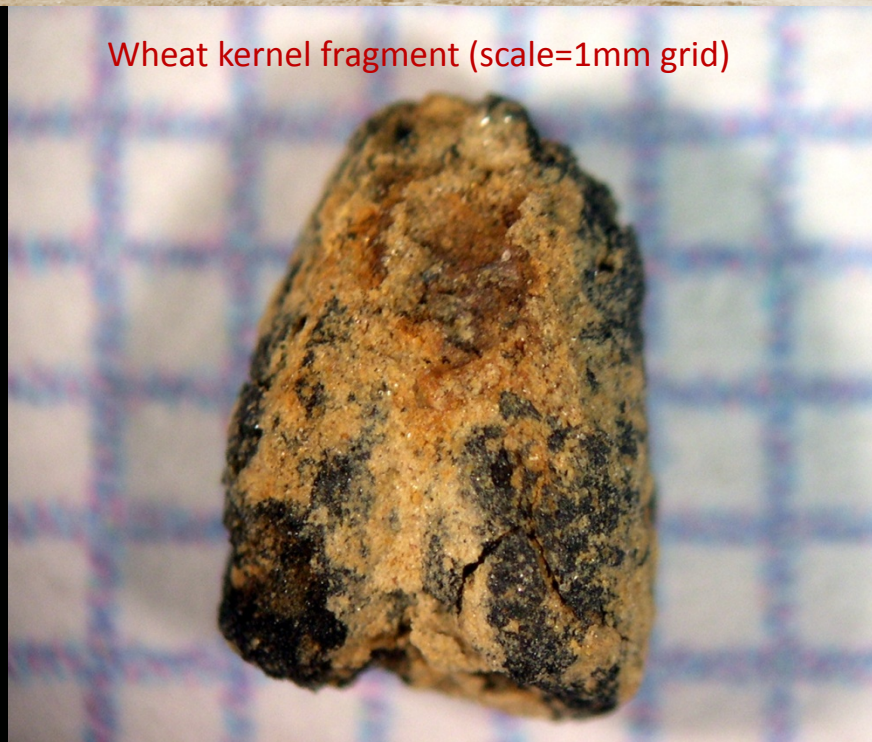
Maize cupule from Feature 5 (scale=1mm grid)

Peach pit fragments from Feature 15 (scale=1mm grid)

Houston LeCompte (7NC-F-139)

N hand-collected samples	N flotation samples	Soil volume	Weight carb material	Density (grams per liter)	N of specimens
5	59	90.75	104.065	1.1467	6,507





Rumsey/Polk Tenant (7NC-F-112)

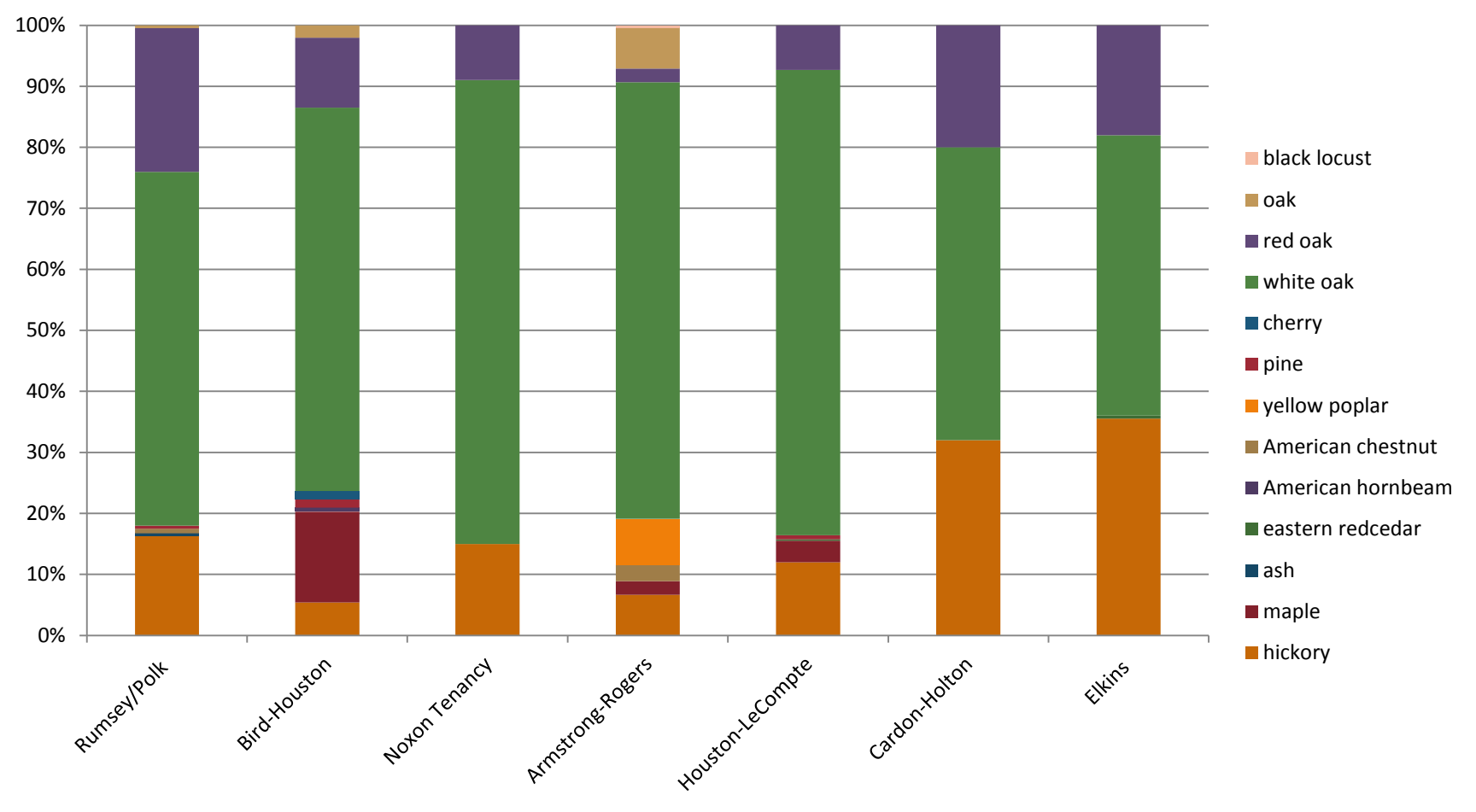
N flotation samples	Soil volume	Weight carb material	Density (grams per liter)	N of specimens
34	128.86 liters	58.825 grams	0.4565	3,949

Oat kernel from Feature 106 (scale=1mm grid)

Phaseolus bean from Feature 149 (scale=1mm grid)

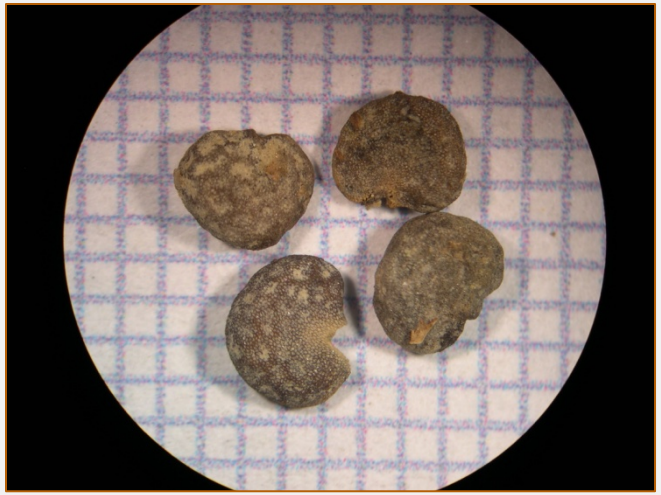
Documented Seed, Nut and Crop Taxa

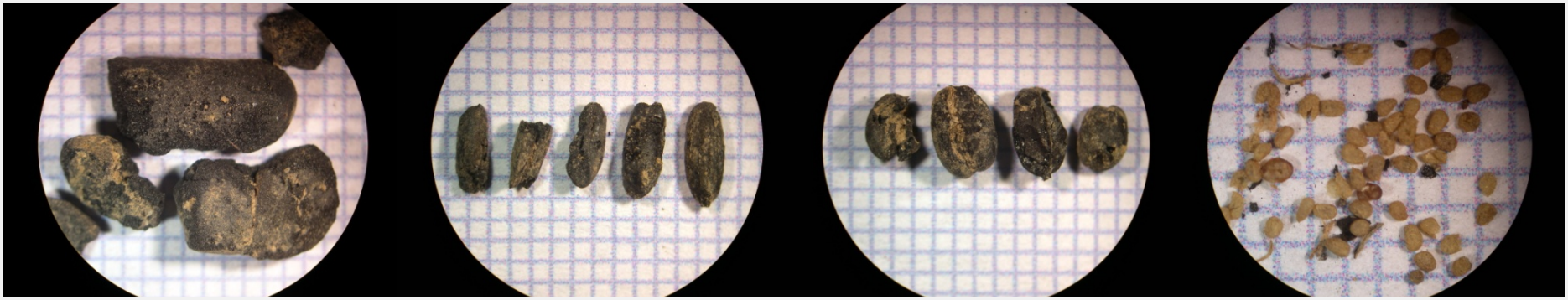
	Rumsey/Polk (7NC-F-112)	Bird-Houston (7NC-F-138)	Noxon Tenancy (7NC-F-133)	Armstrong-Rogers (7NC-F-135)	Houston-LeCompte (7NC-F-139)	Cardon-Holton (7NC-F-128)	Elkins (7NC-G-174)
jimsonweed (Datura stramonium)					x		
pigweed (Amaranthus sp.)					x		
morning glory (Ipomoea sp.)							x
knotweed (Polygonum sp.)							
sedge (Cyperus sp.)			x		x	x	x
ragweed (Ambrosia artemisiifolia)					x		
mint (LABITAE)	x						
grass (POACEAE)	x		x			x	
chokeberry (Aronia sp.)			x				
huckleberry (Gaylussacia sp.)			x				
grape (Vitis sp.)						x	x
peach (Prunus persica)		x		x		x	x
cherry (Prunus sp.)							x
strawberry (Fragaria sp.)					x		
Raspberry/Blackberry (Rubus sp.)				x			
maize (Zea mays)	x	x	x	x	x		x
bean (Phaseolus vulgaris)	x						x
pea (Pisum sativum)							x
wheat (Triticum aestivum)	x					x	x
oat (Avena sativa)	x					x	
wheat or oats (Triticum/Avena)	x			x	x	x	x
tobacco (Nicotiana tabacum)	x						
sumac (Rhus sp.)					x		
black walnut (Juglans nigra)	x	x			x		x
walnut (JUGLANDACEA)		x	x		x		
hickory (Carya sp.)					x		x
hazelnut (Corylus sp.)							x


100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Rumsey/Polk
Bird-Houston
Noxon Tenancy
Armstrong-Rogers
Houston-LeCompte
Cardon-Holton
Elkins
black locust
oak
red oak
white oak
cherry
pine
yellow poplar
American chestnut
American hornbeam
eastern redcedar
ash
maple
hickory

% wood taxa

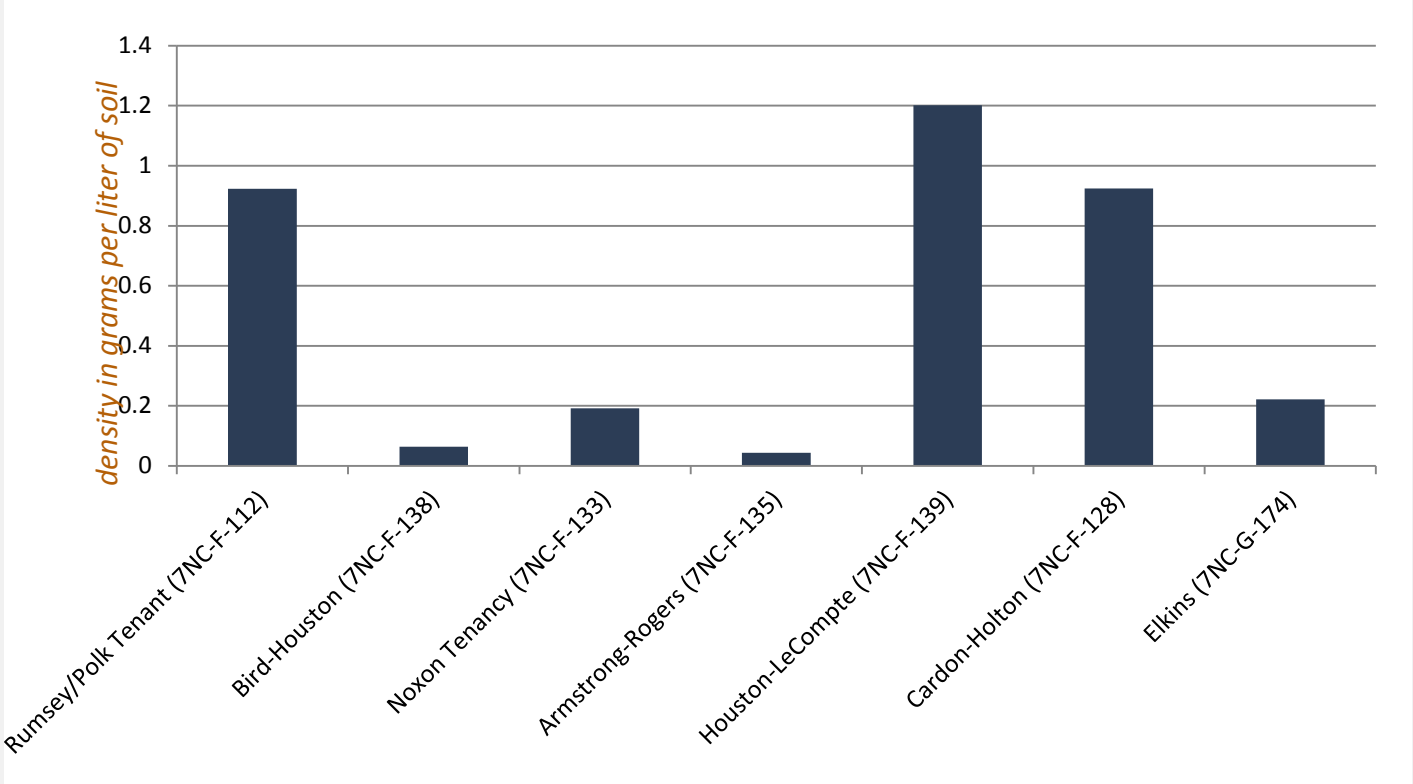
Wells – Noxon Tenancy (1), Bird-Houston (1), Houston-LeCompte (3), Cardon-Holton (1), Armstrong-Rogers (2)





Phaseolus bean (7NC-F-112), oats and wheat (7NC-F-128), tobacco (7NC-F-112)

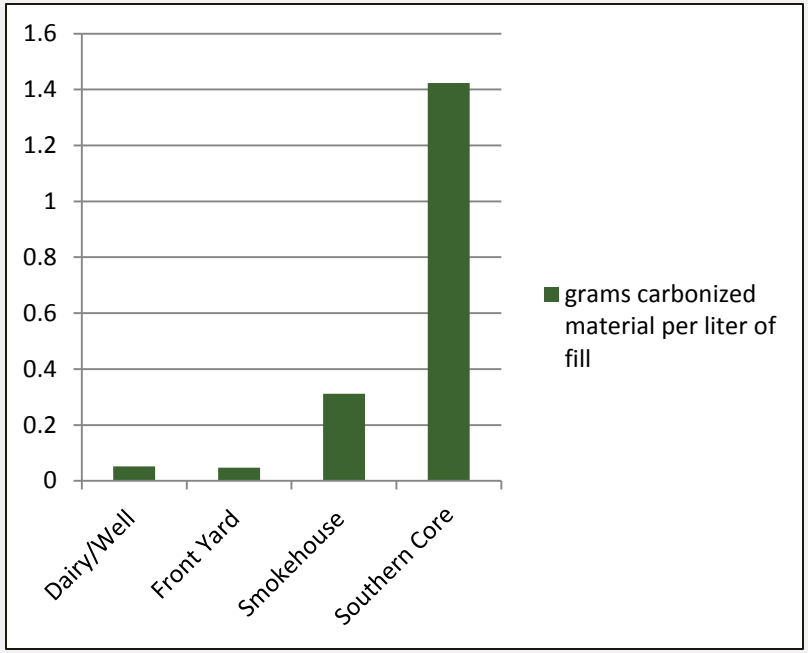
maize cupules (7NC-F-128)



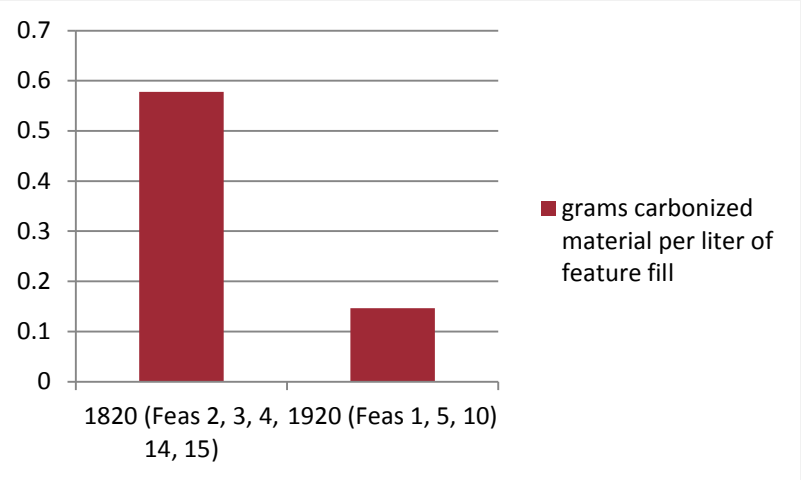
Scale = 1mm grid

Armstrong-Rogers (7NC-F-135)

Work Area	Dairy/Well	Front Yard	Smokehouse	Southern Core
number of samples	6 samples	7 samples	9 samples	11 samples
sample numbers	18, 23, 27, 30, 32, 35	22, 23, 24	2, 3, 5, 7, 8, 10, 17, 20. 28	1, 4, 6, 11, 13, 14, 15, 16, 34, 36, 37
feature	14, 14B, 14F, 130	127	52, 53, 54, 78, 92, 109	18, 32, 45, 46, 58, 115, 123
volume (liters)	12	11	16.25	22
weight carbonized plant remains (grams)	0.62	0.52	5.06	31.3



Bird-Houston (7NC-F-138)



Maize recovered from Feature 5 (scale=1mm grid)

Peach pit fragments from Feature 15

Tobacco at the Rumsey-Polk Site

172 uncharred tobacco seeds recovered from seven pit features

Tobacco *(Nicotiana tabacum)* uncharred seeds and seed coats	18th Century Features	19th Century Features
Specimens per liter of floted soil	2.184	0.379

- Uncarbonized seed presence notable across the region
- Uneven representation of plant products in the archaeological record
- Control samples provide critical baseline information
- Team approach enhances the work

THANK YOU

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