Analysis of the Beeswax Shipwreck Porcelain Collection

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Abstract

An assemblage of 1577 porcelain sherds associated with a historically recorded but unidentified shipwreck on the north Oregon coast was analyzed to determine the age and intended destination of the ship and its cargo. Prior to this study, only a limited number of studies of Asian export porcelain to the New World were available, and even fewer studies of their occurrence in the Pacific Northwest. This study provides a date range for the manufacture of the porcelain and information on the nationality of the Beeswax Wreck. The presence of the shipwreck, known locally as the Beeswax Wreck, has been documented through both historic sources and archaeological research. Archaeological materials associated with the wreck are consistent with a Manila galleon bound for Acapulco.

Keywords*:* Beeswax, Chinese porcelain, Galleon, Oregon coast

Introduction

This study details the analysis of an assemblage of 1577 porcelain sherds thought be directly associated with a historically recorded but unidentified shipwreck on the north Oregon cost. The shipwreck, known locally as the Beeswax Wreck, has been documented through both historic sources (Franchere, 1967; Gibbs, 1993; Hult, 1968; Lee and Frost, 1968; Marshall, 1984) and archaeological research (Williams, 2007). Previous archaeological research indicates that the archaeological materials associated with the wreck are consistent with a Manila galleon bound for Acapulco. The purpose of this study was to analyze the assemblage of sherds in order determine the age, nationality, and intended destination of the ship and its cargo (Lally, 2008).

Methodology

The Beeswax Wreck porcelain collection consists of 1577 porcelain sherds, with 1442 recovered through the beachcombing efforts of one individual over a period of more than 15 years from five separate locations near Manzanita, Oregon (Lally, 2008; Lally,

In Press). The majority of the sherds are from Oswald West State Park (OWSP) and Nehalem Bay, with a small number of sherds collected from Tillamook Head, Tillamook Bay, and Nehalem Falls (map?). Also within the collection are 127 sherds collected from two archaeological sites, 35-TI-1 and 35-TI-4, curated at the University of Oregon Museum of Natural and Cultural History and Tillamook County Pioneer Museum (Table 1). Analysis of chronological and stylistic attributes of decoration style, motif type, and marks was conducted. Sherds were measured and identified to vessel element (base, rim, body) and vessel type (open-form, closed-form, cups, vases, etc). Degree of erosion, glaze, and cobalt tone were noted. A date range for the porcelain's manufacture was determined based on 15 attributes and porcelain types to suggest a date range using South's (2002) model of visual interpretation. Additionally, 13 attributes and types were used to establish a mean ceramic date for the collection using South's (2002) equation. Those attributes and types excluded from the visual interpretation and mean ceramic date calculation were later compared to both methods in order to confirm or refine the date generated.

Results

Porcelain attributes identified during the analysis provide data on the manufacturing date. Examined independently, these attributes suggest a wide date range, indicating manufacture from both the Ming (1368-1644 AD) and Qing (1644-1911 AD) Dynasties. However, in many instances this apparently wide date range is due to the continued use of traditional Chinese motifs through time. Considered together, though, these attributes strongly suggest a date of manufacture for the collection between the later portion of the Transitional Period (1620 and 1683) and Kangxi Reign (1662-1722 AD). The visual interpretation model supports this, providing a date range between 1670 and 1700, as did the calculated mean ceramic date of 1690. Calculation of both is discussed in detail below. Analysis of sherd type identified six attributes and vessel types to which a date could be assigned. Grooved-foot rims were observed exclusively on monochrome white porcelain. This feature is particularly important in regard to the porcelain's date of manufacture as the grooved foot rim was only produced between 1644 (Butler, 2002; Butler and Curtis, 2002; Curtis, 2002; Donnelly, 1967; Harrisson, 1995; Mudge, 1986) and 1690 (Harrison, 1995). A beveled foot rim, thought to be a feature unique to the

Kangxi reign (1662-1722) (Vermeer, 2005), was observed on a single sherd (Sherd 8692). In addition, six sherds were identified as *klapmutsen*, or wide flat rims, generally attributed to production between 1620 and 1680 (Fischell, 1987), though possibly as early as 1613 (van der Pijl-Ketel, 1982).

Sherds of lidded vessels, lidded cups, and lids were identified among the collection. The sherds are similar in measurement, potting, and decoration, indicating that the lids were likely intended for the lidded cups. Similar lidded cups were observed among the *Vung Tau* cargo of 1690 (Jorg and Flecker, 2001). In addition to the cups, 19 sherds were identified as compressed globular boxes (or lids). Two of the compressed globular box sherds have unglazed bases, discolored slightly from exposure to kiln heat and curdled. Donnelly (1967) noted that during the post-Transitional Period and height of the Dehua kiln production, similar small globular boxes with unglazed, curdled bases were produced. These unique unglazed, curdled bases are indicative of origin at the Dehua kilns between 1675 and 1725 (Donnelly, 1967), when unglazed bases were out of fashion for other porcelain vessels (Butler, 2002). Four monochrome white sherds represent a variety of more unusual vessel types typical of manufacture at the Dehua kilns between 1675 and 1725. Sherd NH386 bears a striking resemblance to Marco Polo Censers that Donnelly (1967) dated between 1675 and 1725. Sherd NH88 is a molded European figure. Sherd NH657 is a molded petal, possibly from a Quan Yin figure.

Decoration Attributes and Ware types

The majority of the collection consists of porcelain sherds decorated with cobalt underglaze-blue outline-and-wash. Cobalt attributes are highly indicative of transitional Period (1620-1683 AD) or Kangxi Reign (1662-1722 AD) date of manufacture, being violet to violet-blue in color and lacking classic Ming Dynasty attributes such as the “heaped and piled” cobalt application. Ming Dynasty glaze characteristics are also absent from the collection. Two sherds clearly appear to be Chinese *Imari* (Numbers LL2/18, LL2/43), displaying gold gilt pine branches with red overglaze and underglaze-blue. Chinese *Imari* remained popular from the late-1600s to the mid-1700s, and in general, red overglaze on Chinese porcelain was imported to Mexico in quantity during the late 1600s (Mudge, 1986). Two sherds in the collection (NH359 and NH532) are

identified as Batavian ware, having brown slip applied to the exterior of the sherds and interiors decorated with underglaze-blue motifs. Batavian ware was only produced during the Kangxi Reign, specifically the late-seventeenth century to the early eighteenth century (Donnelly, 1967; Fuchus and Howard, 2005; Mudge, 1986; Sheaf and Kilburn, 1988). The Beeswax Wreck collection also contains monochrome white sherds with molded ribbing, strikingly similar to Donnelly's (1967) examples of wine cups and Rhinoceros Horn Cups made at Dehua kilns between 1650 and 1750.

Motif Attributes

Floral themes are the most common motif and accounted for 13 percent of the collection. A total of 39 *Prunus* blossom or *Prunus* plant motifs were identified, depicted in underglaze-blue, incised motif, and applied decoration. Two sherds (NH029, NH334) have *Prunus* blossoms depicted in white on a blue cracked-ice background (Fig. 1). This was an exceptionally popular motif, especially on Hawthorn Jars, during the Kangxi Reign (Frank, 1969; Kerr, 1986). Also among the Prunus motifs are several monochrome sherds that, based on examples provided by Donnelly (1967), Mudge (1986), and Bass (2005), appear to date between 1675 and 1710. Sherd NH392 can be assigned a specific date range based upon the chronology provided by Donnelly: it is decorated with a high-relief, molded and applied *Prunus* plant blossom, stem, and leaves, with a plain-centered flower with long petals and a single vein running the length of the petal. Donnelly dated this style from 1675 to 1725.

Fig. 1 Sherd NH29, Prunus blossoms depicted in white on a blue cracked-ice background. (J. Lally)

The collection also contains a number of sherds decorated with peach and peony blossoms. While utilized throughout the production of Chinese porcelain, these motifs strongly support a Shunzhi (1644-1661 AD) or Kangxi Reign (1662-1722 AD) date of manufacture (Lally, 2008; Lally, In Press) as both motifs experienced a period of increased popularity during

those Reigns (Macintosh, 1977). Underglaze-blue floral scroll motifs also provide strong indications of manufacture date. A total of 143 sherds were decorated with tiger lily scroll, a motif Frank (1969) identifies as exclusive to Kangxi Reign export porcelain. Ten of the tiger lily scroll sherds include a four-petal flower often associated with the tiger lily motif (Lally, 2008; Lally, In Press) having been observed among shipwreck cargos dating between 1690 (Jorg and Flecker, 2001: 72, figure 65) and 1735 (Chiến, 2002: figure 156). The tiger lily four-petal flower was also observed on three sherds absent tiger lily scroll. The tiger lily four-petal flower was depicted in similar fashion in the *Vung Tau* (1690) (Jorg and Flecker) shipwreck cargos, and reference examples dating between the late-seventeenth or early-eighteenth centuries (Harrisson, 1995: 33, figure 38; Valenstein, 1989: 224, figure 217).

Fig. 2 Sherd NH483, hundred boys motif or the scholars motif. (Jessica Lally)

Six sherds display a variation of floral scroll, described among some sources as *lion and plant* design. Butler (2002:18) and Harrison (1995:45) provide examples of lion and plant design on porcelain vessels dating between 1650 and 1670. *Boneless* floral scroll, a common style of under glaze painting utilized in the Chenghua Reign (1464-1487) and also prevalent on Kangxi imitations of Chenghua Reign porcelain (Frank, 1969), was identified on two sherds (NH218 and NH351). Thirteen sherds have human figure motifs. Six sherds (NH022, NH483, NH661, NH660, LL2/18/39a and LL2/18/39b) appear decorated with the *hundred boys* motif or the *scholars* motif (Fig. 2). A traditional motif utilized throughout Chinese porcelain production, the *hundred boys* and *scholars* motif were of immense importance during the Reign of Shunzhi (1644-1661) and Kangxi Reign (1662-1722) (Curtis, 2002: 50). Further indication of this time period is the manner in which the figure

motifs are painted, being more typical of the Shunzhi Reign or Kangxi Reign, with fine outline and violet-blue cobalt. The seven remaining human figure sherds are also painted in Shunzhi Reign or Kangxi Reign-style and depict human figures in combination with landscape elements and lattice fences, common motifs in both Reigns (Curtis, 2002; Frank, 1969; Mathers et al., 1990).

Paneled motifs are present on 12 sherds. Seven paneled sherds resemble the paneled motifs of the *Vung Tau* (1690) (Jorg and Flecker, 2001), the *Ca Mau* (1723-1735) (Chiến, 2002) and the *Geldermalsen* (1752) (Sheaf and Kilburn, 1988) wrecks. Five sherds, however, appear *kraak*-like, having specific attributes typical of *kraak* porcelain: decorative motif; v-shaped, inward-sloping footrim; "moth-eaten" edges (areas where the glaze is receded from the rims); and apricot colored foot rims. The quickly executed manner of decoration on these sherds may be indicative that the vessels were made during the height of porcelain production, post-1600. Several border motifs were identified within the collection. Three sherds depict the zigzag border motif, utilized during the 1640s or 1650s but used no later than 1675 (Butler, 2002). A single sherd (NH 235) was decorated with the stonewall or cracked ice border, which Butler attributes to the same time frame as the zigzag border. Sheaf and Kilburn (1988), however, suggest an even narrower time frame for the stonewall border, anywhere from 1660 to 1670. "Blobby dots," were also identified on three sherds (NH44, NH226, and NH608). This motif was utilized as a background motif as well as a border motif and is generally attributed to manufacture between 1645 and 1660 (Butler, 2002; Curtis, 2002: 44). The collection contained 47 rim sherds with brown dressing, a trait that did not appear within the Chinese domestic or export market until the 1640s-1660s. It was eventually discontinued in early Kangxi and was not utilized again until the eighteenth century (Butler, 2002: 23).

Marks

A total of 32 sherds in the collection had hallmarks or symbol marks. Among identifiable marks were a single Artemisia leaf mark and three swastika marks. Both were symbols of good fortune used during the Kangxi Reign (1662-1722) in place of the *nein-hao*, or reign mark (Macintosh, 1977; Mudge, 1986). Sherd NH482 contained a partial hallmark that translated as "of (the) beautiful jade" (Penglin Wang, personal communication April

17, 2008). Although utilized during the Ming Dynasty (1368-1644) (Butler and Curtis, 2002:108), marks containing reference to *the Jade Hall* were particularly fashionable during the Shunzhi Reign (1644-1661) (Curtis, 1995; Curtis, 2002:42) and rarely used during the Kangxi Reign (Butler and Curtis, 2002:108).

Date range determination

Attributes and ware types within the collection tend to suggest a Transitional Period (1620-1683), Shunzhi (1644-1661), or Kangxi Reign date (1662-1722). To determine a narrower date range, analysis of attributes and vessel types was conducted. First, a visual interpretation of attributes and porcelain types associated with specific date ranges were conducted, using the model provided by South (2002). Second, a set of attributes was selected for determination of the mean ceramic date, again following South's model (2002). This model is designed to examine occupation periods among sites, and unlike the visual interpretation method, takes into account the frequency of attributes by using a weighted average. Time frames, attributes, and types were adapted for the purposes of this study to reflect Chinese porcelain attribute dates. The mean ceramic date and visually interpreted date range were compared to known dates concerning the Chinese porcelain trade, the dates of two shipwrecks that Williams (2007) suggested as likely to be the source of the porcelain, and the collection attributes not included in the aforementioned calculations. These attributes were used to refine, narrow, or invalidate the dates suggested. Not all attributes and types were suitable for inclusion in the visual interpretation of attributes and mean ceramic date, and so were omitted either for lack of definitive information or for lack of consensus among existing porcelain literature.

Often, existing Chinese porcelain literature refers to dates by nonspecific periods such as "late-seventeenth century" or "early 18th century." In order to produce a mean ceramic date as well as a visual interpretation of attribute date ranges, more precise dates are needed. Therefore, for the purposes of this study, the most commonly agreed upon attribute date among existing research was used. When porcelain attributes and types were given a date range of "late," "middle," or "early" in the century, they were defined in this study as follows: *early* - turn of the century through the 30s, *middle* - 40s through the 60s, and *late* - 70s to the end of the century. A total of 15 dateable

attributes and ware types identified among the collection were determined to have enough documentation among resources to be included in determining a date range (Table 2). The attributes and porcelain ware types are graphed on a timeline (Fig. 3). To determine the date range of the attributes, South (2002) suggests that at least half of the attributes coincide with the earliest time period marker. Similarly, at least half must coincide with the latest time period marker. However, the latest period marker must at least touch the beginning of the latest attribute observed. Thus, given 15 attributes and types, it was necessary that 8 7.5 (half of 15 or $^{15}/_{2}$) of them corresponded with each date range marker. As shown by Fig. 3, this provides a date range for the collection between 1670 and 1700, indicated by the solid vertical lines. A mean ceramic date was then calculated for the collection, providing a weighted average for attributes identified (Table 3). The mean ceramic date was calculated using the following equation (South, 2002: 217):

$$Y = \frac{\sum_{i=1}^{n} Xi \cdot fi}{\sum_{i=1}^{n} fi},$$

where n = the number of attributes identified, Xi = the median date for each attribute, and fi = the frequency at which it occurred in the collection.

Utilizing the documented date range, a median date was calculated for each attribute. The median date was multiplied by the number of times the attribute occurred within the collection. The total sum of the frequency column was then divided into the total sum of the product column, resulting in a mean ceramic date. A total of 13 attributes and types were used, resulting in a mean ceramic date of 1690. That date falls closer to the later portion of the visually interpreted date range (1670-1700 AD), and supports the shipwreck identities proposed by Williams (2007). The indication is that the majority of features identified in the collection correspond to the later portion of the date range suggested by the visual interpretation model. Attributes and types not included in the mean ceramic date calculation or the visually interpreted date range support the dates generated by the two models. These include *klapmutsen*-style or wide flat rims (1620-1680 AD) (Fischell, 1987); evidence of Dehua kiln production (1675-1725 AD) (Donnelly, 1967; Gordon, 1977); human figure elements (1644-1722); the *Prunus* blossoms with *cracked-ice* motif (Kangxi Reign, 1662-1722 AD) (Frank 1969), lidded

cups (circa 1690) (Jorg and Flecker, 2001), an Artemisia hallmark (Kangxi Reign, 1662-1722) (Macintosh, 1977; Mudge, 1986), and non-kraak panel motifs (1690 - 1752) (Kerr, 1986: 65; Jorg and Flecker, 2001; Chiến, 2002; Sheaf and Kilburn, 1988).

Several attributes among the collection sherds are associated with dates earlier than the visually interpreted date range (1670-1700). Such motifs include the peach motif (Jiajing Reign, 1522-1566 or Shunzhi Reign, 1644-1661 AD) (Bai, 2002; Lion-Goldschmidt, 1978), hallmark reference to “the beautiful jade” (Shunzhi Reign) (Curtis, 2002: 42), lion and plant design-floral scroll (1650-1660) (Butler, 2002: 18, figure 3), and boneless floral scroll (1465-1487) (Frank, 1969). Considering these attributes along with early attributes used in both the mean ceramic date calculation and the date range determination, it is apparent that there is also a population among the collection sherds (approximately 5% of the total sherd population) that suggests an earlier date, possibly during the Shunzhi Reign. The presence of earlier attributes is a relatively minor issue as motifs were reused and older styles imitated in later reigns. Furthermore, such finds are not uncommon among shipwrecks. Often during the excavation and analysis of shipwreck porcelain cargoes, porcelain has been discovered that does not fit the time period of the shipwreck, or the time period suggested by the bulk of the porcelain cargo (Sheaf and Kilburn, 1988). They have, in large part, simply been considered anomalies. The appearance of a few “earlier” porcelain sherds among a collection of later sherds may, however, simply reflect a lack of information regarding export porcelain. Dates for only a few specific attributes are known for certain, or agreed upon among the existing literature. It is quite possible that many of the attributes considered to be early attributes in this study coexisted with later attributes.

Discussion and Conclusion

The Beeswax Wreck collection exhibits porcelain attributes and types typical of export types common to the markets in New Spain. The presence of monochrome porcelain, likely from the Dehua kilns, including ribbed and molded porcelain, Marco Polo censers, Batavian ware, and a sherd with a European face, are all indicators of European export. More specifically, large quantities of monochrome-white porcelain, as well as the identification of lidded cups and Middle-Eastern influences among the collection sherds, indicate that the ship was a Spanish vessel involved in the Manila trade. This supports

the finding of Williams's (2007) research that indicates that the Beeswax wreck was a Manila galleon carrying quantities of porcelain, beeswax, and other goods from Manila to Acapulco. After consideration of attributes and porcelain types among the collection sherds, the visually interpreted date range (1670-1700), and the mean ceramic date (1690), it is apparent that the majority of evidence strongly indicates that the porcelain found on the Nehalem-Manzanita coast is from a Spanish Manila galleon that wrecked during the Kangxi Reign, specifically between 1670 and 1700. The date of the collection is not likely later as many late-Kangxi porcelain attributes are absent. Therefore, the identity of the shipwreck responsible for the porcelain deposition is not likely the 1705 wreck of the *San Francisco Xavier*. Rather, analyses conducted in this study strongly indicate that the Beeswax Wreck was the *Santo Cristo de Burgos,* lost in 1693.

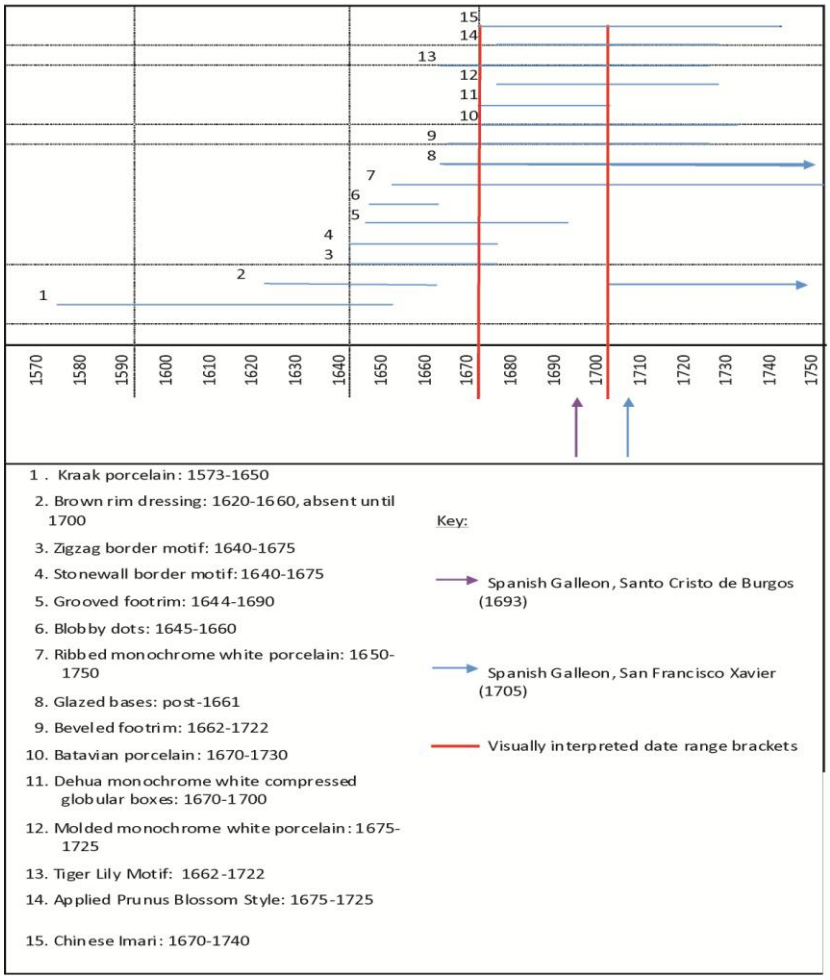

Fig. 3 Visually interpreted date range for the collection porcelain attributes. (Jessica Lally)

Provenience	**Current Location**	**Sherds (n)**
Oswald West State Park	Private Collection	981
Nehalem Bay	Private Collection	456
Tillamook Head	Private Collection	2
Tillamook Bay	Private Collection	1
Nehalem Falls	Private Collection	1
Nehalem River	Private Collection	1
Site 35-TI-1	University of Oregon	115
Site 35-TI-4	Tillamook County Pioneer Museum	12
Wilson River Site	Tillamook County Pioneer Museum	1
Nehalem Spit (private donation)	Tillamook County Pioneer Museum	2
Nehalem Bay State Park	Tillamook County Pioneer Museum	1
Similar geographic location (private donation)	Tillamook County Pioneer Museum	4
Total:		**1577**

Table 1. Number of Sherds in the Beeswax Collection by Provenience.

Attribute	Attribute date	Reference
Kraak porcelain	1573-1650	Frank (1969), Harrisson (1995), Mudge (1986), van der Pijl-Ketel (1982)
Brown-rim dressing	1620-1660, Post-1700	Butler (2002)
Zigzag border motif	1640-1675	Butler (2002)
Stonewall border motif	1640-1675	Butler (2002)
Grooved footrim	1644-1690	Butler (2002), Butler & Curtis (2002), Curtis (1995), Donnelly (1967), Harrisson (1995), Mudge (1986)
Blobby dots	1645-1660	Butler (2002)
Ribbed monochrome-white porcelain	1650-1750	Donnelly (1967), Gordon (1977)
Glazed bases	Post-1661	Butler (2002)
Beveled footrim	1662-1722	Vermeer (2005)
Batavian porcelain	1670-1730	Donnelly (1967), Fuchus& Howard, 2005; Mudge (1986), Sheaf & Kilburn (1988)
Dehua monochrome-white compressed globular boxes	1670-1700	Donnelly (1967), Gordon (1977)
Molded monochrome-white Porcelain	1675-1725	Donnelly (1967), Gordon (1977)
Tiger Lily Motif	1662-1722	Frank (1969); Valenstein, (1989); Jorg&Flecker, 2001; Chi¿n, 2002
Applied Prunus Style	1675-1725	Donnelly (1967)
Chinese Imari	1670-1740	Mudge (1986)

Table 2. Attributes Used for Visual Interpretation of Date Range.

Attribute or porcelain type	Date range
Beveled Foot	1662-1722
Grooved Foot	1644-1690
Globular Box	1670-1700
Ribbed	1650-1750
Molded Dehua	1675-1725
Kraak	1573-1650
Zigzag	1640-1675
Stonewall	1640-1675
Blobby Dots	1645-1660
Batavian	1670-1730
Tiger Lily Motif	1662-1722
Applied Prunus Style	1675-1725
Chinese Imari	1670-1740

Table 3. Attributes Selected for Mean Ceramic Date.

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Biography

Jessica Lally *began her analysis of the Beeswax Porcelain Collection in 2007, as a portion of her graduate research project. Her work on the subject has continued, documenting additional finds and associated museum collections. Since 2008, Jessica has worked as an archaeologist for the Confederated Tribes and Bands of the Yakama Nation in Washington State. She specializes is regulatory compliance, documentation of Traditional Cultural Properties, and documenting traditional lifeways of indigenous peoples. Her professional interests are varied, including many aspects of proto-historic and prehistoric archaeology of the Pacific Northwest.*