***Supplemental Text 2. Bayesian Chronology of Pie Creek Shelter***

Modeled phases (designated by the *Phase* function in OxCal) for Pie Creek dates were grouped by cultural components (Components I-IV/IVa) and strata (Strata 3–9). A key assumption of the Markov Chain Monte Carlo (MCMC) analysis conducted by OxCal is that dates will assume a uniform distribution within each phase, which may yield poor model agreement in cases where a stratigraphic component is formed by episodic deposition over a longtime span. In several cases, phases were split into sub-phases on the basis of the temporal distribution of the dates. Assumptions regarding the continuity or discontinuity of cultural phases are governed by the *Boundary* function, which constrains the modeled probability distributions of dates within a phase.

Pie Creek Shelter is a large overhang in northern Tule Valley, Nevada, a few km south of the confluence of Pie Creek and the North Fork of the Humboldt River; at 41.3° N latitude, it lies well toward the northerly ‘wet’ side of the ENSO climate dipole. Human habitation spans the last 5600 years as documented by 14 dates from contexts excavated in 1998-2000 (McGuire et al. 2004). The modeled sequence presented here is now based on 19 dates, with a focus on the LDHP interval (two outliers, PSUAMS-4191 and -4195, are excluded from the model).

Component IV/IVa (Stratum 9; Pie Creek phase) is the earliest human occupation encountered at the site, with a modeled mean duration of 5740-4830 cal BP. Three conventional dates (Beta-163512, 163504, and 163511) are sparsely distributed across a span of nearly a millennium, with evidence of brief, generalized subsistence-oriented camps occupied by mobile foraging groups (McGuire et al. 2004:124-125). This component terminates in a rock fall event (Rock Fall II), constituting a discontinuous boundary between it and the succeeding Component III.

Component III (Strata 8, 7, and Floor B; South Fork phase) consists of several discrete distributions of nine 14C dates, modelled to span 4535-2700 cal BP. During this phase Pie Creek Shelter was a recurrent family residential seasonal camp locale and logistical hub for hunting mostly artiodactyls (McGuire et al. 2004:126). Our modeled age span is several centuries longer than that recognized by McGuire et al. (2004:127) because we incorporate the estimated age of Floor B, a stable occupation surface and depositional hiatus at the top of Stratum 7 (Young 2004:43). Floor B apparently stabilized near the beginning of the LDHP and continued as a habitation surface for several centuries.

Above Floor B are two thin ashy midden deposits with renewed eolian and colluvial inputs that together make up Component II (Strata 6 and 5; James Creek phase). Increased densities of flaked stone tool, debitage, and faunal remains in Component II suggest relatively frequent and persistent seasonal use of the shelter; abundance of fish remains indicates continued and increasing use of local cool-water spring-fed aquatic habitats; and high diversity of archaeobotanical remains argues for expanded diet breadth (Butler 2004; McGuire et al. 2004:127-128; Wohlgemuth 2004). McGuire et al. (2004) estimate Component II lasted from 3200-1450 cal BP, for a total of 1750 years. Our model gives Component II a much briefer span of 315 years from ~2700-2385 cal BP, based on two nearly identical dates from separate features (Feature 6, PSUAMS-4192, and Feature 13, Beta-163508[[1]](#footnote-1)). The major difference in our age spans is because we do not include a massive rock fall debris pile (Rock Fall I) that covers the shelter floor on top of Component II and marks a significant depositional break with overlying Component I. The age of Rock Fall I is uncertain. It occurred sometime after ~2580 cal BP (the date of underlying Feature 13, Beta-163508), and sediment influx rates for Strata 5 and 6 (Young 2004:43) suggests it was initiated by ~2300 cal BP, consistent with our modeled time span. On the later end, charcoal from the top of Rock Fall I is dated ~1465 cal BP (Beta-123223), and Young (2004:42) interpreted the massive collapse occurred “about 1500 years ago” as uppermost Component II (McGuire et al. 2004:127).

Two scenarios thus exist, related to LHDP occupation of the shelter. First, if Rock Fall I occurred ~2300 cal BP, it likely rendered the shelter effectively uninhabitable until ~1500 years ago, for reasons perhaps having little to do with the LHDP. Alternatively, if it happened ~1500 years ago, then late Component II (i.e., Stratum 5) must have had substantially lower deposition rates than Stratum 6 (perhaps in line with sedimentation declines observed in regional paleoenvironmental records). Stratum 5 would span a much longer interval on the order of a millennium rather than a couple centuries, observed densities of occupation debris would thus have accumulated over a much longer time frame, and deposition rates of such debris would necessarily be much lower than in Stratum 6. Stratum 5, in short, would represent a sparse and sporadic occupation period from ~2400-1500 cal BP, consistent with its radiocarbon record. Under this scenario the negligible use of Pie Creek Shelter might be attributable to the effects of the LDHP, despite its northerly location. At present we do not know which scenario may be more correct, but we suspect that Pie Creek Shelter may instead have served as a salubrious well-watered northerly refuge during the LDHP, at least until the Rock Fall I collapse cut short its habitability.

Component I lies above Rock Fall I and constitutes the latest prehistoric occupation of the site, after the LHDP. As noted above, the base of Component I is dated ~1465 cal BP (Beta-123223); lacking other early Component I dates, we use it as a *terminus post quem* for Component I of 1465±75 cal BP using the *After* and *C Date* functions. Component I (Strata 3 and 4; Maggie Creek and Eagle Rock phases) is subdivided by stratum into two modeled phases: Stratum 4 (1460-755 cal BP) and Stratum 3 (755-290 cal BP), each represented by two conventional 14C dates. The cultural boundary between the Maggie Creek and Eagle Rock assemblages exists somewhere within the duration of Stratum 3 but it is stratigraphically unclear. While PSUAMS-4190 constitutes an obviously post-contact date, this date was retained as a *terminus ante quem* (*Before* function) to constrain the duration of the preceding stratum, providing a more accurate estimate of the latest prehistoric occupation at the site.

References Cited

McGuire, Kelly R., Michael G. Delacorte, and Kimberley Carpenter

2004 Archaeological Excavations at Pie Creek and Tule Valley Shelters, Elko County, Nevada. Nevada State Museum Anthropological Papers No. 25. Nevada State Museum, Carson City.

1. Feature 13 also contains a second date of ~2920 cal BP (PSUAMS-4195), but it is considered a too-old outlier, more consistent with underlying Component III. [↑](#footnote-ref-1)