TAHOE REACH REVISITED: THE LATEST PLEISTOCENE/EARLY HOLOCENE IN THE TAHOE SIERRA

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The last decade of research in the Tahoe-Truckee area and surrounding High Sierra has provided clear evidence of early Holocene and perhaps latest Pleistocene human activity, probably coming immediately on the heels of the Tioga glacial retreat. In this discussion we summarize this research, and compare environmental proxy data and obsidian hydration profiles from high-elevation sites in Sierra, Placer, Nevada, El Dorado, Alpine, and Washoe counties, to suggest "big-picture" trends in prehistoric use of the Tahoe Sierra.

The title "Tahoe Reach Revisited" is in reference to work by Robert Elston, Jonathon Davis, and various of their colleagues along the Tahoe Reach of the Truckee River – that section of the river from Lake Tahoe to Martis Creek (Figure 1).

In the 1970s these researchers did the first substantive archaeology in the Truckee Basin, and developed a cultural chronology that has stood for 30 years without significant revision – not, as I'm sure Elston would agree, because it was completely accurate, but because no one offered any meaningful alternative. Instead, archaeologists working in the Tahoe Sierra and environs – even as far away as the western foothills – simply compared their data to the Tahoe Reach model to date their sites: "*Lots of big basalt tools? It must be Martis.*"

But this is not a paper about Martis. My focus instead is on a much earlier period, which Elston and his colleagues called the Tahoe Reach Phase. They dated this phase to about 7,000-8,000 years ago, based on a radiocarbon date from mottled silts at the base of site CA-PLA-164 on Squaw Creek near Lake Tahoe, and the presence of large stemmed dart points very similar to Parman points from Last Supper Cave in northwestern Nevada. Elston et al. called this "good evidence of an early phase of occupation in the Sierra which was previously unknown" (1977:69). They were right.

RECENT RESEARCH IN THE TAHOE SIERRA

One of the sites investigated by Elston and Davis along the Tahoe Reach was NEV-182/H, at the confluence of Martis Creek and the Truckee River. In the summer of 2006, Far Western did limited excavations at the site for a proposed recreation trail to be built by the Town of Truckee. Susan Lindström, Ron Reno, and Charles Zeier investigated some extensive remains of historic-era ice works along the trail route, while I concentrated on the prehistoric deposit at NEV-182.

I had the pleasure of working with Washoe Tribal Historian JoAnn Nevers and ethnographer Penny Rucks. JoAnn had some valuable observations about the site, as I will mention.

NEV-182 lies on an early Holocene erosional terrace above the Truckee River, just east of the town of Truckee. The shallow deposit lies directly on unaltered glacial till and outwash sediments from the Tioga Glaciation. The terrace would have been free of glacial ice and open to occupation at least by 10,000 years ago. The artifact assemblage from our excavations was rather small, but interesting – including several items with clay rinds that indicated great age. We also found a reasonable amount of obsidian, which is relatively

Figure 1. Location map.

scarce in the Truckee Basin. There are several large prehistoric basalt quarries at Truckee and Lake Tahoe, and basalt was the dominant toolstone until the late prehistoric period.

There were also several cupule boulders along the edge of the river terrace (Figure 2), as well as many milling slabs and boulder slicks. Many cupule petroglyphs have been reported for the Tahoe Sierra over the years, though I'm not aware of any in-depth study of them. In his thesis back in 1962, Sam Payen called these "Style 1" and noted that they are "scattered over much of the northern half of the Sierras, with notable concentrations in the Truckee Basin" (Payen 1962). He hypothesized that "pitted boulders" were one of the earliest petroglyph styles. JoAnn Nevers also interprets these cupules as quite ancient. It was interesting to note that, while she had much knowledge of other sites all along the river, including place-names, she had no information at all about this site. This suggested to me that it might have been abandoned well before the ethnographic period, beyond the reach of living memory or oral history.

Obsidian hydration from the site supported this. Twenty samples submitted for hydration analysis produced a mean of 6.2 µ, with most clustering between 5.7 and 8.3 µ. Unfortunately, Elston and Davis didn't believe in the efficacy of hydration dating, so there are no readings from their Tahoe Reach Phase deposits for comparison. However, archaeologists since then have provided hydration data for the Tahoe/Truckee region. In the last decade or so, people like Susan Lindström, Bill Bloomer, and Thomas Martin, and companies like Summit, KEC, and Far Western, as well as Caltrans, the U.S. Forest Service, and State Parks, have helped create a database of obsidian hydration and sourcing, radiocarbon dates, and artifact types for the Tahoe Sierra (Figure 3).

EARLY OCCUPATION OF THE TAHOE SIERRA

One of the interesting things emerging from these data is conclusive evidence for very early human use of the region – early Holocene or even perhaps latest Pleistocene – in other words, as soon as the last glacial retreat happened.

Figure 3a is a graph of debitage hydration data from 53 high-elevation sites in the Tahoe Sierra. Eighteen of the sites had hydration readings of 6.0 µ or larger, and nearly half of those had readings of 7.0 µ and above (Table 1). The sample of 1,300 readings is somewhat skewed toward larger sites and projects with more hydration samples. To try and minimize the bias, I charted a random sample of 10 readings from each site (Figure 3b).

Though it's less dramatic in the smaller sample, the trend is essentially the same for both:

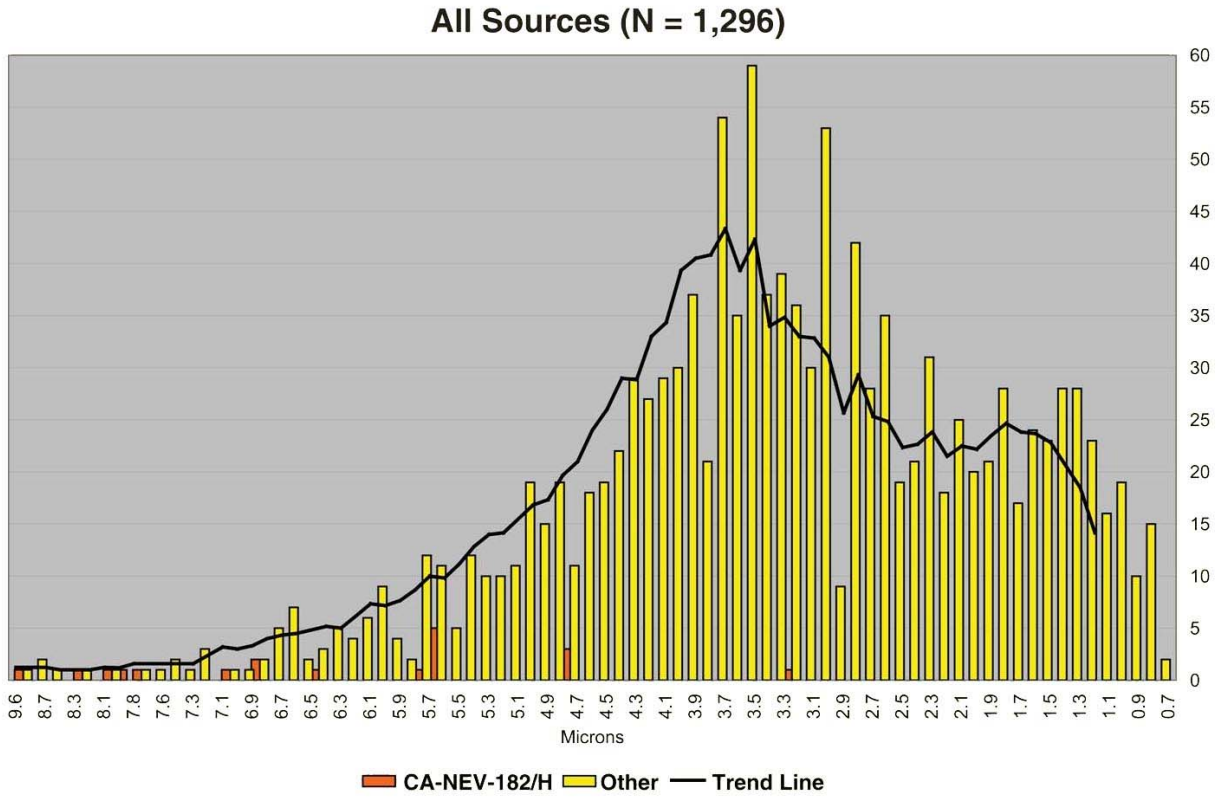
- Obsidian deposition began in the Tahoe Sierra at least by 9.5-10.0 µ (Bodie Hills).
- It increased more-or-less steadily for thousands of years, up to about 3 µ.
- There was a period between about 3 µ and 2 µ when it took a dive
- And there was a late-period surge again before it finally ended in the historic period, or after 0.9 microns

I'm resisting the urge to "find greater meaning" in the hydration curve; the main point I want to make here is how early obsidian deposition began in the Tahoe Sierra.

Toolstone Sources

We've known for a long time that the primary obsidian source represented in regional sites is Bodie Hills. In 1994 Rob Jackson and his colleagues at BioSystems (now Pacific Legacy) quantified this in their Framework for Research and Management (FARM) for the Tahoe-area national forests (Jackson et al. 1994). Judging by the source profiles from the 18 early sites in my sample, Bodie Hills has dominated the small obsidian presence in the Tahoe Sierra since the beginning. The source profiles also suggest that the earliest occupants were traveling or trading between the Tahoe Sierra and the western Great Basin – not only the Mono region, but the Modoc Plateau region as well. Though there is a smattering of obsidian from the North Coast Ranges, nearly 95 percent comes from the eastern Sierran front. The most likely travel route would have been up the Truckee River canyon from Reno or over Monitor Pass and up to Lake Tahoe.

Figure 2. Cupule boulders.



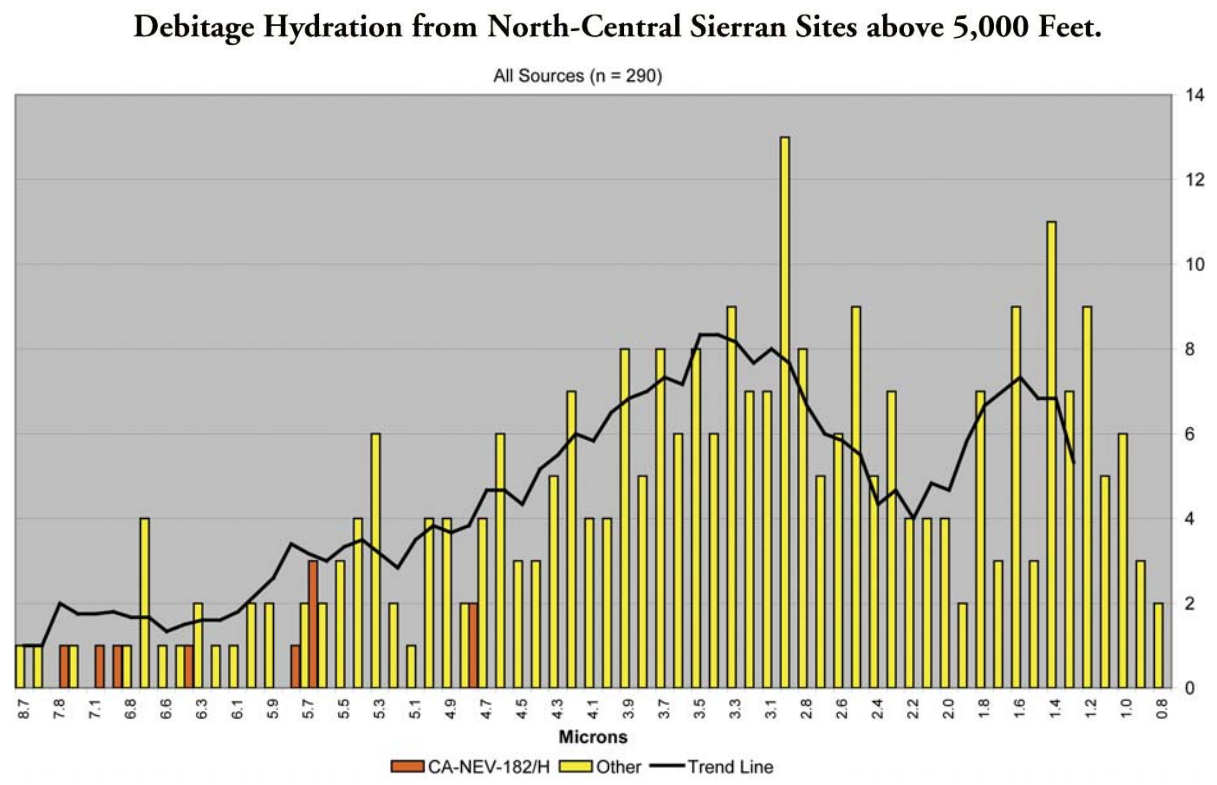


Figure 3. Debitage hydration: (a) all readings (above); (b) random sample of 10 readings per site (below).

Table 1. Hydration from Early-Period Sites in the Tahoe Sierra (>5,000 ft).

Sites	Locations	References	Hydration Range (μ)				Total #
			9.0-9.9	8.0-8.9	7.0-7.9	6.0-6.9	
CA-ELD-179	Taylor Creek	Burke et al. 1991	-	-	-	1	1
CA-ELD-184	Tallac Point	Lindström 1985	-	-	-	6	6
CA-PLA-500	Foresthill Divide	Wohlgemuth 1984	-	-	-	1	1
CA-PLA-664	Foresthill Divide	Waechter 1989	-	-	-	1	1
CA-NEV-199	Truckee "bug station"	Rondeau 1982	-	-	-	1	1
CA-NEV-575/H	Boca	Waechter et al. 1995	-	-	-	1	1
CA-PLA-5	Martis Valley	Ataman et al. 1999	-	-	-	1	1
FS #05-17-56-370	Tahoe National Forest	Jackson et al. 1994	-	-	-	1	1
S-1	Squaw Valley	Bloomer and Lindström 2006a	-	-	-	1	1
CA-PLA-165	Squaw Valley	Bloomer and Lindström 2006a	-	-	-	2	2
FS #05-19-795	Taylor Creek	Martin 1998	-	2	4	9	15
CA-NEV-884	Alder Hill	McGuire et al. 2006	-	-	1	2	3
CA-NEV-21	Alder Hill	McGuire et al. 2006	-	-	1		1
CA-PLA-6	Martis Valley	Ataman et al. 1999	-	1	-	1	2
CA-NEV-13/H	Donner Lake	Bloomer and Lindström 2006b; Nelson et al. 2007	-	1	2	10	13
CA-PLA-1863	Big Meadows	BioSystems 1993	-	1	-	3	4
CA-ALP-149	Gabbott Meadows	Peak and Neuenschwander 1991	1	-	1	3	5
CA-NEV-182/H	Truckee River	Lindström et al. 2007	1	3	2	3	9
Total			2	8	11	47	68

Bodie Hills Hydration Rates

Two of my colleagues, Jeff Rosenthal and Bill Bloomer, are actively working on Bodie Hills hydration rates. Table 2 shows Bodie Hills means and 1σ ranges for various projectile point types from Rosenthal's database of regional point hydration. Two things are relevant to my discussion:

- Most of the hydration from NEV-182 falls into the early Holocene and latest Pleistocene, and
- Large stemmed darts are markers of the early Holocene in the high Sierra, as Elston and Davis proposed. In fact, quite a few stemmed points have been reported from the Tahoe and Truckee basins (see McGuire et al. 2006).

Climate and Adaptations

Figure 4 is a compilation of climate proxy data for the Tahoe region and the adjacent western Great Basin from Don Grayson, Bob Elston and Jonathon Davis, Wally Woolfenden, and Peter Wigand; human adaptive patterns as characterized by Elston, Grayson, and Lindström and Bloomer; and Bodie Hills hydration ranges from Rosenthal and from Bloomer.

Depending on whose rate you use, the early Holocene in the higher elevations began at about 7 μ or about 8.5 μ (Bodie Hills), or around 10,000 years ago, at the end of the Tioga glaciation. There was a gradual warming and drying trend, which allowed people to live on landscapes in the Truckee Basin that hadn't been available before.

Judging by my sample of 53 sites, there is a small but definite presence of obsidian at the very earliest period (Figure 3).

Table 2. Point Types by Hydration and Period.

Point Type	BH Mean (μ)	BH 1-sigma Range	Period	Local Phase
Cottonwood arrow	1.3	1.6-1.0	Proto-historic	Late Kings Beach
Desert Side-notched arrow	1.6	2.3-0.9	Late Prehistoric/Proto-historic	Late Kings Beach
Rose Spring arrow*	2.3/2.4	3.2-1.5	Late Archaic	Early Kings Beach
Basally-notched and Corner-notched darts	2.9/3.0	4.3-1.5	Middle/Late Archaic	Martis/Early Kings Beach
Side-notched dart	4.0	5.7-2.3	Early/Middle Archaic	Martis
Contracting-stemmed dart	4.2	5.5-2.9	Early/Middle Archaic	Martis
Small-stemmed dart	4.8	5.5-4.1	Middle Holocene	Spooner
Great Basin Stemmed dart	5.9	6.8-5.1	Early Holocene	Tahoe Reach
Basally-thinned ("fluted") dart	7.1	8.0-6.2	Latest Pleistocene	n/a

Notes: Point types and hydration ranges adapted from Rosenthal (in McGuire et al. 2006); local phases adapted from Elston et al. 1977, 1994. BH = Bodie Hills. *Includes contracting-stemmed and corner-notched arrow points.

The earliest of these appear to be in the Truckee vicinity, and especially in Martis Valley and at Donner Lake. Donner Lake would have been one of the last places in the Truckee Basin to be ice-free (D. Craig Young, personal communication 2006), so these very large readings are particularly interesting. Jim Nelson and Bill Bloomer are working on the report for the Donner sites, and it should add a lot to what we know about the early Holocene in the Tahoe/Truckee region.

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Climate and Adaptations.

YRS BP	ERA	CLIMATIC CONDITIONS*	HUMAN ADAPTATIONS**	BODIE HILLS HYDRATION (McGuire et al. 2006)	ALL HYDRATION (Bloomer 2006)
500	"Middle" Late Holocene	"Little Ice Age" - cooler and wetter, but with little summer precipitation.	Ethnographic/Modern Washoe. Likely arrival of Numic speakers (Paiute/Shoshone).	< 1.0	1.5
1000		Medieval Climatic Anomaly (Stine 1990, 1994): periods of severe and prolonged drought, punctuated by shorter periods of heavy precipitation. Increased fire frequency. Truckee River flows reduced; conifers grow in Independence and Donner Lakes.	"Kings Beach" phase: adoption of bow and arrow; end of biface industry, decreased use of local basalt quarries. Greater intensity and diversity of resource use, with emphasis on plant foods. Small dispersed settlements, perhaps as a result of severe climatic conditions. House structures less formal, with no internal features, implying short-term residence.	1.9-1.0	2.0
1500		Dry interval; Pyramid Lake level drops.		2.5-2.0	
2000				2.6	3.0
2500					
3000	"Early" Late Holocene	End of mid-Holocene droughts; cooler and moister conditions. Expansion of forests and woodlands, including pinyon. Rapid rise in water levels at Lake Tahoe drowns encroaching conifers; flows increase in the Truckee River. Downslope movement of certain conifers in high Sierra marks the beginning of modern forests. East-side lakes are reborn.	"Martis" phase/Middle Archaic: more use of the uplands, apparent emphasis on small game and plants, large winter villages located in ecological "sweet spots." Continued emphasis on large bifaces, often of local basalts, along with basalt drills/punches, blades, core tools, and small flake tools. Bedrock grinding features (milling slicks) at base camps, portable millingstones elsewhere. Various large side-notched, corner-notched, contracting-stemmed, and concave-based dart points with overlapping temporal ranges.		4.0
3500					4.5
4000					5.0
4500					
5000					5.5
5500					
6000					6.0
6500	Middle Holocene	Significantly drier than before or since. Widespread changes in plant distributions; likely arrival in some areas of single-leaf pinyon. Continued warming creates dry, open conifer/oak forests; upper treelines move up slope. Lake Tahoe shrinks, does not overflow for long periods; conifers invade, growing 20 ft below normal lake level. Truckee River flows decrease. No glaciers in the high Sierra. High charcoal concentrations indicate increase fire frequency. Desiccation of many east-side lakes.	Early Archaic/Spooner phase: all habitats used, with larger sites located near permanent springs and streams to mitigate effects of drought. House structures relatively large and formal, suggesting large household groups; population densities still rather low. Biface production emphasized, steep-sided scrapers less common. Millingstones and handstones reflect seed processing.	5.5	6.5
7000				5.6	
7500					7.0
8000					
8500			Pre-Archaic/Tahoe Reach phase: low population densities; small and mobile groups traveling from resource to resource; hunting of megafauna implied by abundance of large stemmed dart points (Great Basin Stemmed series); other common tools included large bifaces and blades, crescents, beaked gravers, steep-sided end and side scrapers, large heavy core tools.		7.5
9000	Early Holocene	Gradual warming and drying trend; conifers invade Osgood Swamp.			8.0
9500					
10,000					8.5
10,500	Latest Pleistocene	Low average temperatures, high average annual precipitation. Extensive wetlands, vigorous stream and spring flows. Pluvial lakes full.	???	7.0	
≥11000				> 7.0	≥9.0

*** From Elston 1982; Elston et al. 1977, 1994; Grayson 1993; Lindström and Bloomer 1994; Wigand 2005; Wolfenden 1996.**
****Adapted mostly from Elston 1982.**

Figure 4. Climate and adaptations.