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Human Impacts on the Land: A Look at the Historic Sellman House (18AN1431)

Sarah A. Grady
Smithsonian Environmental Research Center, sarahgrady11@gmail.com

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Cover Page Footnote

Contributing papers in this journal are products of citizen science research at the Smithsonian Environmental Archaeology Laboratory (SEAL) at the Smithsonian Environmental Research Center's (SERC) 2,650 acre campus in Edgewater, Maryland, USA focusing on human-environmental relationships. The citizen science program at SERC began in 2012 under the tutelage of Dr. Jim Gibb, and is now co-lead by the author. This is a completely volunteer operation and allows volunteers to participate in various levels of engagement within the field of archaeology and shows how archaeology can be used to demonstrate past changes by humans. Thanks to Dr. Alison Cawood who leads the citizen science program at SERC, Dr. Anson Hines, Director of SERC, and all citizen scientists involved in this program.

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Sarah A. Grady

Unintentional anthropogenic land modification contributes to the global issue of erosion and sedimentation. Investigations of one site, 18AN1431, in Edgewater, Maryland, U.S., by the Smithsonian Environmental Archaeology Laboratory, combines archaeological and geological methods to measure anthropogenic changes in a landscape. The methods measure the effects of daily landscape use by two successive households—the Sellmans and Kirkpatrick-Howats.

La modification anthropique non intentionnelle des sols contribue au problème global de l'érosion et de la sédimentation. Les recherches sur le site, Sellman House (18AN1431) par le laboratoire d'archéologie environnementale du Smithsonian, combinent des méthodes archéologiques et géologiques pour mesurer les changements anthropiques dans un paysage à Edgewater, dans le Maryland, aux États-Unis. Les méthodes d'analyses mesurent les effets de l'utilisation quotidienne du paysage par deux ménages successifs - les Sellman et les Kirkpatrick-Howats.

Introduction

Soils, which support all life, form so slowly that they are depleted at a faster rate than they can be renewed. Case studies, such as that presented here, help explain landscape change at an individual, or local, level, showing the ways a small group of people, when combined with the other seven billion people on this planet, have an impact on the environment, particularly on soil loss. In the Chesapeake region, literature tends to focus on impacts of agricultural practices on erosion and sedimentation but this article focuses on non-agricultural, anthropogenic changes around an individual dwelling, Sellman House (18AN1431), located on the Smithsonian Environmental Research Center's (SERC) 2,650-acre campus in Edgewater, Maryland. I have developed a methodology to measure anthropogenic erosional processes, focusing on the curtilage, or the yard surrounding Sellman House, since its first occupation in 1729.

Revolutionary War figure, Patrick Henry proclaimed: "Since the achievement of our independence, he is the greatest patriot who stops the most gullies!" (Helms 1991: 24). Gullies caused by poor agricultural practices carried sediment to waterways, making once-navigable streams unnavigable. Waterways were the main routes for the transportation of goods in the Chesapeake region during the Colonial (1607–1780) and Early Republic (1800–1830) periods, so silting in of waterways led to the decline of many towns, such as Port Tobacco, Maryland (Gottschalk 1945; Lee, this issue). During the 19th century, more leading figures in America recognized the importance of soil and the effects of agriculture on soil loss. Cultivation of tobacco, historically the leading cash crop in the Chesapeake region, left large quantities of soil exposed to the elements. Degradation of the land caused by cash crops like tobacco had significant effects on production and led to abandonment of areas after soils were depleted. Avery Odelle Craven (2006) has discussed the effect of tobacco agriculture in Virginia and Maryland from 1606 to 1860, documenting how tobacco culture depleted soil nutrients and led to colonists abandoning old tobacco fields in pursuit of new land. Abandoned tobacco fields were either left bare or repurposed for corn or wheat for two or three seasons before abandonment (Janesko, this issue). These barren fields, and those that transitioned to wheat or corn, were highly susceptible to erosion and contributed to the proliferation of gullies in Virginia and Maryland. Widespread deforestation also contributed to erosion problems. The National Conservation Congress of 1909 "reported nearly 11,000,000 acres of abandoned land in the United States, most of which was damaged and over one-third of which was actually destroyed by erosion" (Craven 2006: 17).

Reliance on cash crops like tobacco caused major problems with soil infertility and soil loss throughout Maryland. Some areas, such as southern Maryland, experienced depopulation due to loss of soils and nutrient depletion in soils that remained, making them unsuitable for agriculture. With depletion of soils came the depletion of the population of southern Maryland, which had significant political ramifications.

> The problem became so dire that census marshals in Southern Maryland in 1900 conspired to falsify returns, listing families that moved westward and individuals who had died. They exaggerated the size of the population to maintain seats in the US House of Representatives. They were caught (Gibb and Johns 2019: 30).

Prior to the 1900 census scandal in southern Maryland, the Maryland State Bureau of Immigration, created in 1896, promoted settlement in the state. Secretaries of the bureau were charged with searching far and wide for immigrants. Herman Badenhoop, who served as the secretary of the immigration bureau from 1900 to 1906, visited Kansas to speak about the advantages of farming in Maryland, the only disadvantage being the land "must be fertilized" (Gibb and Johns 2019: 31). In reality, soils were so depleted of minerals and nutrients that they were no longer suitable for growing crops of any sort. But the goal was to entice emigrants from western states and immigration from Europe and the extant rail and steamship systems, an expanding state road system, and the nearby urban markets of Washington, D.C. and Baltimore provided inducements to farmers who lacked these benefits.

The idea of soil conservation was brought to the forefront of public attention in the early 20th century by Hugh Hammond Bennett, the "Father of Soil Conservation." A dust storm from the Great Plains struck Washington D.C. in 1934 while Bennett lectured and he used the storm for dramatic effect to demonstrate the importance of soil conservation: "The spectacular dust cloud was the first one in history big enough to retain its identity as it swept across the country from the Great Plains to beyond the Atlantic Coast" (Bennett 1939: vii). In the early 20th century Bennett recognized that soil conservation was of utmost importance and spoke about it, leading to the creation of the Soil Erosion Service within the U.S. Department of the Interior––later the Soil Conservation Service, and presently the Natural Resources Conservation Service within the U.S. Department of Agriculture. Bennett discussed how native peoples did not change the land much and "removed [topsoil] from the land surface no faster than it was built up from beneath by the slow, complex processes of nature" (Bennett 1939: 1). Native peoples in America let the land replenish itself before cultivating it again, using techniques such as swidden agriculture to restore nutrients to the soil and let the ecosystem move through its adaptive cycle (Cronon 1983). Soil formation from underlying sediments and bedrock is a slow process. The agricultural practices of colonists had a significant impact on topsoil, depleting fertility and the soil matrix while damaging littoral ecosystems, supplies of water, and navigation. Methods employed in the second quarter of the 20th century, such as crop rotation, while slowing the damage, could not undo 300 years of improvident practices.

Agriculture was the mainstay of life in the colonies and is thus the primary focus of research on land degradation, but non-agricultural, anthropogenic changes, also cause soil erosion. The case of Sellman House is an interesting example of anthropogenic impacts on a landscape and I address these effects using a suite of archaeological and geological techniques. This case study reports the methodology used by the Smithsonian Environmental Archaeology Laboratory (SEAL) to document and measure the effects of quotidian and episodic activities on a small portion of the Rhode River sub-estuary during the 18th century through the early 20th century.

Background

Europeans first settled in Maryland in 1634 after George Calvert, the first Lord Baltimore, decided that his colony of Avalon in Newfoundland (founded in 1621) was too cold, and, ironically, the soils unsuited to agriculture. Brugger (1988: 14) described Maryland soils as "centuries of mulch on top of water-deposited sandy loam [which] made for earth far more fecund than the Englishmen had known." He based this assertion on the reports of Father Andrew White (1988) and others who extolled the virtues of a land of rich soils, inexpensive rent, and plentiful game (Alsop 1988; Clayton 1972; Durand 1934; Hammond 1988; Hawley 1988; Jones 1724). Maryland soils were perfect for colonial production of cash crops like tobacco, which quickly depleted soil nutrients. Fertile land and navigable waterways were the principal determinants in the choice of land by colonial planters, and the coastal Chesapeake region had an abundance of both (Lukezic 1990).

One family, the Sellman family, came to Maryland in the 18th century and built their family home, Sellman House, in 1735. This house sits on top of a knoll and occupies about 2.5 ha (about 6.2 ac.) of maintained lawn that is surrounded by mowed and cultivated fields (FIG. 1). Sellman House consists of three extant sections and is a composite structure representing adaptation to a changing environment

Figure 1. The architectural sequence of Sellman House: (*left*) two-story, 1841 section in the Greek Revival/Federal transitional style; (*middle*) south end of the original one-story, 1735 building; (*right*) 1979 Kirkpatrick-Howat addition. (Photo by Sarah A. Grady, 2013.)

(Krotzer et al. 2018). The northern portion of the composite structure consists of two structures built by members of the Sellman family during their occupation from 1729 to 1917 and was called Woodlawn. It served as the Sellman family residence for six generations. The southern portion, now the mid-section of the composite structure, is the original house built by William Sellman after his marriage to Ann Sparrow in 1735 (Sellman 1975). When this building was constructed, tobacco was king and the structure overlooked the Sellman's tobacco fields. It was a small, one-story, two-room structure. Only one room of this structure remains. The northern portion of this original structure was demolished and replaced by Alfred Sellman, the great-grandson of William Sellman, who built a two-story Federal/Greek Revival transitional-style addition in 1841 (Krotzer et al. 2018). We know the 1841 addition sits on top of the northern half of the original 1735 structure because the foundation of this structure extends under the 1841 addition. The demolition of the northern portion of the original 1735 structure and the construction of the 1841 structure likely caused some of the erosion around Sellman House. In 1979, the family who succeeded the Sellman family in 1917 built the southernmost addition. This addition is a product of the 1970s energy crisis, when petroleum shortages affected major industrial countries of the world, including the United States; it is a "passive solar wing," which uses design to be energy efficient, including features such as large skylights (Krotzer et al. 2018).

The eastern yard of Sellman House consists of eroded terraces constructed in the mid-1740s, while the south yard features 20th-century terraces, undoubtedly constructed by the Kirkpatrick-Howats after 1917. Both landscapes are purposeful; terraces were a common landscape feature of the 18th century (Clifford, this issue). Those constructed in the 20th century represent a Colonial Revival aesthetic that visually and symbolically grounded the family in the country's colonial, and heroic, past. "With the transition from elite plantation to well-to-do farm in the 19th century, and the decline in popularity of aristocratic ornamental gardens after the American Revolution, the Sellman family may have converted the east yard to a more workaday character in which vital domestic functions (e.g., laundering) were practiced" (Gibb and Grady 2018: 14). Now the terraces are visibly eroded, but the transition from garden to "workaday" usage probably helped stabilize the ground and stop erosion of the terraces. Beyond these terraces in the eastern and southern yards are cultivated fields that were mostly in pasture for much of the 20th century. This farmland is extremely eroded due to poor agricultural practices and the impacts of free-roaming cattle and pigs (Hall, this issue). In the second quarter of the 18th century, reforested 17th-century tobacco fields were cleared for agriculture, as well as road and building construction (Curtin et al. 2001: 40). Because of this, the area around Sellman House was likely devoid of trees, which contributed to soil erosion in some yard areas. However, soil erosion in the west/front yard, which has no plow zone, was caused by everyday household activities, rather than agricultural use of the land.

Erosion at Sellman House

This study of erosion at Sellman House focuses on a methodology designed to examine non-agricultural, anthropogenic processes using a combination of geological and archaeological techniques. Just looking at the topography of the area, you can see the amount of erosion that has taken place around Sellman House. Topographic mapping occurred prior to archaeological investigations around Sellman House; this data was collected through instrument mapping. Based on these data, I created contour maps that depicted the steep slope west of Sellman House, suggesting a flow of soil and artifacts away from Sellman House toward the bottom of a hill. Examination of the erosion occurring around Sellman House began in 2012 with soil cores and shovel test pits that exposed shallow soils in the north and west yards on the knoll where Sellman House sits, indicating substantial soil loss. Soil cores and shovel test pits at the bottom of the hill to the west of Sellman House revealed large quantities of redeposited soils; the probable source of redeposited soils was the north and west yards at the top of the knoll. Soil loss and redeposition identified in soil cores and shovel testing led us to question whether the redeposited soils at the bottom of the hill could be traced to an exact source at the top of the knoll by comparing data on soil grain size and artifacts from shovel testing and excavation.

Archaeological Investigations

Archaeological investigations at Sellman House began in 2012 with shovel testing. Artifact analysis from shovel test pits around Sellman House included the preparation of distribution maps, plotting the counts and weights of brick (FIG. 2), coal (FIG. 3), and oyster shell. These maps defined artifact concentrations that indicated the potential location of other buildings or activity areas and, most importantly for the current study, movement of soil away from the house by documenting the flow of artifacts. Soil profiles from shovel testing and soil cores also identified shallow, eroded soils around Sellman House and a buried surface under approximately 4 ft. of stratified sediment at the base of the hill west of the house. This suggested that the main area of soil loss was the west yard of Sellman House where a deeply eroded automobile driveway was a potential source of the redeposited soil.

After shovel testing the area around Sellman House, the field team excavated 1 m by 1 m units in areas where the artifact distribution maps indicated concentrations of brick, coal, and oyster shell. One pair of units excavated to the west of Sellman House in an area where artifact distributions indicated brick concentrations but no coal exposed a brick foundation directly beneath the sod. It is likely that bricks from this foundation, which was only three courses high, were cannibalized and used elsewhere. The excavation of additional 2 m by 2 m units placed around the cannibalized brick foundation revealed a large, central brick hearth. The brick foundation transitions into a stone foundation that runs to the edge of the deeply cut automobile driveway. The southern portion of this former building has evidence of damage caused by erosion related to the 20th-century automobile driveway. Soil has eroded in the area of this driveway up to a depth of 1.5 m below grade. The brick structure was probably a summer kitchen. Temporally diagnostic artifacts indicate that the summer kitchen dates to the first half of the 19th century and the lack of coal in this area is consistent with this assessment. The Sellman family may have occupied this structure after demolition of the north half of the 1735 dwelling and while the 1841 wing of the main house was under construction. The occupation of this summer kitchen is likely the main source of artifacts recovered from Unit 11, which is approximately 200 ft. downhill from this structure.

Downhill and west of Sellman House and the summer kitchen we extracted a series of soil cores and excavated a unit, Unit 11. Shovel test pits and soil cores revealed about 4 ft of stratified sediment that blanketed a buried surface horizon. Through instrument mapping of these shovel test pits and soil cores, I was able to create a cross-section that shows the flow of soil downhill. The layers of redeposited material over the buried A horizon thinned on a slope leading down to a spring-fed stream.

I also looked at grain-size distribution for soils in the west yard of Sellman House and compared it to the soils at the bottom of the hill taken from soil cores and Unit 11. To do this, I started with the soil classification system developed by the U.S. Department of Agriculture's Soil Conservation Service (now the Natural Resources Conservation Service), which is used by most archaeologists in the United States. This system focuses on measurable soil properties, including soil depth, mois-

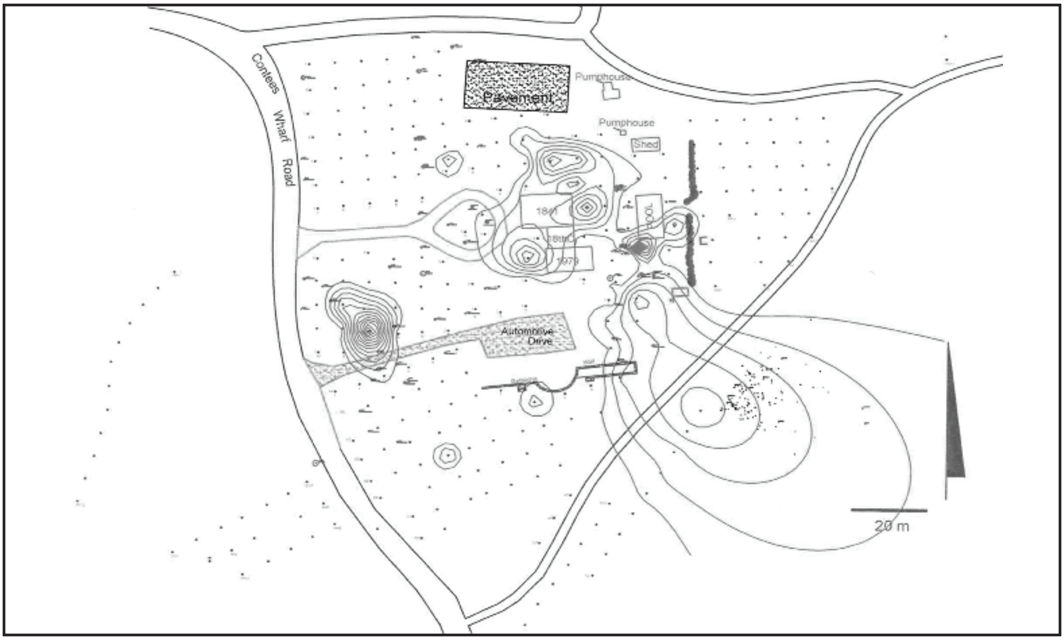

Figure 2. Map showing the distribution of architectural materials (mainly brick) and shovel test pit survey locations. (Figure by Sarah A. Grady, 2012.)

Figure 3. Map showing the distribution of coal, including locations of the shovel test pit survey. (Figure by Sarah A. Grady, 2012.).

ture, temperature, texture, and structure. Analyzing grain size of soils "has commonly been assumed to be a useful tool for interpreting the depositional environments of ancient sedimentary rocks" (Boggs 1987: 116) and can also be used when studying more recent anthropogenic changes. I used these soil properties to examine erosion and redeposition to test the hypothesis that soils from the west yard of Sellman House, particularly from above and around the summer kitchen, eroded and reformed on the slope below. I sampled soils in 10 cm increments from the north profile of Unit 11, including the redeposited sediments and buried, plowed, A horizon soil. For purposes of comparison, I sampled soils at two locations in the west yard of the house to see if erosion could be pinpointed to one of the two families that occupied the Sellman House or different erosional events focused on either the summer kitchen or the automobile driveway.

Soil Processing Methods

Soil analysis began after excavation using geological techniques beginning with measurements of moisture content. I placed each sample in an oven-safe cup, weighing and then baking each overnight at 200°F, and then re-weighing to determine the amount of soil moisture. To prepare soil samples for grain-size analysis, I crushed each sample with a mortar and rubber-tipped pestle to break up the peds (i.e., the natural soil aggregates) without damaging the grains. I then passed the crushed samples through tiered sieves set up to capture Unified Soil Classification System (USCS) particle-size breaks for coarse, medium, and fine sand (2 mm to 0.05 mm), silt (0.05 mm to 0.002 mm), and clay (smaller than 0.002 mm). Grain size (coarse to fine) and size sorting provide data about the environment in which the soils were deposited; coarser and poorly mixed (greater size variety) grains indicate deposition from high energy water flow and finer, well-mixed grains signify low-energy movement.

I stacked the sieves in descending order of mesh size on an automatic shaker and shook each sample for 15 minutes. I then weighed and bagged the contents of each sieve labeling the resealable plastic bags with the sample and sieve numbers. Non-mineral content of the samples included only a few minute chips of ceramic, glass, and oyster shell, and equally minute flecks of charcoal. I then graphed the resulting particle-size weight distribution values in terms of proportions and cumulative frequencies. This method is more accurate in measuring breaks in particle size distribution than the use of a hydrometer, which looks at the rate at which soil particles fall when suspended in water, and the application of Stokes Law, which assumes that particles are spherical.

Analysis and Results

Initial surveys of Sellman House showed significant evidence of the landscape being altered by humans. Analysis of the spatial distribution of coal ash recovered from shovel test pits around Sellman House suggested southward movement from the east (rear) yard probably related to stormwater and sediment flow. Indeed, spatial analyses suggest two locations of significant stormwater and sediment flow: one from the east yard going south and the other from the west yard moving westward toward the bottom of the hill. These erosional processes were further explored through artifact and soil grain distributions focusing on Unit 11.

Unit 11, at the bottom of the hill on which Sellman House sits, is 1.09 m deep and revealed ten strata (FIG. 4). It is almost in direct line with the heavily eroded 20th-century driveway. The strata indicate a succession of erosional events beginning in the first half of the 19th century, probably in the second quarter. These soils have charcoal flecks throughout but do not contain coal. This suggests that redeposited soils in Unit 11 originated around the early 19th century summer kitchen where distributions also showed no evidence of coal. Artifacts are mostly brick and mortar fragments. The ceramics and vessel glass recovered from Unit 11, although far smaller (expressed in terms of weight) than those from the units around the summer kitchen, are identical to those from the summer kitchen locus. Other artifacts recovered from Unit 11 include: yellowware, salt-glazed stoneware, whiteware, pearlware, window glass, oyster shell, and some aboriginal pottery (TAB. 1). Strata 5 and 6 in Unit 11 were probably stable surfaces blanketed with soil from the driveway that continued to erode until it was paved. Stratum 9 is a plowed A horizon buried beneath a meter of stratified sediment. This stratum yielded aboriginal Potomac Creek pottery that dates between 1300 and 1700 CE. Native Americans tended to settle near a water source and there was once a spring-fed stream a few meters farther downhill. This stream filled with sediment and material, probably sometime in the 20th century, from the eroding front yard of Sellman House.

Average vessel (ceramic and glass) sherd weights were calculated and compared among

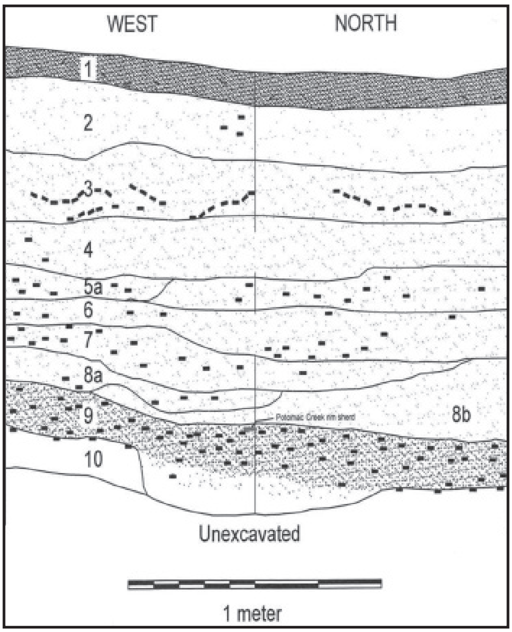

Figure 4. Profile of Unit 11 showing ten strata. The black specks throughout represent charcoal flecks. (Figure by James G. Gibb, 2012.)

the units located at the top of the knoll, where the house sits, and the middle and bottom of the hill, by clustering units from each area. Units 1, 5, 6, and 8—located at the top of the hill and around the summer-kitchen foundation—have the greatest mean vessel sherd weight (2.59 g). Five meters farther down the hill and away from the house, Units 2, 3, and 4 yielded a mean vessel sherd weight of 1.94 g. Unit 11, 70 m down the hill and away from the house, yielded a mean vessel sherd weight, aggregated for Strata 1–8, of 0.57 g. This fall-off curve shows the movement of artifacts—and, by extension, the soil matrix of which they were a part––downhill and away from the house.

To refocus the analysis from the spatial distribution of artifacts and artifact weights, I created a series of frequency curves for grain size. Sediments from Unit 11 show a slight change from the upper strata to the lower strata in the frequency curves (FIG. 5). The cumulative arithmetic curve (FIG. 6) plots grain size (x axis) against the cumulative weight-percent frequency (y axis). Sediment in the upper strata have a higher peak, indicating the mode at a phi value of three. The divergence in frequency curves suggests different point sources for the sediments. The lower strata of Unit 11 contained a higher proportion of finer-grained sediment, which would be consistent with redeposited topsoil. The upper-strata grains were coarser, indicating a deeper and less weathered source for much of the material in these strata. From these distributions one might infer a model of initial redeposition of surface soils from across the summer kitchen site (which includes the footprint of the western half of the driveway), perhaps during its use and subsequent dismantling, followed by erosion and redeposition of soils from the driveway during the early 20th century. At this point, the driveway was just an eroding track that was not paved with poured concrete until the middle of the 20th century.

Currently, citizen scientists are extracting pollen from the soil samples taken from Unit 11. The Kirkpatrick-Howat family planted a

Table 1. Weight (g) of artifacts for each stratum in Unit 11.

	Stratum								
Artifact Type	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Yellowware	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0
Whiteware	0.0	0.4	1.3	0.0	0.0	1.2	0.0	0.0	0.0
Pearlware	0.0	0.4	0.0	0.0	0.0	7.4	2.6	0.0	0.0
Creamware	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0
Gray stoneware	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.7	0.0
Architectural glass	0.0	0.0	0.0	0.4	0.0	1.1	0.0	0.0	0.0
Vessel glass	0.0	0.0	0.2	0.0	0.0	6.6	1.7	0.0	0.0
Shell	0.0	0.0	0.0	0.0	0.0	49.9	4.6	0.0	0.0
Nail	0.0	3.5	0.0	0.0	0.0	10.2	3.9	3.6	0.0
Brick	0.0	5.1	24.8	0.8	0.0	202.9	7.9	0.0	0.0
Coal	0.0	0.8	6.3	0.0	0.0	9.8	4.0	2.6	0.0
Tobacco	0.0	0.0	0.0	0.0	0.0	0.5	0.2	0.0	0.0
Projectile point	0.0	0.0	0.0	0.0	0.0	4.3	0.0	0.0	0.0
Lithics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	79.9	0.0
Aboriginal pottery	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.3	49.5
Total weight (g)	0.0	10.2	32.6	1.2	0.0	298.5	24.9	89.1	49.5

variety of exotic arboreal species sometime in the 20th century and pollens from these trees should show up in the upper-strata soil profiles. The pollen data will allow us to compare rates of erosion and sedimentation for the Sellman and Kirkpatrick-Howat households. The analysis of pollen will, hopefully, support the soil grain size analysis and analysis of artifacts from Unit 11 and help us conclude if most of the erosion is from everyday use of the land or came after the addition of the automobile driveway in the 20th century.

Conclusions

"The human species has become so dominant that the quality of [air, water, and soil] resources now depends on that [human] species learning to exercise a whole new level of stewardship" (Weil and Brady 2017: 1). Human use of the land has a significant (i.e., measurable) impact on the earth's ecology as human populations increasingly deplete soils. An understanding of human interactions with soil is essential to a sustainable future where coupled human and natural systems work in a state of equilibrium. It is also key to understanding the past, specifically, the choices people made that included corrective and adaptive measures. This example of a relatively isolated house––the closest neighbors to Sellman House were an early 20th-century tenancy 300 m to the northeast and another 18th-century plantation house one thousand meters to the south—is small in scale and of little consequence to the history and ecology of the region, much less to changes that have occurred on a global scale. Imagine, however, the aggregate of household actions throughout the Rhode River sub-estuary—the larger area where Sellman House is located—and throughout the Chesapeake watershed over 350 years of Euro-American control over the lands and waters of the region.

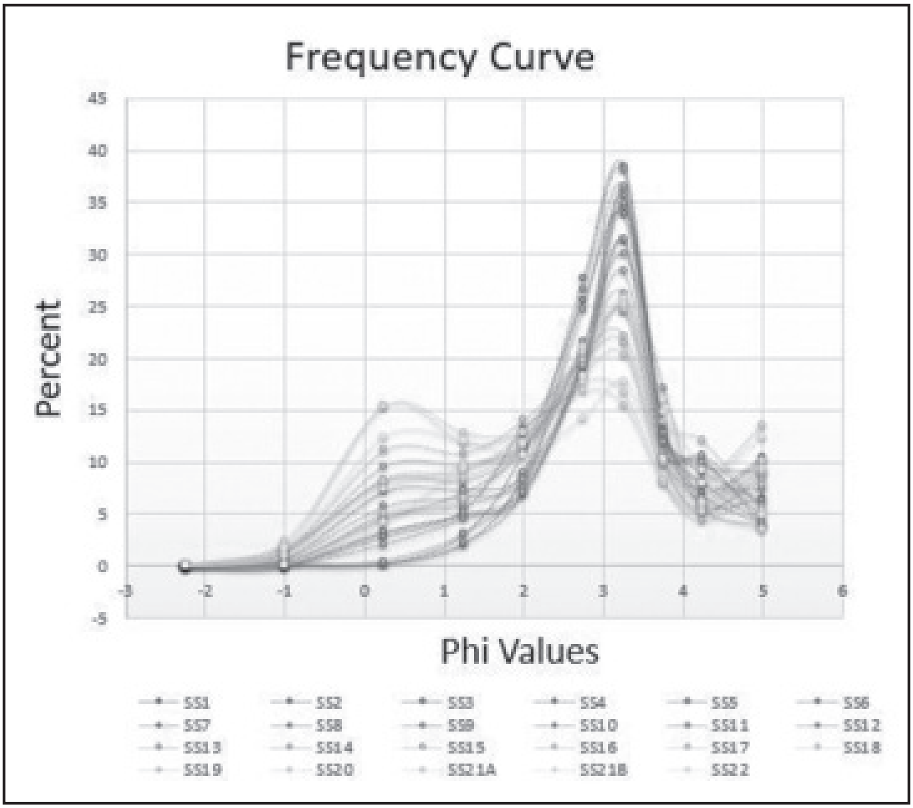

Figure 5. Frequency curve showing soil grain size analysis. (Figure by Chloe Moyer, 2015.)

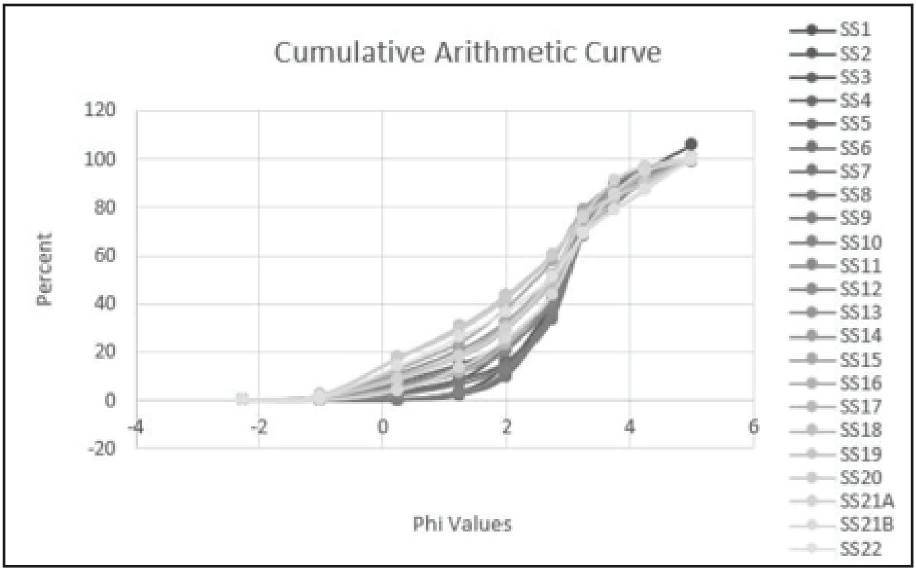

Figure 6. Cumulative arithmetic curve showing change in soils in Unit 11 from the upper strata to the lower strata. (Figure by Chloe Moyer, 2015.)

Sellman House is one example of the impact individual households have on the landscape through their everyday, non-agricultural use of the land. This one site demonstrates how much individual households can alter land and water, intentionally and unintentionally, through daily, quotidian activities. An understanding of change on a local scale is important to understanding change on a larger scale. Archaeology illuminates, through systematic measurement, the ways humans have altered their landscape and can be used to inform current policy to mitigate these changes. It demonstrates how once-thriving port towns, such as Port Tobacco, declined after the waterways along which they thrived were no longer navigable. Poor agricultural practices in the past led to large-scale erosion and sedimentation. Taking a step in the right direction, Maryland now requires the planting of cover crops so that fields do not lay bare. Bare fields deplete soils of their nutrients, contribute to erosion and sedimentation, and create large quantities of airborne dust. This study, however, focuses on non-agricultural sources of erosion and sedimentation. Everyday activities also have an effect and demonstrating this archaeologically—measuring these changes—will inform people about the impact they have and, hopefully, make them more conscious about creating a sustainable future for the world.

Acknowledgments

The contributed articles in this issue are products of citizen science research at the Smithsonian Environmental Archaeology Laboratory at the Smithsonian Environmental Research Center's 2,650 ac. campus in Edgewater, Maryland. They focus on human/environmental relationships. The citizen science program at SERC began in 2012 under the tutelage of Dr. Jim Gibb and is now co-lead by the author. It is a completely volunteer operation that allows volunteers to participate in various levels of engagement within the field of archaeology and shows how archaeology can be used to demonstrate past changes by humans. All of the volunteers with SEAL contribute to the research and help make this research possible. Thanks to Dr. Alison Cawood, who leads the citizen science program at SERC, Dr. Anson Hines, director of SERC, and all citizen scientists involved in this program. I would also like to thank the peer reviewers who helped shape this paper.

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Author Information

Sarah A. Grady.
Smithsonian Environmental Research Center.
sarahgrady11@gmail.com.