

Ancient Timekeepers of Chaco: an Investigation Into Possible Lunar Alignments of Prehistoric Shrine-Sites



The Science of Time
Harvard-Smithsonian Center
for Astrophysics
June 2016

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In and near Chaco Canyon, New Mexico – the center of an elaborate ceremonial architecture of the ancient Ancestral Puebloan culture – inhabitants may have intentionally interrelated numerous small masonry structures on alignments to the major standstill moon. The structures include low-walled / C-shaped, circular, and cairn configurations located on prominent positions near the tops of three mesas that form the south side of Chaco Canyon and mesas located beyond the canyon, with inter-site alignments spanning 5 to 15 km. Ritual deposits of turquoise at these small sites suggest their use as shrines. Geographic Information System (GIS) analysis of the spatial distribution of these sites – with precise geodetic coordinates determined through the National Geodetic Survey's (NGS) Online Positioning User Service to provide consistency with the National Spatial Reference System and the astronomy – shows clustering of their interrelationships along azimuths to the rising and setting moon at its major standstill. Previous extensive investigation by the Solstice Project, with geodetic support by NGS, documented the Chacoans' commemoration of the lunar standstill cycle at the Sun Dagger petroglyph site on Fajada Butte and in the wall alignments and inter-building relationships of numerous Chaco Great Houses. Other research documented the relationship of the Chacoan Great House of Chimney Rock, Colorado, to the major lunar standstill. Our findings of the inter-shrine-site alignments to the major standstill moon provide significant evidence for a hitherto undocumented small scale of lunar astronomical expression of the Chaco culture, in parallel with its large scale architectural alignments. For more information, visit: geodesy.noaa.gov (NOAA's National Geodetic Survey) and www.solsticeproject.org (Solstice Project).

Background Archaeoastronomical Research in Chaco Region

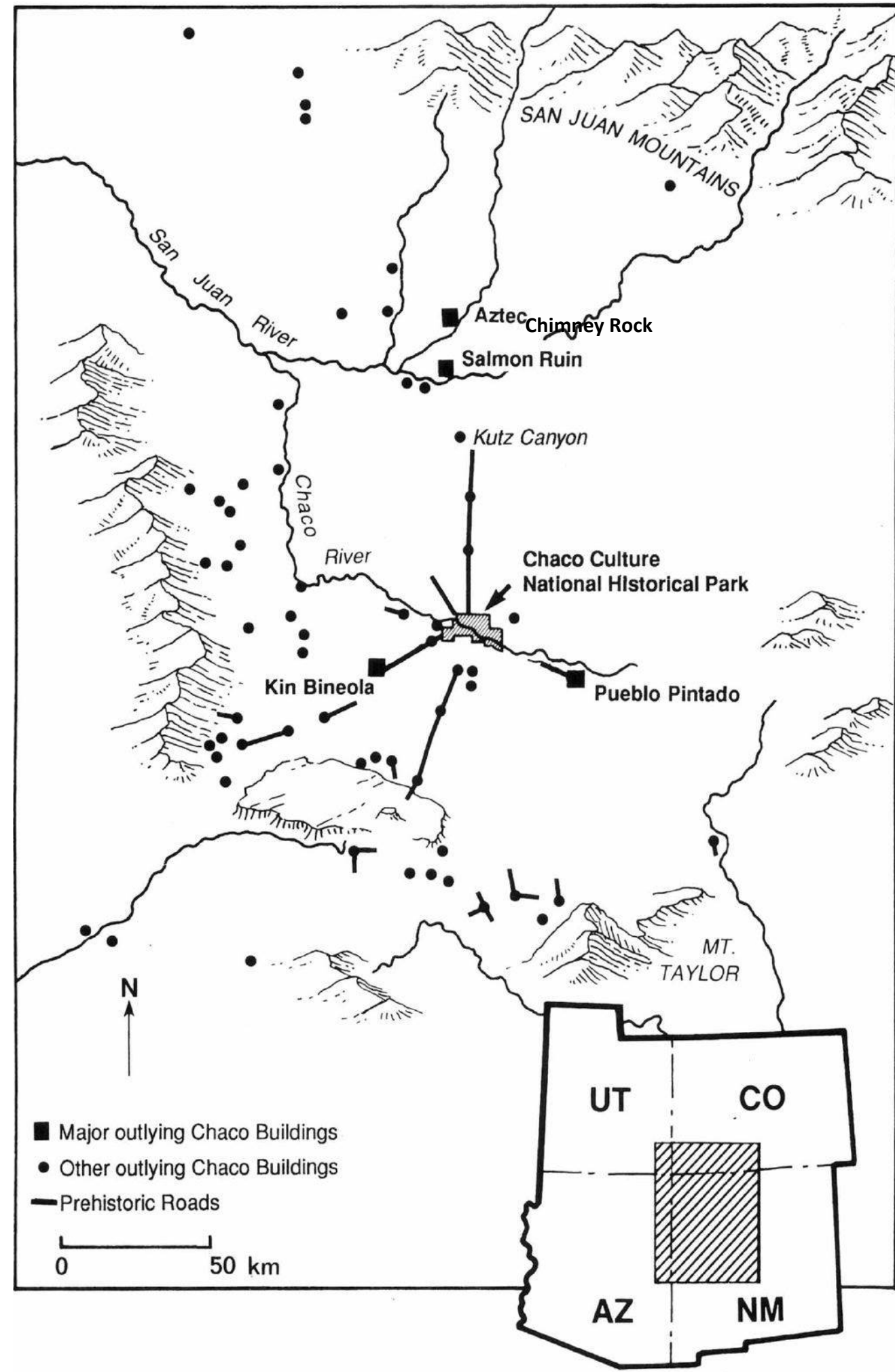


Fig. 1. Overview map of Chaco Canyon region showing the general physiographic setting and select prehistoric buildings and roads. © Solstice Project

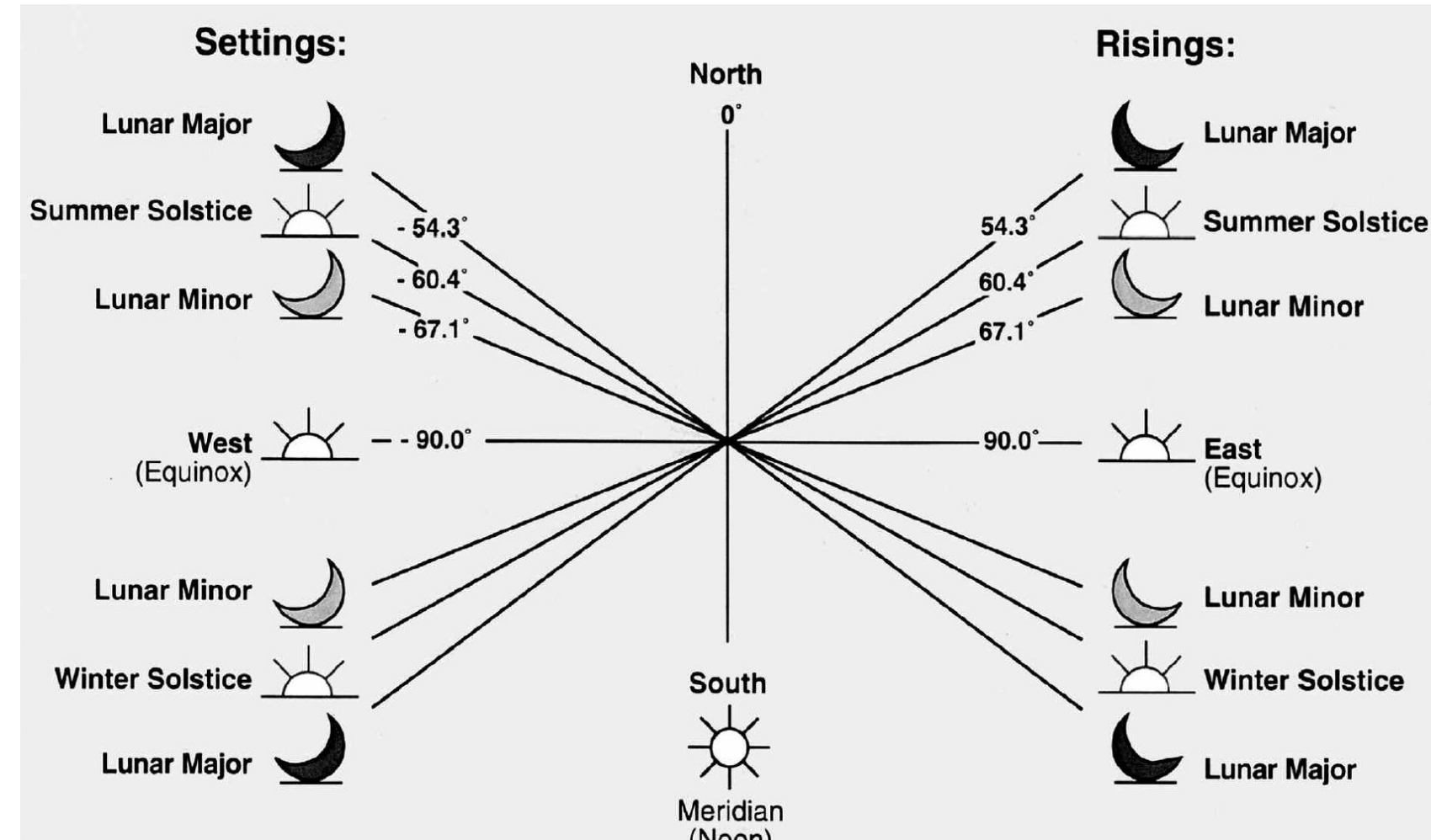


Fig. 2. Seasonal solar and lunar standstill rise/set geometries/azimuths at Chaco Canyon, New Mexico. © Solstice Project



Fig. 3. Sun Dagger site on Fajada Butte by moonlight. Photo by William Stone
Inset: Sun Dagger at summer solstice.
Photo by Karl Kernberger
© Solstice Project



Fig. 4. SE aerial view of Chaco Canyon and shrine-site mesa-tops at right, Great House Pueblo Alto in foreground and Fajada Butte in far background. Photo © Adriel Heisey

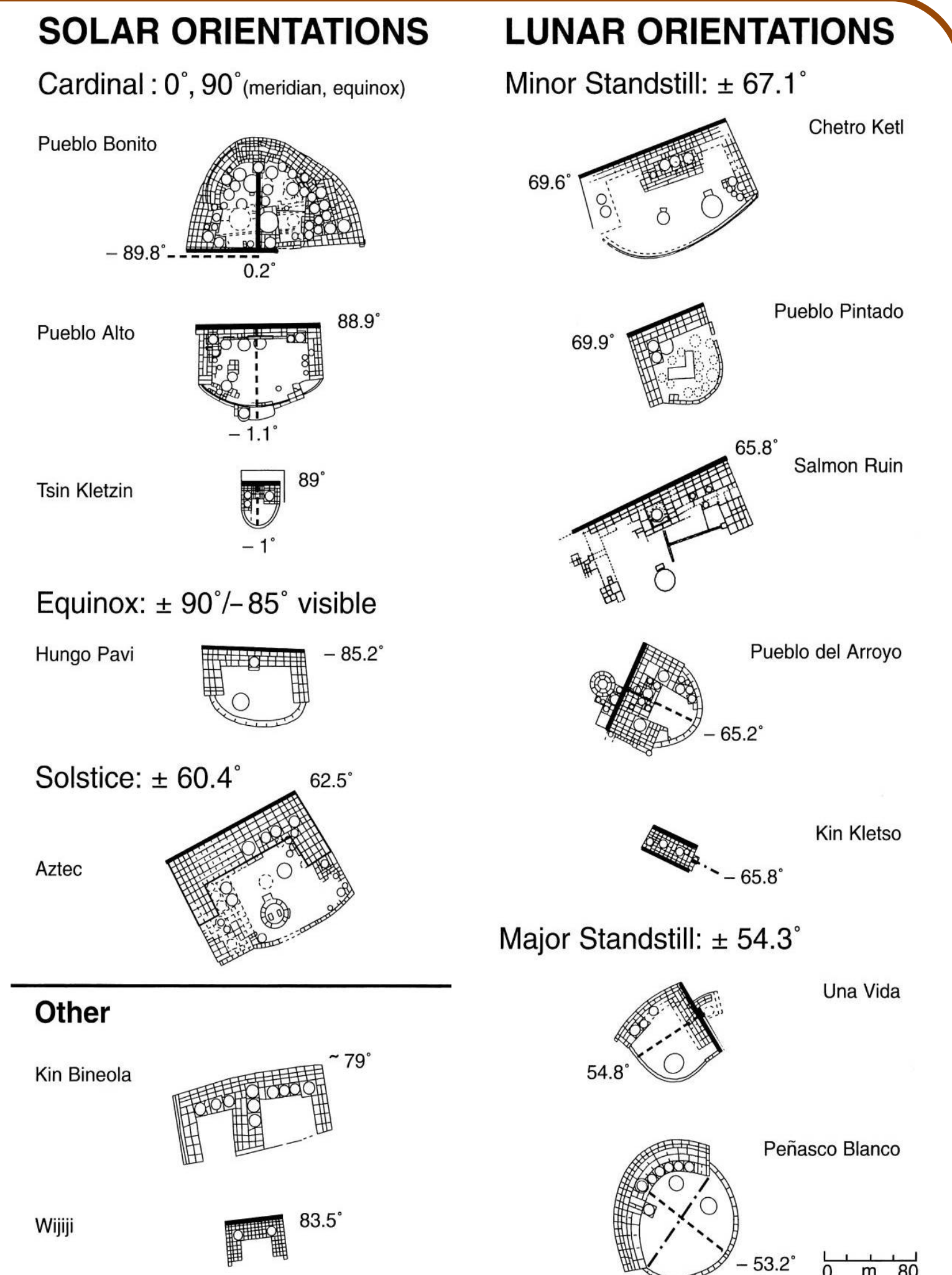


Fig. 5. Previous investigation by the Solstice Project documented solar and lunar orientations in numerous Great Houses of the Chaco Canyon region. © Solstice Project



Fig. 6. Shrine-site 1088 and NW view of setting northern major standstill full moon over Chaco River, January 2007.

Fig. 7. Aerial view of certain of 12 cliff-edge cairns at shrine-site 1088 and rising northern major standstill moon.

Fig. 8. Chacoan Great House Penasco Blanco seen across its 140 m width and on its perpendicular alignment to the setting full moon at northern major standstill, January 2007. See Fig. 5.
Figs. 6-8: Photo © Adriel Heisey

Possible Alignments to the Lunar Major Standstill in Chaco Canyon (Rising: 54.3°, Setting -54.3°)

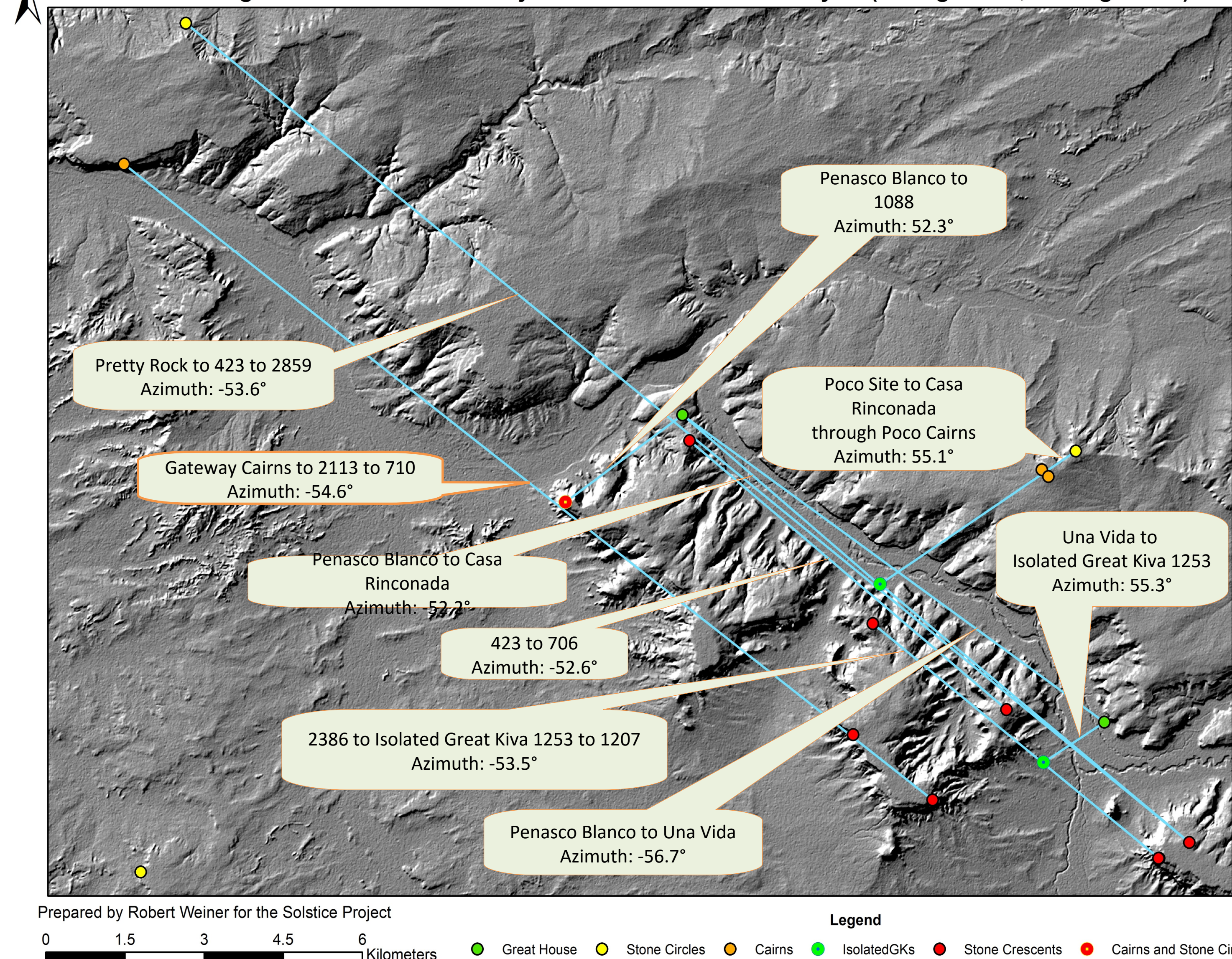


Fig. 9. GIS terrain map of Chaco Canyon depicting shrine-sites positioned with survey-grade GPS. Also shown are lunar major-oriented Great Houses Penasco Blanco and Una Vida and two isolated Great Kivas, which are associated with the inter-shrine alignments. The inter-site lines, which span 5 to 15 km, are labeled with the names of sites (ordered north to south; numbering 2 or occasionally 3) and the azimuth. Note that the shrine-sites are all the known such sites on elevated surfaces of the three mesas that form the south side of Chaco Canyon. See photos for examples of shrine-sites, Great Houses and Great Kivas.

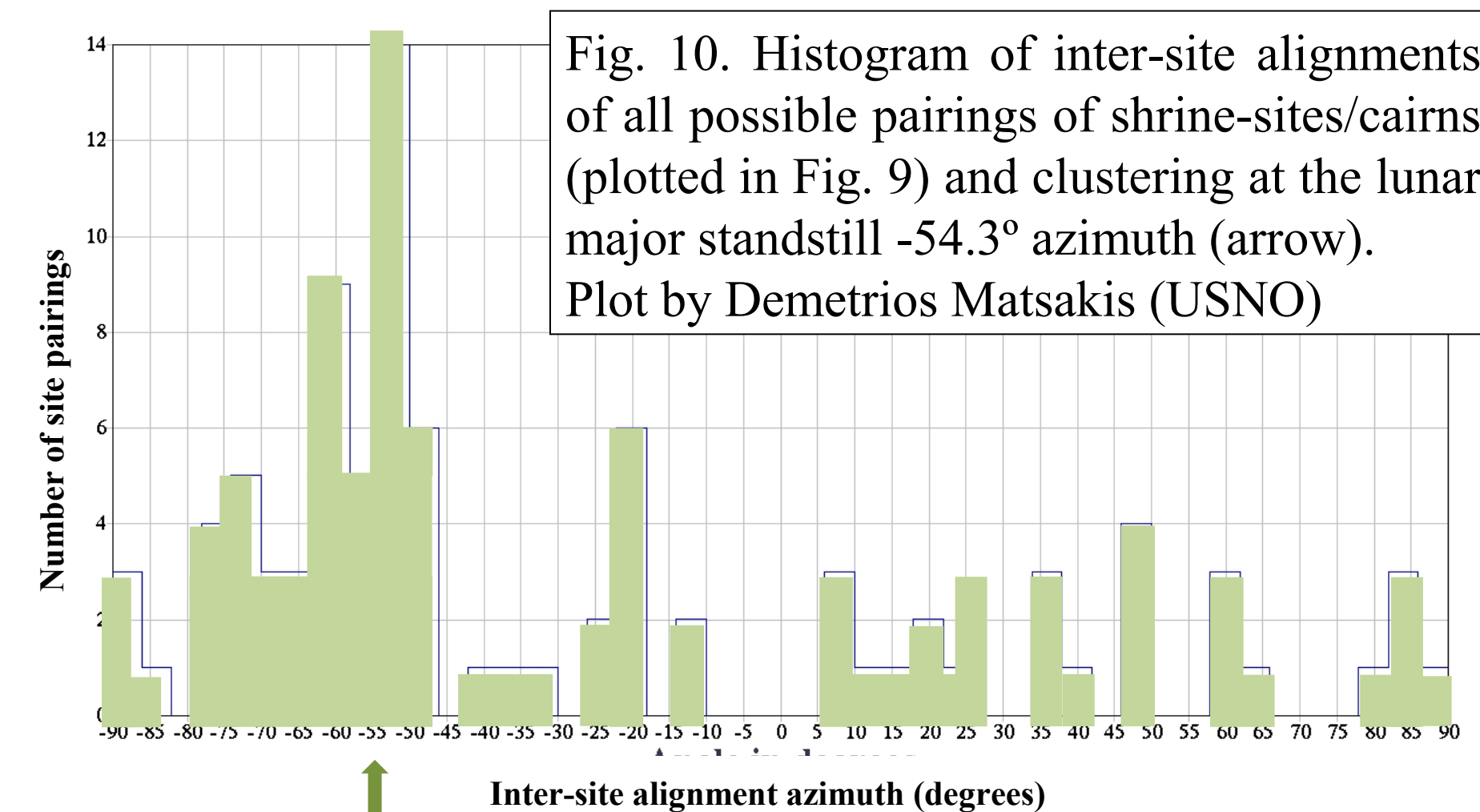


Fig. 10. Histogram of inter-site alignments of all possible pairings of shrine-sites/cairns (plotted in Fig. 9) and clustering at the lunar major standstill -54.3° azimuth (arrow). Plot by Demetrios Matsakis (USNO)



Fig. 11. One of 12 cairns at shrine-site 1088 on cliff edge of West Mesa with view to W. Photo © Anna Sofaer

Fig. 12. Crescentic shrine-site 710, and view to W. Photo by William Stone

Fig. 13. Casa Rinconada, an isolated Great Kiva, located in central Chaco Canyon. Note its position on two major lunar inter-site alignments. It is of interest that its niches of ritual offerings number 28. Photo © Anna Sofaer

Considering Intentionality and Significance: We note that key numbers appear to underscore the lunar association of the inter-shrine-site alignments: at two shrine-sites there are 12 and 13 cairns, corresponding with the lunar months (12.3) in the solar year; and in Casa Rinconada there are 28 niches for ritual offerings, corresponding with the days of the lunar month. The clear parallels of the lunar major standstill inter-site alignments with the Great House building alignments further support the likelihood of the intentionality of these alignments as lunar commemorations. It is of interest that these alignments also parallel the land formation of Chaco Canyon itself, revealing the canyon's approximate alignment to the major standstill moon. The ancient culture may have chosen Chaco Canyon to commemorate extensively the lunar standstill cycle because of this distinctive correspondence of its land formation with the moon's cycle.