

Analyzing the Effects of Screening Methods on Artifact Collection at Kanaka Village during the  
Hudson's Bay Company Occupation of Fort Vancouver

Dana Sukau

University Scholars Honors Program Thesis

Spring, 2017

Faculty Advisor: Dr. Ed. Hagen

Department of Anthropology

College of Arts and Sciences

Washington State University Vancouver



**Abstract:**

Types and quantities of material evidence collected from archaeological sites are primary sources of information for archaeologists to base interpretations and provide evidence to answer posed research questions. Artifact collection rates depend on the collection and screening methods used. Screening methods that use smaller mesh screens tend to result in greater quantities of artifacts collected and greater quantities create increased opportunities for rare or underrepresented artifacts to be collected. This study used domestic materials, beads, ceramics and glass, collected during excavations in the Village area of the Fort Vancouver National Historic Site during the 2013 Public Archaeology Field School. The benefits of wet screening using 1 mm mesh screens were examined in comparison with dry screening assemblages collected using a nested ¼ in. mesh screen inside of a 1/8in. mesh screen. Measures for artifact density supported the hypothesis that wet screening did produce greater densities of the domestic materials examined. However, multiple diversity indices did not support the hypothesis that wet screening samples would be more diverse than samples collected using dry screening. Overall, the evidence supports the use of small mesh screening methods when applicable to the proposed research question.

**Keywords:** Diversity, Density, Dry Screening, Wet Screening, Screen Mesh, Kanaka Village

**Introduction:**

Archaeologists use material evidence to gain understanding of the people who used and discarded them (Brauner 2000[2]:2). Archaeological sites are not always easily identifiable to the general public because the remains are often buried beneath the ground. An excavation is able to bring those remains to light and show the public the importance of each site and why it is

important to preserve them. Preserving the past and showing the public the importance of protecting these resources are some of the main goals of the National Park Service and the Fort Vancouver National Historic Site is a premiere example of this. Each summer a Public Archaeology Field School is conducted on the site in a partnership between Washington State University Vancouver, Portland State University, and the National Park Service. These Field Schools engage the public so that they understand why it is important to preserve this and other archaeological sites. Another important function of the Field School is to provide students with a hands-on learning environment while bringing forth valuable data about the site (Wilson2015:221-222).

The Fort Vancouver National Historic Site is located near the Columbia River in Vancouver, Washington, and encompasses a large area of historically important sites including Officer's Row, the Vancouver Army Barracks, and the reconstruction of the Fort Vancouver stockades. The reconstructed stockades were built in the 1970s directly over the footprint of the fort used from 1829 to 1860 built by the Hudson's Bay Company (HBC) (Wilson 2014:2-11). Just west of the reconstructed Fort is the site of Kanaka Village which was in use during the HBC occupation of the Fort at the height of the fur trade (Taber 2017:6). The 2013 Field School focused their excavation in the Village area of the historic site. The Village had a population of up to one thousand people at its prime and between fifty and sixty cabins. The fur trade encouraged a varied work force that included individuals from different geographical and ethnic backgrounds. English, French-Canadian, Scottish, various Native American groups and even Native Hawaiian's took part in the fur trade and made up the Village population. In *A Mongrel Crowd of Canadians, Kanakas, and Indians* Douglas C. Wilson (2015:224) describes the Village

site as a “place where archaeologists can reclaim the history of a diverse set of now underrepresented minority groups”.

Fort Vancouver functions as a source for the public to gain information about the past and the archaeological material collected during excavations on the site are primary sources of evidence. Materials collected through excavation are used to present a picture to the public of what life was like during the HBC occupation or other phases of the Fort’s past. If the assemblages collected are incomplete, the functions or characteristics of the Fort may be misinterpreted leading to incorrect descriptions and the inability to answer research questions. Artifact density and diversity were methods used in this study to examine the benefits of wet-screening in comparison to dry-screening of historical archaeological material recovered from Kanaka Village at Fort Vancouver National Historic Site. Research questions for the project asked if using wet screening in conjunction with a smaller mesh screen would collect larger numbers or artifacts than dry screening methods that use larger mesh screens. In addition, the study questioned if larger artifact collections were recovered by wet screening would they result in more diverse artifact assemblages that could answer a wider range of research questions and better represent the site.

### **Literature Review:**

#### *Kanaka Village at Fort Vancouver*

Kanaka Village is an example of ethnic diversity that is associated with the British colonial fur trade. Many of the employees and their families lived in permanent settlements in the Village outside of the Fort. Others would temporarily settle along the outer edges of the Village while on their voyages. In addition, the fur trade encouraged the formation of mixed

ethnicity families to strengthen the alliances between the Native groups and the fur traders (Wilson 2014:2-8). Such a large gathering of a diverse population combined with the many years of occupation has made the Fort Vancouver site popular for researchers in the region.

The Village site has been extensively excavated and analyzed over time primarily in partnership between the National Park Service, Portland State University, and Washington State University Vancouver. Summer Archaeological Field Schools put on by the three institutions excavated the Village site from 2001 to 2003 with the intention of identifying house sites and confirming them against historical accounts and maps. A later field school in 2010 focused on seasonal encampments along the outer edges of the site as well as addressing the possibility of household economic specialization (Wilson 2014:26-35). The 2013 Field School season narrowed its focus to two houses within the village. The first house was that of William Kaulehelehe, a Native Hawaiian preacher who lived in the Village from 1846 until 1860 when he was evicted by the U.S. Military. Kaulehelehe was also known as “Kanaka Billy” and received a small salary from the HBC to preach to and keep order among the other Hawaiians in the Village (Thomas and Hibbs Jr. 1984:619).

The second house was that of Francois Proulx and was much more extensively excavated during Field Schools in 2012, 2013, and 2014 in preparation of developing plans to reconstruct the home. This study focuses on a sample of the material gathered from the Little Proulx house site collected during the 2013 Field School. Francois Proulx was a French-Canadian fur-trapper, and lived in the house with his Chinook wife, referred to as “Catherine” in historical records (Taber 2017:16; Wilson 2013:14). The 2013 excavations attempted to identify where construction characteristics like doors and windows were located. Archaeological material was

also thoroughly collected to prevent a risk of being damaged during the reconstruction process if the house is reconstructed in the future as proposed (Wilson 2013:16-18).

Overall, archaeological evidence related to Kanaka Village represents a fur trade community encompassing ethnically diverse households that shared material culture and social activities. The shared serving class standing and practices allowed for peaceful relations and resource stability. However, possibly due to the abrupt transition from the HBC to the U.S. Military at Fort Vancouver following 1860 the Village population retained their diverse individual ethnic identities (Taber 2017:22-23). These conclusions about an inclusive community would not be possible without the support of the archaeological record as Village inhabitants were primarily illiterate and written records left behind from HBC officials depict the hierarchical structure of the British fur trade elites, based on occupation and ethnicity (Taber 2017:6).

#### *Domestic Materials in HBC Deposits*

While the Fort Vancouver site was used well before contact with Europeans, most of the artifacts found during excavation relate to the 19<sup>th</sup> and 20<sup>th</sup> centuries (Wilson 2014:27). Excavations during the 2013 Field School looked at a previous house site and the materials being collected are the cumulative material residue of everyday household activities. This would include small bone or glass fragments, beads, ceramics, or other intentionally or unintentionally discarded materials that are compacted into floors (Graesch 2009:759-779). This study focused on material types; ceramics, beads, and glass, that would be broadly categorized as domestic or personal and were collected in large quantities compared to other material types.

Ceramic materials refer to any object made of fired clay and are an abundant archaeological material collected at Fort Vancouver (Wilson 2014:33). On average, ceramics make up about 25% or more of an HBC artifact assemblage collected from Fort Vancouver. Of these most are transferprint pieces often produced by the Staffordshire, England based firm of Copeland and Garrett/W.T. Copeland, also referred to as Spode (Taber 2017:14). Transferprint describes the decoration pattern rather than the ceramic type and are most often found on white earthenware or ironstone tableware. Pattern colors may range from blue, green, brown, or black, to red and pink (Wilson 2014:33). Over 80 patterns have been identified from excavations at Fort Vancouver and were transported primarily from Britain by sailing vessels (Taber 2017:15).

In 2006 Robert Cromwell compared ceramic assemblages from areas within the Fort to the houses from the Village to examine the access employees had to various types and qualities of ceramics. He found that even though they would have been expensive and consisted of a high portion of their income, those living in the Village had nearly complete sets of transferprint ceramics. The pieces did however show wear from uses that were outside their normal function. Cromwell interprets the data to show that the ceramics had a social utility for those living in the Village. One example is the presence of teawares which were common in the sample despite their high price, pointing to the conclusion that the English tea ceremony was important even for the ethnically diverse population of the Village (Cromwell 2006:13-25).

Various forms of glass are also collected in abundance during Fort Vancouver excavations. Glass is categorized into two broad types, either flat glass or vessel glass. Flat glass is assumed to have come from a window and its thickness can be used to date the artifact. If the piece has any remains of a silver residue it is presumed to be a piece from a mirror rather than from a window. Vessel glass on the other hand refers to most other form of glass and can come

in a wider variety of shapes, sizes, and colors depending on the pieces function. Colors can range from dark olive green, to aqua or colorless (Wilson 2014:31).

Up through the time of the HBC occupation two manufacturing methods were used to create glass bottles and other objects. Free blown bottles were individually made by a glass blower and their final shape and symmetry depended on the skill of the glass blower. All free blown pieces have smooth shiny finishes and will never have a seam or other markings from a mold. They will however have a kick-up at the base where the pontil rod is attached to hold the hot glass (Lorrain 1968:36). The free blowing method was used until 1865, overlapping with the development of mold blown glass. Mold blowing methods were used from 1810 to 1920 before machine made bottles became dominant (Wilson 2014:31). The shape and symmetry of mold blown bottles depends on the mold used rather than the skill of the glass blower. Bottles from a mold will have evidence of a seam where the hot glass filled the seam of the hinged mold and an orange-peel texture from the sand used to prevent the glass from sticking to the mold (Lorrain 1968:36; Wilson 2014:31).

In addition to identifying the type of glass and its method of production the most important information a bottle can give us is its contents. Roderick Sprague's classification system based on artifact function lists glass materials under the "Unknown" category rather than within a specific function. The categories are then broken up based on color and the probable identification of what the vessel was used for. He explains that the function is different for the container than for the contained and the emphasis should be placed on the contained. For example, a glass bottle functions to hold liquids whether that liquid is rum or perfume. Sprague argues that an anthropologist should be more focused on the function of the rum or the perfume within the social context than the bottle itself (Sprague 1980:258-259). In this study the type of

bottle or vessel was identified in terms of the type of liquid or substance it was likely used to contain in an attempt to focus on the functions of the vessels within the cultural context.

Examples of vessel glass categories used include alcohol bottles, beer bottles, or bottles used for medicinal substances.

According to Sprague's functional classifications beads were a personal item used for adornment, similar too jewelry (Sprague 1980:255). Within the North American fur trade beads were used for adornment on a variety of items including clothing, horse tack, musket holders and many others. Glass beads, like the ones found at Fort Vancouver, were valued by Native Americans and also functioned as a form of currency. The HBC imported them from Britain by the ton and they were sold in company stores by the pound or strung on strings and sold by the yard (Cromwell et al. 2013:i-iii).

One hundred and sixty individual varieties of beads have been identified in the collections at Fort Vancouver. Similar to glass, the beads are broadly categorized by their manufacturing method. The two primary manufacturing methods that are represented in the collection at Fort Vancouver are drawn beads and wound beads. Drawn beads are made by heating a hollow wand of glass and then stretching the glass until it reaches the chosen diameter. A chisel-like tool is used to cut the wands into the desired size and the individual beads may then be hot tumbled to soften the edges. The next most common manufacturing method represented is wound beads. These beads are individually created by heating wands of glass and winding them around a wire wand (Cromwell et al. 2013: ii).

Lester Ross, an archaeologist working at Fort Vancouver for the National Park Service in the 1970s developed a four digit number system to categorize and identify all of the individual

varieties of beads in the collection. The system refers to “FOVA” numbers, which are identifies that are unique to Fort Vancouver. The FOVA is then followed by a four digit number that identifies the unique bead type. Drawn beads fall into the 1000s, wound beads use the 2000s, while other bead manufacturing categories use the 3000, 4000, or 6000 series (Cromwell et al. 2013:iv). These unique FOVA identifiers were used to examine the diversity, or range of bead types, that were collected in the sample.

### Artifact Screening

During the excavation of most archaeological sites, artifact-filled sediment is systematically removed and sorted in an effort to collect as much archaeological material as possible. However, even rigorous collection methods during excavation are unable to collect all material evidence. Archaeologists must rely on the sample they collect to be representative of the whole (Orton 2000:14). Their interpretations and analyses are only as good as their collection methods and it is up to the archaeologist to measure and report sources of possible interpretive error (Graesch 2009:770).

It has become common practice in archaeology to use screens of various mesh sizes to sieve removed sediment in an effort to minimize information loss (Vale and Gargett 2001:57). The mesh size chosen affects the abundance and types of artifacts collected and a recent shift away from the “industry standard” of ¼ in. (6 mm) mesh towards smaller 1/8 in. (3 mm) or even 1/16 in. mesh has led to new discoveries (James 1997:385). Most of these discoveries have been in the subfield of archaeofaunal analysis in which diagnostic faunal remains from small animals or fish are easily passed through a ¼ in. mesh screen. Multiple archaeofaunal studies have shown that the use of only ¼ in. mesh screening results in a bias favoring larger fish and animal

resources. This recovery bias can result in inaccurate interpretations of subsistence patterns for the group and time period being studied, or inaccurate answers to research questions. When smaller mesh screening methods are applied, a more diverse dataset is often recovered showing reliance on smaller fish or animals that had not previously been represented (James 1997; Gordon 1993; Ross and Duffy 2000). In one case, even when the diversity of species was not changed with the additional use of 1/8 in. mesh compared to the data provided by the 1/4 in. mesh the numbers of identified specimens (NISP) and minimum numbers of individuals (MNI) were significantly increased justifying the use of the smaller mesh (Vale and Gargett 2002:61).

While best archaeological practice would use the smallest mesh screening methods available, it is not usually practical due to the increased time required to sort the archaeological material collected by the more precise screens (Vale and Gargett 2002:58; Ross and Duffy 2000:26). However, despite the dramatic increase in time spent in the field and in the laboratory, a more accurate picture of the archaeological site and less interpretive error will likely result (James 1997:396). It is up to the archaeologist to determine what balance of efficiency and artifact collection is best to answer research questions posed for the site. Many of the studies examining screen mesh size, noted above, have focused on the archaeofaunal data collected but the benefits of small mesh screening has not been studied as extensively within historical archaeology.

During the 2013 Field School in which the data used for this study was collected students removed sediment during excavation and dry-screened the material through a 1/4 in. screen nested inside of a 1/8 in. screen in the field (Wilson 2013:19). In dry screening the sediment is poured into the screen and agitated allowing the loose sediment to fall through ideally leaving behind archaeological material. The nested 1/4 in. screen allows any large rocks, debris, or artifacts to

first be caught in the ¼ in. screen and avoid them coming into contact with the more delicate 1/8 in. screen. Students can then sort through the remaining material caught in the 1/8 in. allowing for a second opportunity to find archaeological material. Approximately one quarter of the sediment removed from each HBC level was wet screened. In wet screening water is added to help breakdown the sediment and the material is then passed through a 1mm mesh screen to recover a greater number of fine artifacts that would likely be lost through a ¼ in. or even 1/8 in. screen.

## **Methods:**

### *Data Collection*

As previously stated the materials used to generate the data for this study were collected during the excavations associated with the 2013 Public Archaeology Field School at Fort Vancouver National Historic Site. Excavated sediment was screened in the field by students and volunteers. Most of the sediment was dry screened used a nested ¼ in. and 1/8 in. meshed screens and approximately one quarter of each level was wet screened through a 1 mm mesh screen. Once collected in the field artifacts are bagged and moved to the Cultural Resources lab at Fort Vancouver to be processed.

Lab processing includes washing and logging all artifacts generating a database for that specific project or excavation. Projects are given four-digit accession numbers that are unique to Fort Vancouver. In front of the four numerical digits is the acronym FOVA, standing for Fort Vancouver. For example, each Field School every year is designated with a new accession number. The accession number for the 2013 Field School excavations is FOVA 3218. All data generated from the materials collected during excavation or in relation to that Field School are

referred to generally by the accession number. This study focused on ceramics, beads, and both vessel and flat glass because there was a large amount of each material in the assemblage and generally were all categorized as domestic materials.

All materials from the FOVA 3218 assemblage were stored, processed, and analyzed in the Fort Vancouver Cultural Resources lab. During processing, each the specific characteristic of each artifact is logged in a dataset that includes all of the artifacts relating to that accession number. Processing and data entry to generate the dataset is completed over time by volunteers and students supervised by the lab coordinator. The final dataset for FOVA 3218 was completed in early 2015 and includes basic information for each artifact based on material type. For example, artifact characteristics generally include the lot and level the piece was found, its material type, size, and color, as well as other categories specific to the material type. This generated dataset was used as the primary source of data in this study to analyze the density and diversity of the artifacts collected.

### Density

Artifact density is the measure of artifact counts per a unit of volume and is a method for standardizing artifact abundance in samples, particularly when different volumes of sediment are removed (Graesch 2009:771). In this study artifact density was used as a measure for comparing collection rates between screening methods. Density was measured as the total artifact count for each material type in the sample divided by the total volume of sediment screened using that method. This was calculated for each of the materials examined, ceramics, beads, vessel glass, and flat glass, for wet screened and dry screened samples.

Approximately one-fourth the amount of soil was wet screened as was dry screened making it necessary to account for volume of soil when comparing the artifact assemblages collected by each screening method. As discussed already it is expected that smaller mesh screens will produce higher quantities of artifacts than larger screens meaning that it is expected when standardized for volume the wet screened samples will produce higher artifact densities than the dry screened samples. These larger samples have a higher chance of producing rare materials and greater abundance leading to greater diversity in artifact assemblages (Gordon 1993:454-458).

### Diversity

The second aspect of artifact collection that was examined in relation to the different screening methods was artifact diversity. Diversity is a category of variation and gives a quantifiable measure to qualitative observations (*Quantifying Diversity* 1989:3). Jones and Leonard argues that diversity is fundamental to almost any discipline where phenomena may be broken into categories and those categories have different counts or members (*Quantifying Diversity* 1989:1). The two primary aspects of diversity are richness and evenness. Richness refers to the number of categories; in this study, the categories are specific varieties or styles of the materials (Gordon 1993:453; *Quantifying Diversity* 1989:2). For example, the individual types of beads represented in the sample or the varieties of vessel glass collected. The more categories represented in a sample the more diverse the sample is (Gordon 1993:456). Evenness then accounts for the distribution of values across these categories (Gordon 1993:453; *Quantifying Diversity* 1989:2). The more evenly distributed the sample is across the categories the greater the diversity (Gordon 1993:456).

Many studies, this one included, attempt to quantify both aspects of diversity using a single value and multiple indices have been developed to do so (Nagendra 2002:176-177; *Quantifying Diversity* 1989:3). While these values do offer insight into the diversity of the sample it is important to keep in mind that two separate samples with the same index values may in fact look very different (Nagendra 2002:175; *Quantifying Diversity* 1989:2). Most of the indices used in this study were developed in fields outside of archaeology like the Shannon index or the Simpson index first applied to ecology to measure species diversity but in this study are applied to diversity of artifact types within an assemblage (DeJong 1975:223).

The Shannon index measures uncertainty based on statistically estimating category a new value would fall into (Nagendra 2002:177). The focus is on richness but it accounts for evenness in that the more the greater the number of possible categories the more uncertainty and therefore more diversity (DeJong 1975:223). Other nonparametric measures for diversity used in this study are Chao1 and abundance-based coverage estimator (ACE) (Hughes et al. 2001). These values increase as diversity increases and it is expected that when compared across material types wet screened samples will have greater diversity than dry screened samples.

While these values account for both richness and evenness they may not give a detailed picture of evenness. In order to further examine the evenness of the samples collected this study also looked rank-abundance curves. These curves show the distribution of values based on how abundant they are in the sample. It places the most frequently occurring value, artifact type in this study, on the left and moves towards the least occurring value on the right (Hughes et al. 2001). As it is expected that wet screened samples will collect a greater proportion of artifacts with a greater diversity the rank-abundance curves are expected to be more evenly distributed for the wet screened samples than the dry screened samples.

## **Results and Discussion:**

### *Overall Sample*

As discussed, this study examined artifacts collected from the Kaulehelehe and Little Proulx house sites within Kanaka Village at Fort Vancouver National Historic Site. The final sample included 1,933 artifacts collected during the 2013 summer Field School. The assemblage included 390 beads, 641 ceramic pieces, 292 samples of flat glass, and 610 pieces of vessel glass. Artifacts were sorted by the screening method they were collected from in order to compare the collection rates and diversity of the assemblages collected by each method. In all, 1,754 artifacts were collected by dry screening excavated sediment and only 179 were collected from wet screened sediment. It is not surprising that the total count of artifacts collected by wet screening is drastically lower than the total amount collected in the dry screened assemblage because approximately three times as much sediment was dry screened than was wet screened. Table 1 summarizes all of the materials included in the study sample.

### *Density Results*

The difference in volume of excavated sediment that was dry screened compared to wet screening makes it difficult to compare without somehow accounting for it. Density is a measurement that can account for variable volumes of sediment because density is a measure of counts per a unit of volume (Graesch 2009:771). By accounting for total volume of sediment wet screening methods produced higher values by averaging 132.2 artifacts per cubic meter of screened sediment. Dry screening methods averaged an overall artifact density of 69.4 artifacts per cubic meter. The values suggest that within a cubic meter of excavated soil wet screening would produce almost twice as many artifacts as dry screening would if only one method or the

other was used. These values only include the generally domestic items that were included in the study; beads, ceramics, flat glass, and vessel glass, other types of artifacts were not included in the study or calculations.

The differences recorded for each material type were also examined more specifically and the Wilcoxon rank sum test was used to confirm if the difference between collection rates for the two screening methods was statistically significant. For beads collected, dry screening produced an average of 35.7 artifacts per cubic meter while wet screening averaged 70.9 artifacts per cubic meter. Figure 1 shows the distribution of bead densities for each unit for each screening method. The wet screened samples were much more tightly clustered and had a statistically higher average density ( $p < 2.2e-16$ ) than dry screened samples. Wet screening also produced a statistically significant higher density of ceramic pieces ( $p < 2.2e-16$ ) than dry screening, averaging about 9 more artifacts per cubic meter. Figure 2 shows the ceramic density distribution. The trend of higher artifact densities in wet screened samples than in dry screened samples continued for both flat glass ( $p = 0.0005$ ) and vessel glass ( $p < 2.2e-16$ ). Figures 3 and 4 show the comparative density distributions for each of the two categories of glass.

These results were consistent with previous studies and one the hypotheses of the study that wet screening results in higher rates of artifact collection largely because it uses a smaller mesh screen (Gordon 1993; James 1994; Ross and Duffy 2000). A second research focus for this study is if collecting a greater quantity of artifacts in the field creates a more representative sample of the total population and increases the probability of collecting rare artifacts. Collection of otherwise rare artifacts can change site interpretations or give different answers to research questions.

### Diversity Results

Diversity indices were used to explore the hypothesis that increased artifact collection due to use of smaller mesh screens would lead to a more diverse artifact assemblage. Beads, ceramics, and vessel glass were explored for diversity; however, flat glass was not explored in greater detail because there types of flat glass are limited to window or mirror glass. With the exception of some small variation in color between colorless or aqua glass there is not much variety within flat glass. The other material types produced unexpected results that are summarized in Table 2.

Samples were divided between the two house sites, Kaulehelehe and Little Proulx, as well as by screening method and then tested for diversity based on four different diversity indices. The first are the Shannon and Simpson diversity indices accounting for both richness and evenness of the specific material types in the sample. Higher values for both the Shannon and Simpson indices relate to higher calculated levels of diversity. For all three material types examined, beads, ceramics and vessel glass, the scores for the wet screened samples from both house sites were lower than the scores for the dry screened samples. This evidence does not support the hypothesis that wet screened samples would produce higher levels of diversity.

Additionally, wet screened beads, ceramic, and vessel glass samples produced lower values for the Chao and ACE indices. The Chao and ACE indices attempt to quantify richness by estimating the total number of categories, in this case specific material types. For both indices a correction factor is applied to the observed number of specific material types (Hughes et al. 2002). According to the Chao index values the dry screened samples predicted that approximately four times the amount of beads varieties, more than double the amount of ceramic

types and almost eight times the amount of vessel glass types might exist if it was possible to collect every artifact type within a site. However, while the values seem large at first it is important to observe that many of the Chao estimates for total possible specific material types also had large standard errors.

### **Conclusion:**

The purpose of this study was to examine the possible benefits of using small mesh screening methods, notably wet screening, in comparison to more traditional dry screening. Benefits that screening methods could produce include higher artifact collection rates and artifact assemblages with greater amounts of diversity, as defined by richness and evenness (Gordon 1993; Graesch 2009). Results showed that, as expected, wet screening produced higher artifact collection rates, measured by artifact density, than dry screened samples. However, these samples did not produce a greater variety of materials according to multiple diversity indices. These mixed results leave it still debatable if the additional time and resources invested in using smaller mesh screening methods produce more accurate representations of sites or improve understandings of the past.

Some of the factors that allowed for greater diversity in dry screened samples may be that Fort Vancouver Field School practices use both a ¼ in. and 1/8 in. screen mesh when dry screening. The incorporation of a 1/8 in. mesh is smaller than that ¼ in. standard for most archaeological projects (James 1994: 385). The wet screened samples did produce a different distribution of artifact types, showing greater abundance for some specific types that were not represented in the dry screened samples, these differences are illustrated in Figures 5, 6, and 7 for beads, ceramics, and vessel glass respectively. While these differences may not have been

significant according to the diversity index values they may still be significant depending on the research question being asked. Overall, the screening methods and screen mesh sizes used during archaeological excavations should be adjusted based on the research question posed, the types of expected materials to be recovered, as well as the time and resources available (Graesch 2009; James 1994; Vale and Gargett 2000).

### **References:**

- Brauner, David R. (compiler)  
2000 *Approaches to Material Culture Research for Historical Archaeology*, 2<sup>nd</sup> edition .  
The Society for Historical Archaeology, California, PA.
- Cromwell, Robert John.  
2006 “Where Ornament and Function are so Agreeably Combined”:  
*Consumer Choice Studies of English Ceramic Wares at Hudson’s Bay Company Fort  
Vancouver*. Doctoral Dissertation.
- Gordon, Elizabeth A.  
1993 “Screen Size and Differential Faunal Recovery: A Hawaiian  
Example.” *Journal of Field Archaeology*. Vol. 20, No. 4: 453-460.
- Graesch, Anthony P.  
2009 “Fieldworker Experience and Single-episode Screening as Sources  
of Data Recovery Bias in Archaeology: A Case Study from the Central Pacific Northwest  
Coast”. *American Antiquity* 74 (4). Society for American Archaeology: 759–779.
- Hughes, Jennifer B., Jessica J. Hellman and Brendan J. M. Bohannon  
2002 “Counting the Uncountable: Statistical Approaches to Estimating Microbial Diversity”.  
*Applied Environmental Microbiology* 67 (10): 4399-4406.
- James, Steven R.  
1997 “Methodological Issues Concerning Screen Size Recovery rates and  
Their Effects on Archaeofaunal Interpretations.” *Journal of Archaeological Science* 24: 385-397.
- Leonard, Robert D., George T. Jones (editors)  
1989 *Quantifying Diversity in Archaeology*. Cambridge University Press, New York, NY.
- Lorrain, Dessamae.  
1968 “An Archaeologist’s Guide to Nineteenth Century American Glass”. *Historical  
Archaeology*: 35-44.

Orton, Clive.

2000. *Sampling in Archaeology*. Cambridge: Cambridge University Press.

Sprague, Roderick.

1980 – 1981 “A Functional Classification for Artifacts from 19<sup>th</sup> and 20<sup>th</sup> Century Historical Sites”. *North American Archaeologist*. Vol. 2(3): 251- 261.

Taber, Emily C, Douglas C. Wilson, Robert Cromwell, Katie A. Wynia, and Alice Knowles.

2017 “Transfer-Printed Gastroliths: Fowl-ingested Artifacts and Identity at Fort Vancouver’s Village.”

Thomas, Bryn, and Charles Hibbs Jr.

1984 “Kanaka Village Vancouver Barracks Washington 1980/1981.” *Archaeological and Historical Services*, Eastern Washington University.

Wilson, Douglas C.

2013 “Research Design and Archaeological Data Recovery Plan: 2013 Public Archaeology Field School; at the Fort Vancouver Village (Kanaka Village 45CL300).” *Fort Vancouver National Historic Site*.

2014 “Archaeology Field Manual.” *Fort Vancouver National Historic Site*, National Park Service, U.S. Department of the Interior.

2014 “The Decline and Fall of the Hudson’s Bay Company Village at Fort Vancouver”:20-42.

2015 “A Mongrel Crowd of Canadians, Kanaks and Indians: The United States National Park Service Public Archaeology Programme and Fort Vancouver’s Village”. *Journal of Community Archaeology & Heritage*. Vol. 2 No. 3: 221-237.

Vale, Deborah, and Robert H. Gargett.

2002 “Size Matters: 3-mm Sieves Do Not Increase Richness in a Fishbone Assemblage from Arrawarra I, an Aboriginal Australian Shell Midden on Mid-north Coast of New South Wales, Australia.” *Journal of Archaeological Science* 29: 57-63.

Warre, Henry James.

1845-1846 Drawing of Fort Vancouver.

<https://oregonhistoryproject.org/articles/historical-records/drawing-of-fort-vancouver/#.WNmtGMJ1pdc>. Accessed March 27<sup>th</sup>, 2017.

## **Figures and Tables**

Table 1: Summary of artifacts used for study.

<b>Material Type</b>	<b>Screening Method</b>	<b>Total Count</b>	<b>Average Density</b>	<b>Column1</b>
Beads	Wet Screen	63	70.9	
	Dry Screen	327	35.7	
Ceramics	Wet Screen	48	90.3	
	Dry Screen	593	81.3	
Flat Glass	Wet Screen	18	252.6	
	Dry Screen	274	112.5	
Vessel Glass	Wet Screen	50	114.9	
	Dry Screen	560	48.1	
Total Wet Screen		179	Average Wet Screen	132.175
Total Dry Screen		1754	Average Dry Screen	69.4

Table 2: Summary of diversity index values. “SE” represents the standard error for that diversity index.

Diversity Index Values

<b>Material Type</b>	<b>Excavation Block</b>	<b>Screening Method</b>	<b>Shannon</b>	<b>Simpson</b>	<b>Chao</b>	<b>Chao SE</b>	<b>ACE</b>	<b>ACE SE</b>
Beads	Kalehelehe	Dry Screen	1.182	0.499	12.33	4.092	18.43	2.199
		Wet Screen	0.562	0.375	2	0.354	3.111	0.822
	Little Proulx	Dry Screen	0.987	0.338	39.33	15.039	37.78	3.602
		Wet Screen	1.077	0.55	9	4.416	14.857	1.689
Ceramics	Kalehelehe	Dry Screen	2.055	0.788	27.2	6.427	35.507	3.766
		Wet Screen	0	0	1	0	1	0
	Little Proulx	Dry Screen	2.521	0.869	44	8.867	49.823	4.151
		Wet Screen	1.873	0.787	16	5.974	16.56	1.871
Vessel Glass	Kalehelehe	Dry Screen	2.315	0.831	25	5.517	24.345	2.18
		Wet Screen	0.9	0.531	3	0.204	3.825	0.788
	Little Proulx	Dry Screen	5.525	0.854	73	23.204	65.57	4.45
		Wet Screen	2.002	0.842	9	0	9	0.943

Figure 1: Average density of beads collected by each screened method in artifacts per cubic meter of excavated sediment.

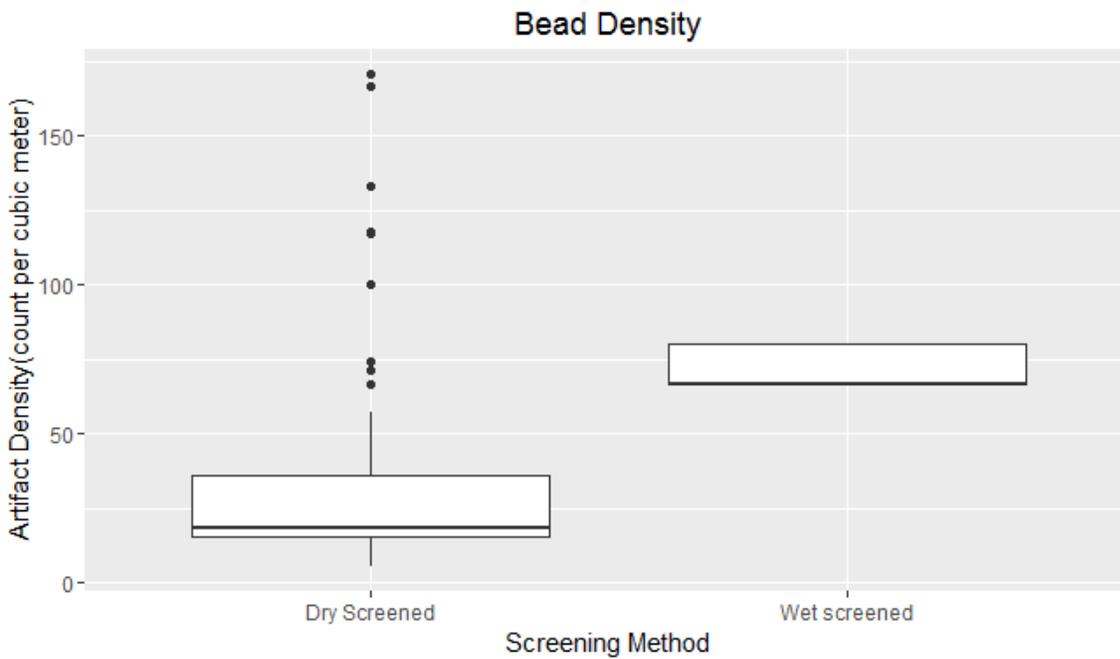


Figure 2: Average density of ceramic pieces collected by each screened method in artifacts per cubic meter of excavated sediment.

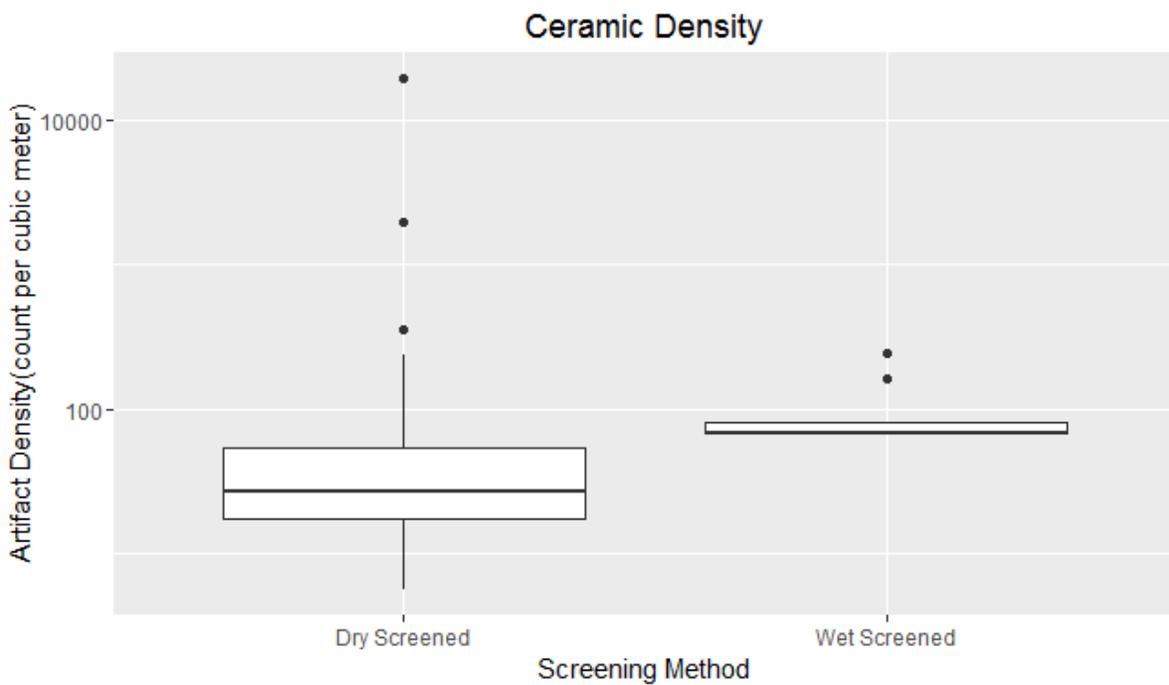


Figure 3: Average density of flat glass pieces collected by each screened method in artifacts per cubic meter of excavated sediment.

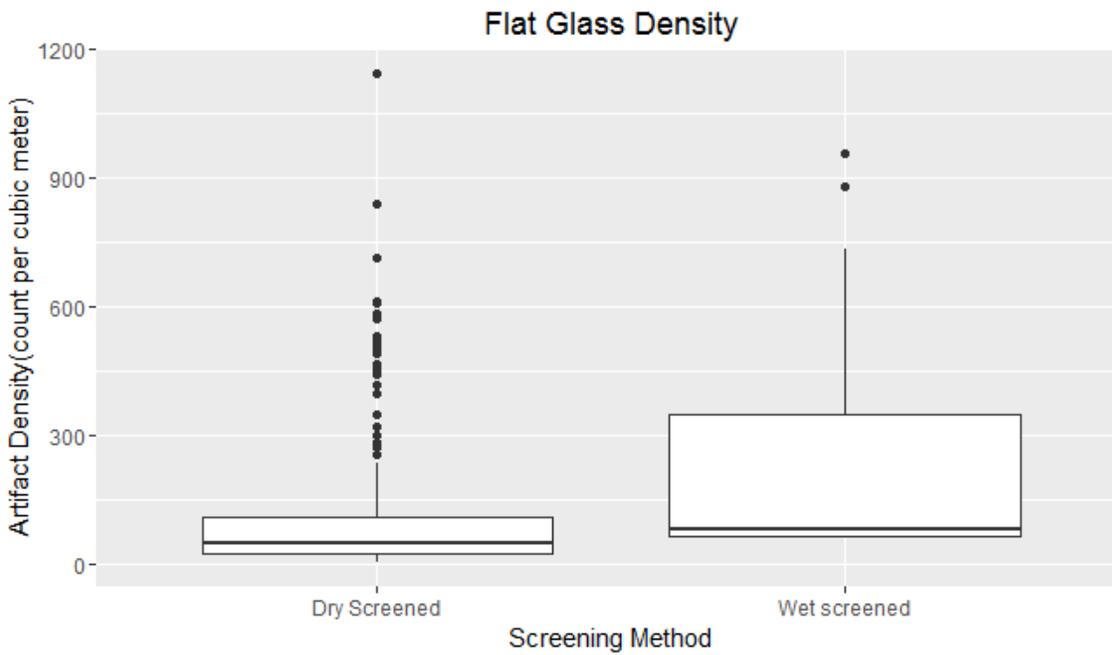


Figure 4: Average density of vessel glass pieces collected by each screened method in artifacts per cubic meter of excavated sediment.

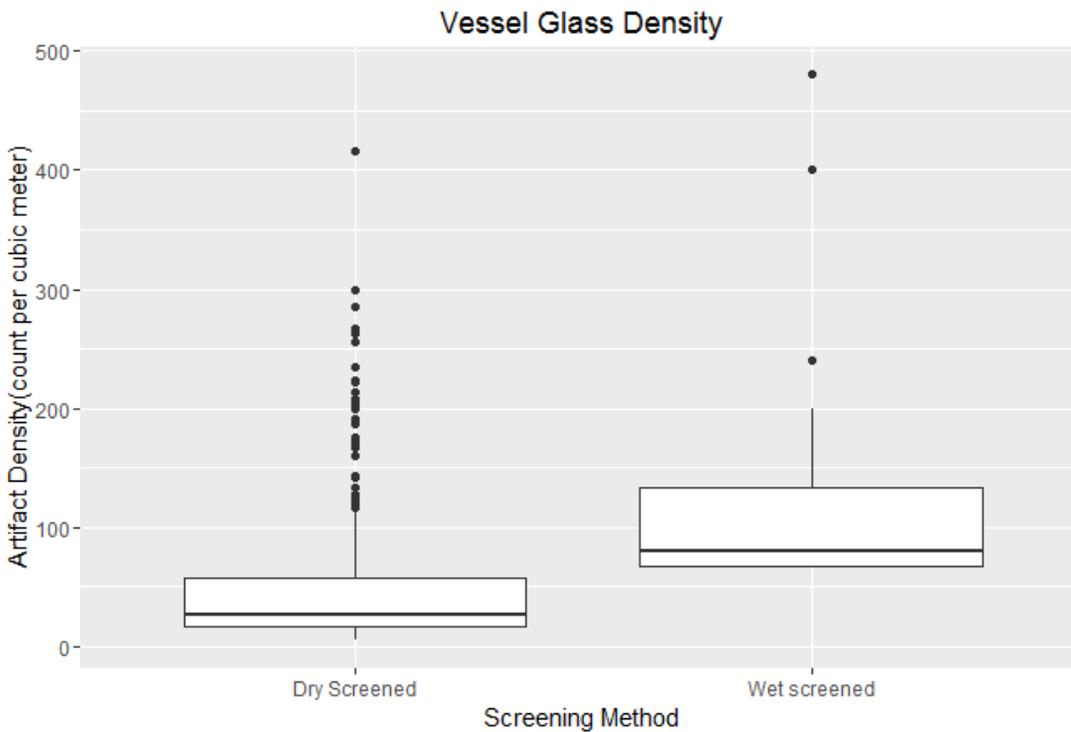


Figure 5: Distribution of bead types by FOVA identifier for wet screened and dry screened samples.

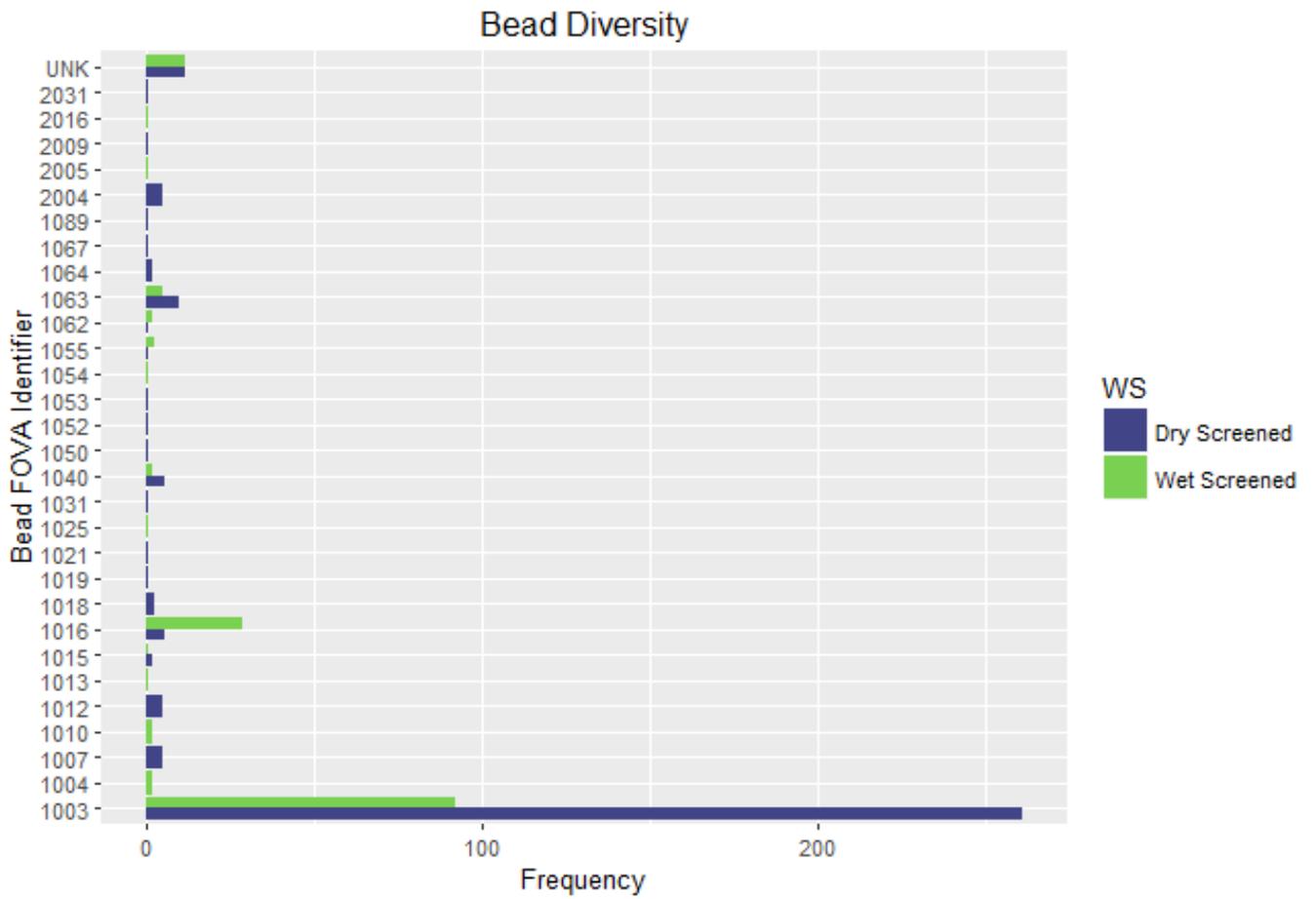


Figure 6: Distribution of ceramic types for wet screened and dry screened samples.

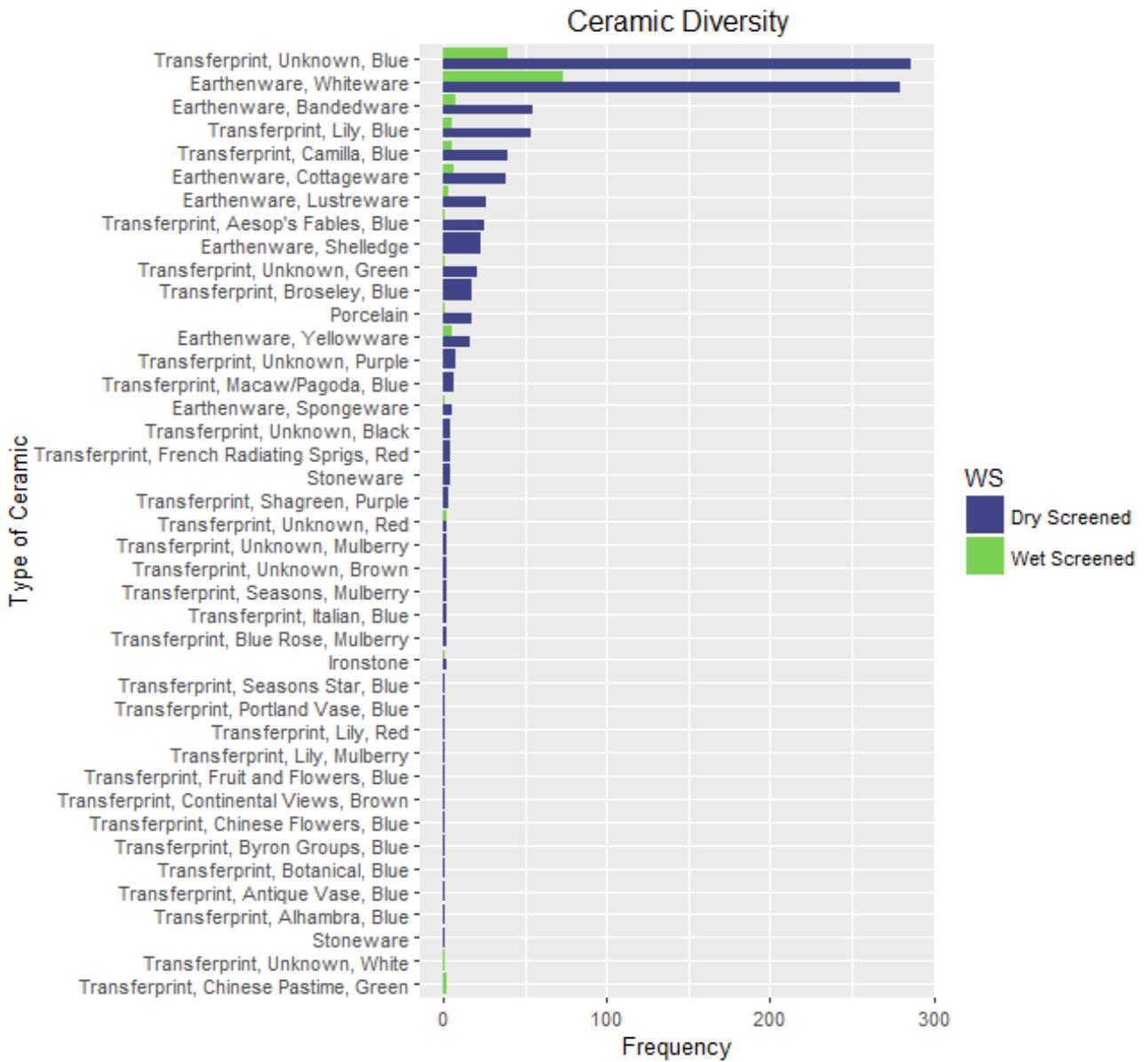


Figure 7: Distribution of vessel glass types for wet screened and dry screened samples.

