

After the Floods: Oswego Lake during the Early Holocene

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The Burnett Site (35CL96) in Lake Oswego, Oregon, yields important information about settlement, subsistence, and lithic technology in the Portland Basin during the Early Holocene. The lithic assemblage is dominated by Cascade-style projectile points, but also contains a high percentage of bifaces and expedient flake technology. Analyses completed for the Lake Oswego-Tigard Water Partnership project focused on the chronology of the site and site formation, settlement and subsistence patterns, procurement strategies of lithic raw materials, production of flake tools, and comparisons with other Early Holocene sites in the Portland Basin.

The Burnett site (35CL96) in Lake Oswego, Oregon (Figure 1), is one of the oldest continuously occupied sites in the Portland Basin, yielding lithic artifacts in deposits from the Early Holocene. Extensive excavations in 2014 produced a large assemblage of lithic artifacts that, upon completion of analyses, provided data on lithic technology and site chronology, as well as insights on local settlement and subsistence patterns during the Early Holocene. Horizontally discrete concentrations of debitage and other lithic artifacts suggest repeated occupation by groups of hunter-gatherers using a variety of lithic raw materials. The site was initially discovered in 1987 by archaeologist Robert Burnett at his residence in the historic 'Old Town' neighborhood of Lake Oswego. Burnett and a crew from Portland State University (PSU) conducted excavations from 1987 to 1990, discovering 137 projectile points, bifaces, and point fragments largely representative of the Old Cordilleran culture, or Cascade phase, dating to about 9,000 years ago (Burnett 1991, 1995). Test investigations in 2005 in a northeastern section of the site discovered lithic artifacts and reduction technologies consistent with the artifact assemblages from the PSU excavations, including a broad reduction trajectory based on biface manufacture from split-cobble flakes, a flake-core technology, and a bipolar technology (Hamilton and Roulette 2005). In 2014, Archaeological Investigations Northwest, Inc. (AINW) completed

test excavations in portions of the site that would be impacted by trenching activities for the placement of a finished water pipeline for the Lake Oswego – Tigard Water Partnership (LOTWP) project (Bajdek et al. 2014). The test investigations resulted in the discovery of 397 additional lithic artifacts and the expansion of the site boundary to the north and south. Follow-up data recovery excavations were conducted in October of 2014 under the pavement of Durham Street. A total of 16 1-m² excavation units were completed along the pipeline alignment near areas of high artifact density (Bajdek and Ozbun 2014).

The stratigraphic relationships at the site, schematically shown in Figure 2, indicate that the pre-contact archaeological materials are encased in Aeolian deposits overlying a deposition of Late Pleistocene alluvium that was laid down around 12,800 cal yr BP during the terminal stages of the Missoula Floods (Stratigraphic Unit 1). The overlying, artifact-bearing silts date to the Early and Middle Holocene, in which a gradual Aeolian accumulation took place. Despite extensive bioturbation and soil formation processes at the site, the depth and distribution of archaeological materials suggest two prehistoric occupation horizons: a deeper, relatively intact occupation surface within the Stratigraphic Unit 2b/2c sediments, and an upper, truncated occupation surface associated with Stratigraphic Unit 2a. Sediments deposited during the historic period are

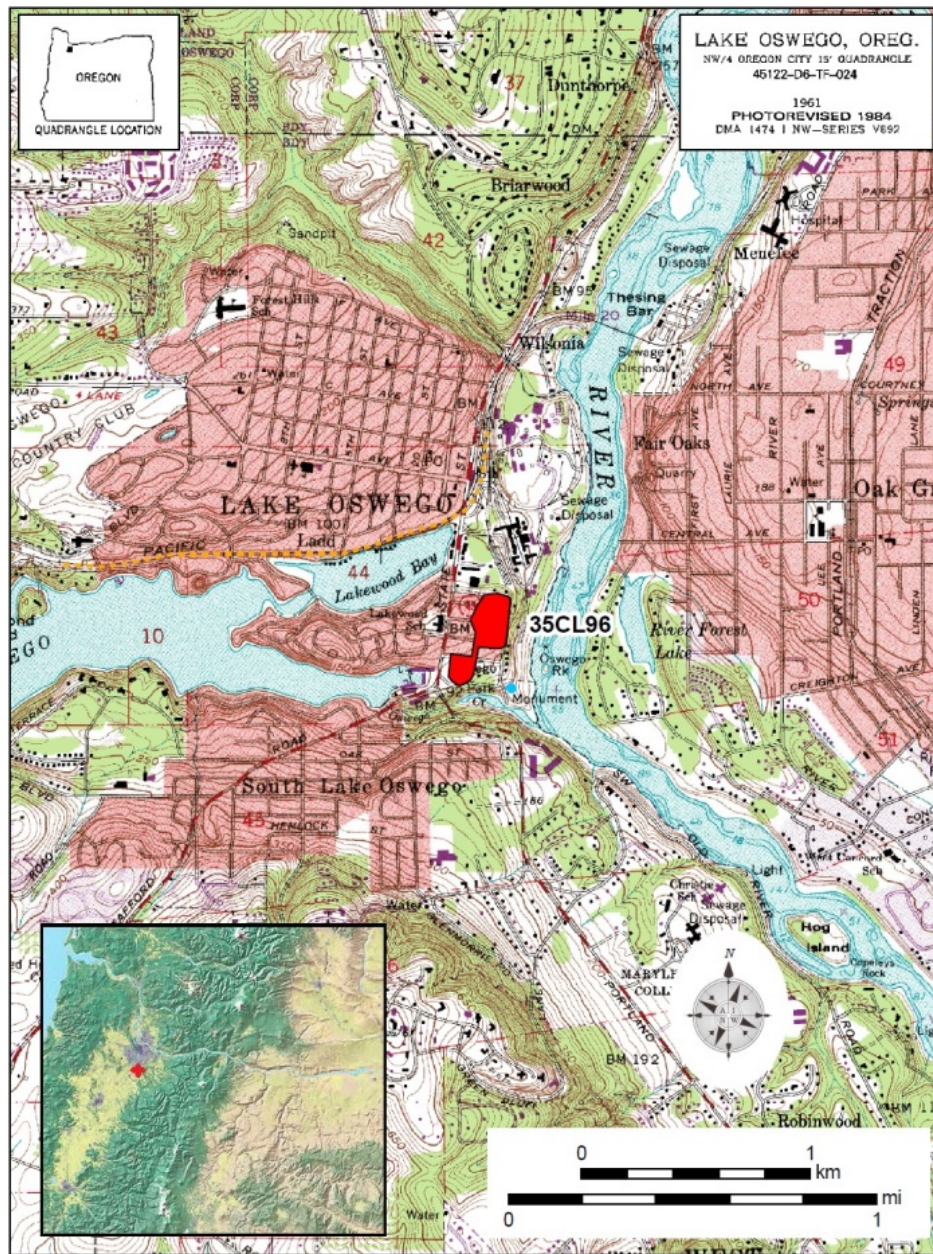


Figure 1. Location of the Burnett site (35CL96) near the Willamette River, Lake Oswego, Oregon.

expressed in Stratigraphic Unit 4. The current chronological understanding of the prehistoric Stratigraphic Unit 2 at the site is based on absolute dating methodology including radiocarbon, optically stimulated luminescence (OSL), and obsidian hydration. One charcoal sample obtained from Unit 2a, in an in-situ artifact-bearing deposit, returned a radiocarbon date of $6,260 \pm 30$ ^{14}C yr BP. Additional dating of sediments using OSL suggest very old post-depositional disturbance,

probably around 7,000 cal yr BP. A pair of samples obtained from Unit 2c provided an OSL date range of 10,450 – 6,700 cal yr BP. The analyses of select obsidian artifacts provided hydration dates for artifacts of the Inman Creek and Obsidian Cliffs geochemical source types. The dates range from 16,350 to 275 cal yr BP, with at least three distinct hydration peaks: 1) the Early Archaic Period (10,500 – 8,500 cal yr BP), the Late Archaic to Early Pacific Period (7,500 – 5,500 cal yr BP), and

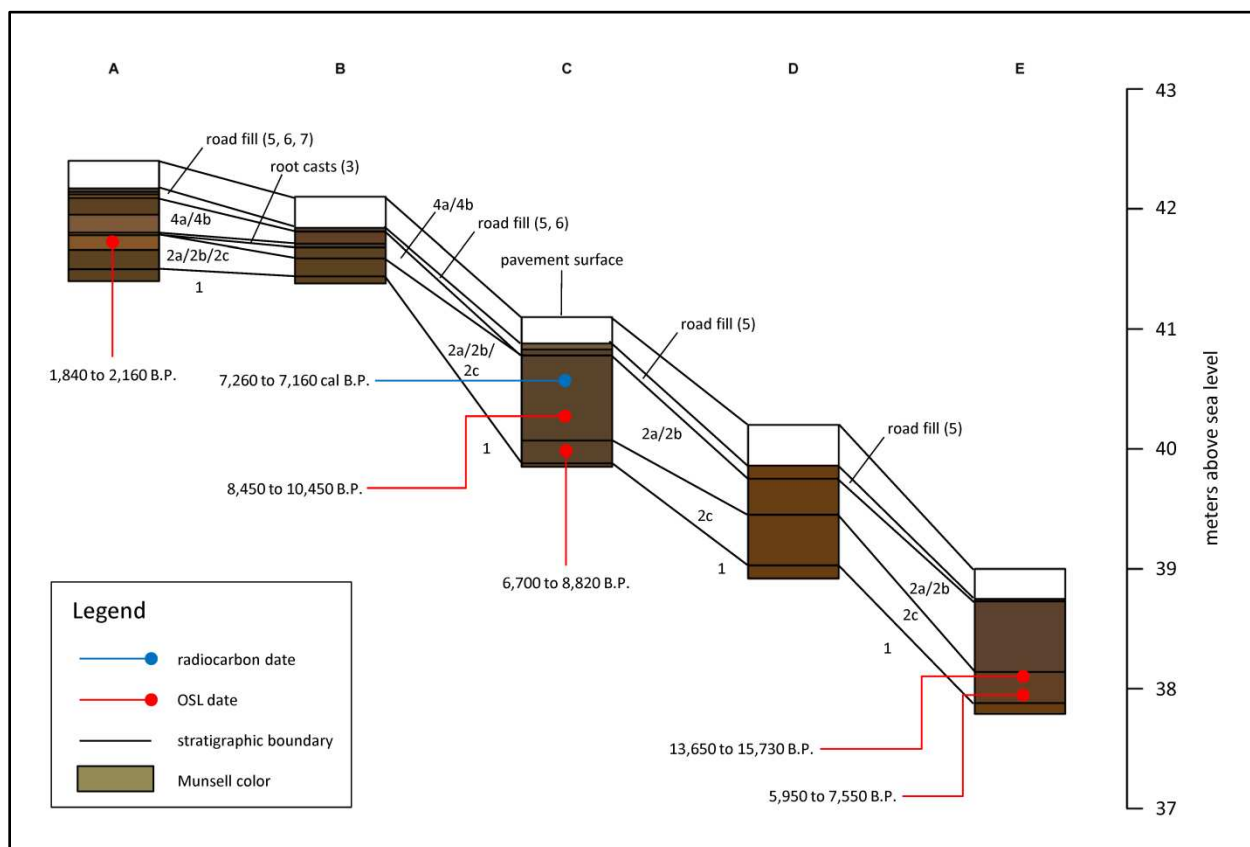


Figure 2. Schematic profile of stratigraphy (with absolute dates) across the Burnett site (35CL96) along Durham Street. The primary prehistoric artifact-bearing deposit is Stratigraphic Unit 2 (2a through 2c).

the Middle to Late Pacific Period (3,000 – 1,000 cal yr BP).

One of the primary activities conducted at the Burnett site was the manufacture of bifaces, which was likely related to replenishing broken or exhausted projectile points. The debitage and flaked stone tools reflect a manufacturing pattern that emphasized the use of durable, local toolstones and core reduction techniques to produce flake blanks for bifacial reduction into stemmed lanceolate dart-sized projectile points and flake blanks for use as flake tools or reduction into other tools. Expedient tools include utilized flakes, hammerstones, and choppers. The formed tool assemblage includes bifaces, scrapers, projectile points, knives, and a drill. Raw materials are dominated by cryptocrystalline silicates (CCS), however, basalt and other fine-grained volcanic toolstones were used much more extensively for the manufacture of tools that at other similarly dated sites in the Portland Basin. The reliance on fine-grained volcanic material for biface production has

been observed in Early Holocene sites east of the Cascades (Hicks 2004). The predominance of projectile points and flakes tools suggests that inhabitants of the Burnett site also focused their onsite activities on hunting and animal processing tasks. The maintenance of hunting gear is reflected in the frequency of broken projectile points and many of the flake tools were probably used to manufacture and maintain tool kits, as well. Cultural use modification analysis of such tools indicates that hide preparation was conducted at the site. The presence of red ochre on analyzed flake tools has been linked to a variety of utilitarian functions, including use as a preservative in protecting hides from decomposition, a waterproofing agent for leather, and an abrasive for reinforcing stone tool edges (Meatte 2012; Roper 1991). In this context, waterproofing leather may be the most functional, considering the other evidence for hide processing. The results of blood residue analysis on select tools reflect upon specific subsistence resources processed at the site, which

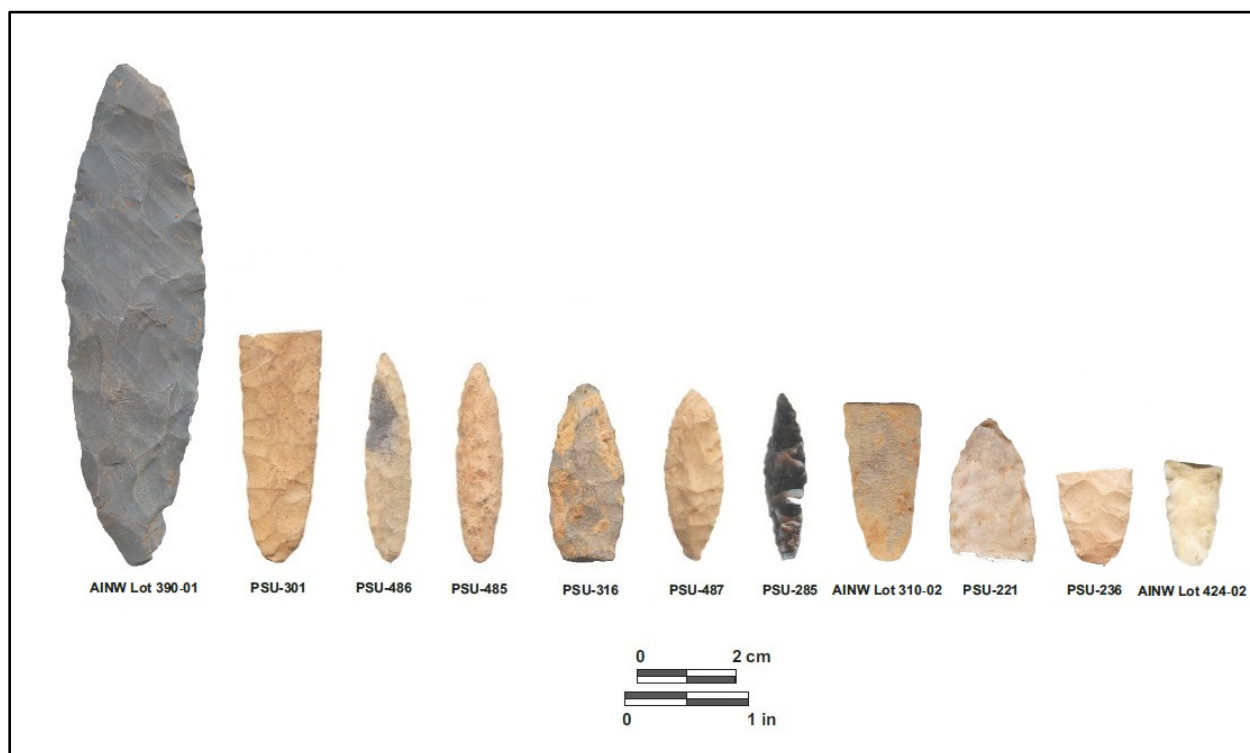


Figure 3. Select projectile points and point fragments recovered from 2014 data recovery (Lot 390, S01 and Lot 424, S02) and 1987-1990 test excavations (PSU-221 through -488).

included deer, sheep, and duck. Groundstone tools that might indicate plant resource processing were not recovered during excavations, suggesting that milling tasks were not conducted at the site. The projectile points from the Burnett site share a number of traits with Early Holocene lanceolate (e.g., Windust) technology. Burin flakes or spalls were removed from the ends of a small number of bifacial blanks to create a square facet retained at the base of some of the finished lanceolate points. These faceted point bases were also created by intentional preservation of bending breaks or remnant platform surfaces. The basal edges are relatively straight and basal grinding is common. A long lithic reduction sequence involving percussion and pressure flaking was likely used in the production of the projectile points, which is typical of lanceolate point reduction sequences of the Early Holocene, whereas shorter sequences are more common in dart point technologies of the later Archaic Period. Two concave-based Windust-type point fragments were found during the original excavations and re-analyzed for the current study (Figure 4). The presence of Windust projectile points at the Burnett along with the more numerous

Cascade points show similarity with other ancient archaeological sites east of the Cascade Range, including Windust Caves, Marmes rockshelter, and Paisley Caves (Rice 1972, Hicks 2004, Jenkins et al. 2013). While these projectile point types are generally associated with Early Holocene archaeological deposits on both sides of the Cascade Range, their age ranges are long and poorly defined. The ratio of debitage to tools is relatively lower in the earliest stratigraphic occupation horizon, whereas the percentage of debitage and tools considered byproducts of manufacturing (cores, blanks, and preforms) increases in the later occupation horizon. This pattern (Hicks 2004:226) may suggest that the Early Holocene inhabitants of the Burnett site arrived with lithic tools sufficient for specific activities while later people spent more time manufacturing tools while occupying the site. Regional mobility and trades contacts are reflected by obsidian artifacts found at the site originating from distant geological sources, which include Obsidian Cliffs, Spodue Mountain, and Glass Buttes. The obsidian sources are primarily located to the southeast of the site, with distances up to

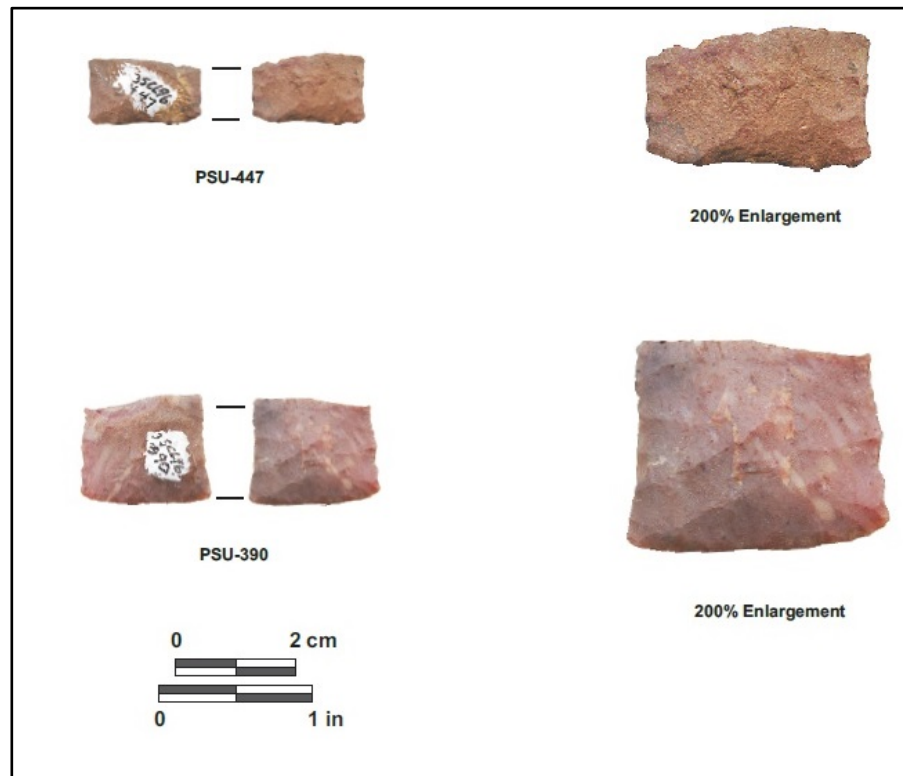


Figure 4. Windust-style projectile point fragments recovered from the 1987-1990 test excavations (PSU-390 and -447).

approximately 327 kilometers (km).

The high density of archaeological material indicates that the Burnett site was used in a widespread and rather redundant manner while the low diversity of artifact types suggests that the function of the site remained the same over an extensive period of time. The location of the site on a broad elevated landform surrounded by several major water habitats (the Willamette River, Oswego Creek, Oswego Lake and associated wetlands) likely supported a number of thriving ecosystems which were exploited by the groups who used the site as a temporary hunting camp, and is consistent with what is known about subsistence economies of Early Holocene peoples (Ames 1988:329). Other temporally comparable sites around the Portland Basin are also situated on elevated landforms above wet habitats. For example, Morasch Terrace (45CL428) is situated in an environmental context most similar to the Burnett site: on a high terrace above the Washougal River, Lacamas Creek, and Lacamas Lake and associated wetlands (Roulette et al. 2003). The localities of both sites seem to optimize access to a variety of habitats. Associated waterways were

probably abundant in seasonally migrating anadromous fish while the lakes, wetlands, and upland hills would have provided a wide range of other plant and animal resources. Pollen records from the Pacific Northwest provide evidence for a significant, regional shift in climate during the transition from the Pleistocene to the Early Holocene (Walsh et al. 2010). This change is characterized by a shift from cool-moist/cool-dry conditions during the Younger Dryas (ca. 13,200-11,400 cal yr BP) to warm-dry conditions by the start of the Early Holocene (ca. 11,400 cal yr BP). The early hunter-gatherer groups of the transitional Pleistocene-Holocene period seem well-suited for a wide range of ecological settings and their subsistence-settlement patterns reflect an adaptation to the unstable environmental conditions of the region. The Windust tradition, with its expedient and diversified technologies and more generalized subsistence strategy, may have been the first to successfully adapt to the warm-dry conditions of the Early Holocene in the Pacific Northwest. During the Early Holocene, the Portland Basin and adjoining uplands were significantly less arid than the Columbia Basin due to the rain shadow effect

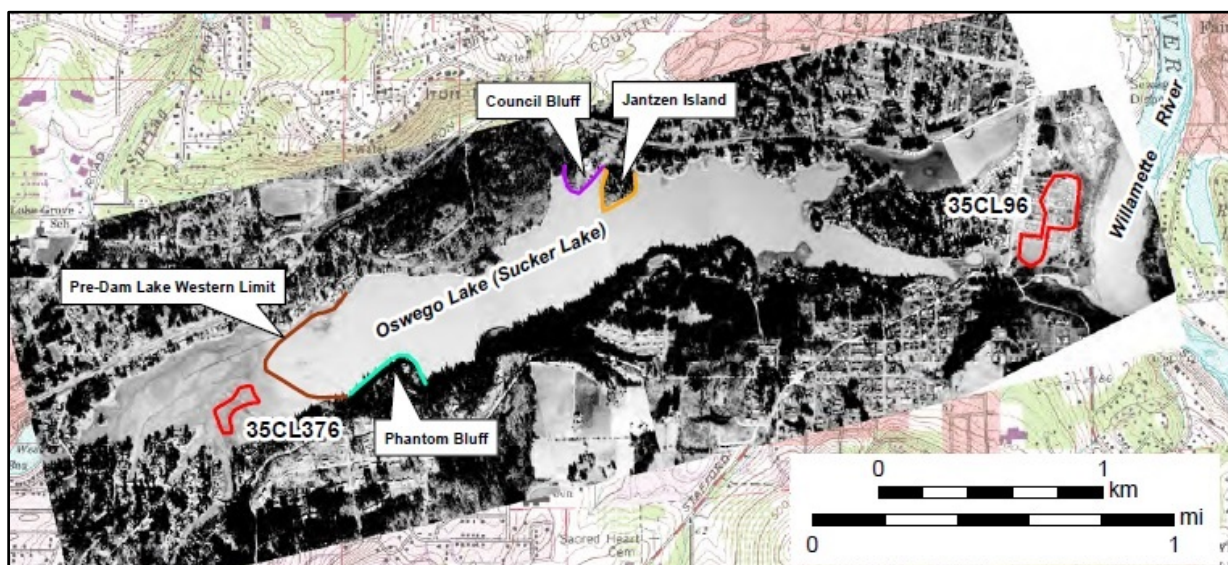


Figure 5. Archaeological sites 35CL96 and 35CL376 locations and pre-dam western Oswego Lake margin.

of the Cascade Range. The Portland area, for example, was better watered and featured high numbers of Douglas-fir, alder, and ferns in woodland areas near the mountains, in addition to oak savannah at lower elevations (Walsh et al. 2010). Deer and elk populations may have been more substantial in the Portland Basin and Willamette Valley, allowing the Early Holocene hunters greater opportunity to procure protein-rich resources. Conversely, the Columbia Plateau was at its warmest and driest during the Early Holocene, with extreme summer temperatures and rates of evaporation. These differences in ecological context and biological productivity between the east and west sides of the Cascade Range may have meant higher human population densities on the west side, within the Portland Basin and Willamette Valley. This could have promoted the development of more defined group territories, the effect of which was to produce more stable patterns of movement between specific resource areas within territories. Ultimately, this would produce numerous sites with evidence of repeated reuse. Site 35CL376, located at the west end of Oswego Lake, may have been part of such an established group territory along with the Burnett site (Figure 5).

The archaeological material at site 35CL376, which include over 100 lithic tools, represents a relatively long sequence of redundant use by Middle Holocene people (Punke et al. 2011). Information from obsidian hydration analysis,

diagnostic lithic technologies (Cascade points), and radiocarbon dating indicates that the site shares a potential spatial and temporal correlation with the later occupation period of the Burnett Site, although the inundation of the site may have removed evidence of an earlier occupation. Several reduction technologies are represented at site 35CL376 but similar to the Burnett site, the emphasis was on the production of bifaces. However, the tool assemblage at site 35CL376 indicates that a wider range of activities occurred at the site associated with the manufacture of several types of specialized tools, the maintenance and repair of these tool types, the processing and preparation of plant and animal resources, and the production and maintenance of hunting and fishing gear. In addition, over 100 fragments of fire-cracked rock were found on the deflated surface. Prehistoric faunal remains were recovered from text excavations consisting of large- and medium-size mammals and turtle. While the Burnett site can be classified as a base camp geared toward hunting activities, site 35CL376 is more indicative of a habitation site or long-term seasonal camp. Considering the large artifact assemblages at both sites and repeated site reuse, it seems that the earliest inhabitants of the Lake Oswego area had well-established patterns of movement from resource patch to resource patch. These relatively stable land use patterns would imply established group territories, and it might be speculated that small family and/or task-orientated groups

occupied a larger group territory around the uplands of Lake Oswego. In addition to the Burnett site and site 35CL376, pre-contact artifacts have been reportedly collected by locals at both Phantom Bluff, located on the south side of Oswego Lake, and Council Bluff (Diamond Head), located on the lake's north side (Fulton 2002). In addition, artifacts were reportedly found at a low-lying wetland situated northeast of Council Bluff, which may have served a location for harvesting plant-based resources.

Based on the archaeological data and early oral history, Lake Oswego was likely a significant locus of pre-contact activity over much of the Holocene, likely stemming from the arrival of highly-mobile bands of hunter-gatherers into the Portland Basin during the transitional Pleistocene-Holocene period around 11,400 cal yrs BP. The archaeological record for the Early Holocene is largely dominated by the Windust tradition in the Pacific Northwest and the buried deposits at the Burnett site suggest that the earliest inhabitants were Windust peoples. The site may have served as one of several task-specific site locations surrounding Oswego Lake and the stratigraphically designated artifact assemblages, which resulted from continuous reuse of the site as a short-term base camp for hunters, confirm the longevity of the site area through the Holocene. While the latest archaeological investigations more firmly establish the chronology of the Burnett site, the chronological sequence of the Cascade tradition in the Portland Basin remains ambiguous. The projectile point assemblages from the Burnett site and site 35CL376 suggest that the Cascade tradition was long-lived in the Lake Oswego area. The continued use of the Cascade-style lanceolate points at these sites, which were likely well-suited to the local ecology, may be an indication that the Cascade point is not a reliable typological marker for dating sites west of the Cascade Range. The regional trend of a continued decrease in the size of projectile points that began in the Archaic period may be indicative of technological responses to environmental changes but within the protected Lake Oswego area, the environment may have remained largely stable following the dispersal of the Missoula floodwaters.

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