Investigating Serrated Points of Colorado

By: Neil Hauser, Coal Creek Research, Inc

Question: How does the frequency of serration of corner notched points vary between arrows and darts in different regions of Colorado?

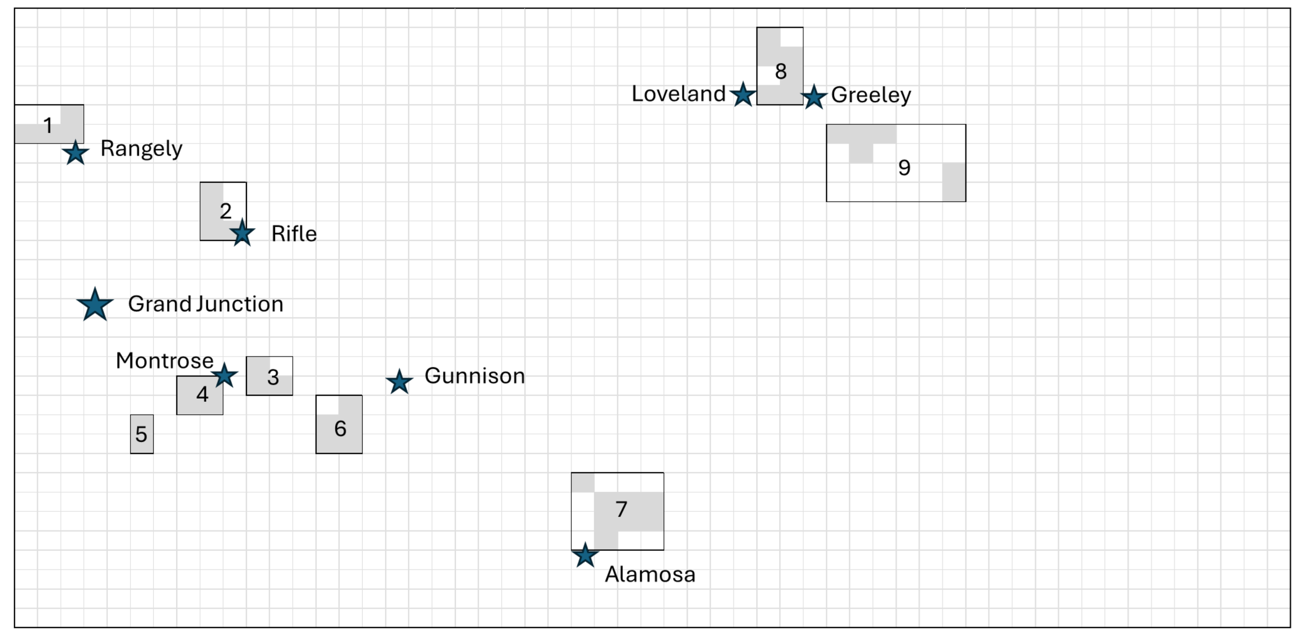

Fig. 1: Colorado Regions Used in Analysis

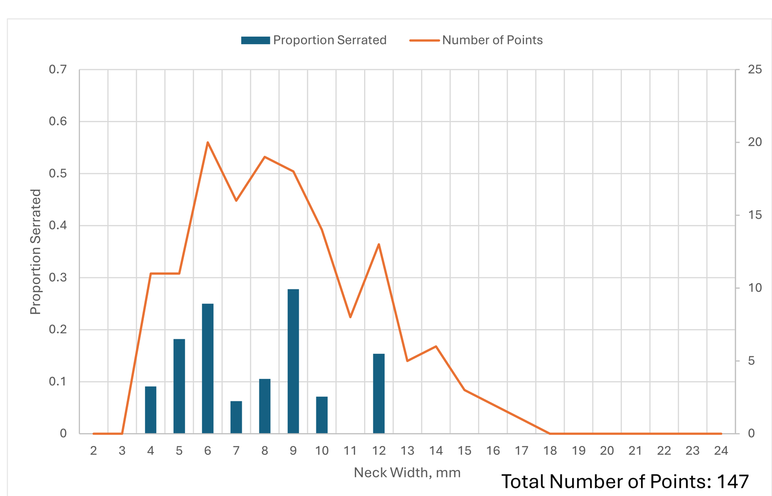

Fig. 2: Region 1

Dry Arid, 5000-6500 ft.

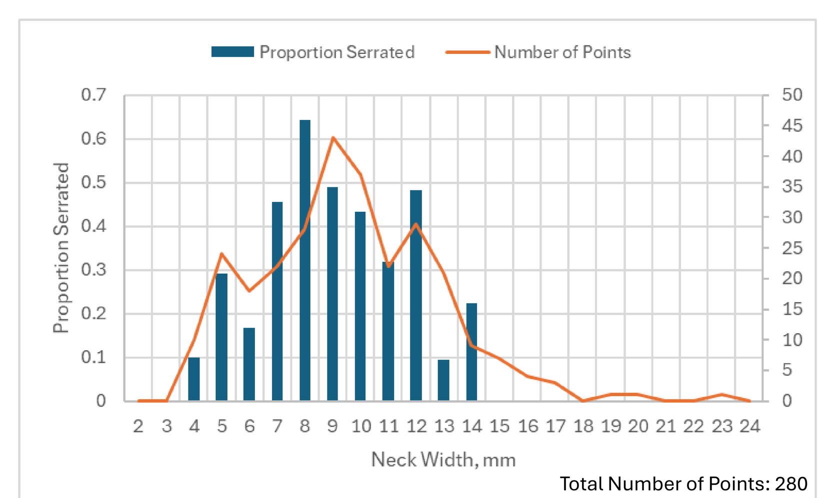

Fig. 5: Region 4

Foothills, 5500-6500 ft.

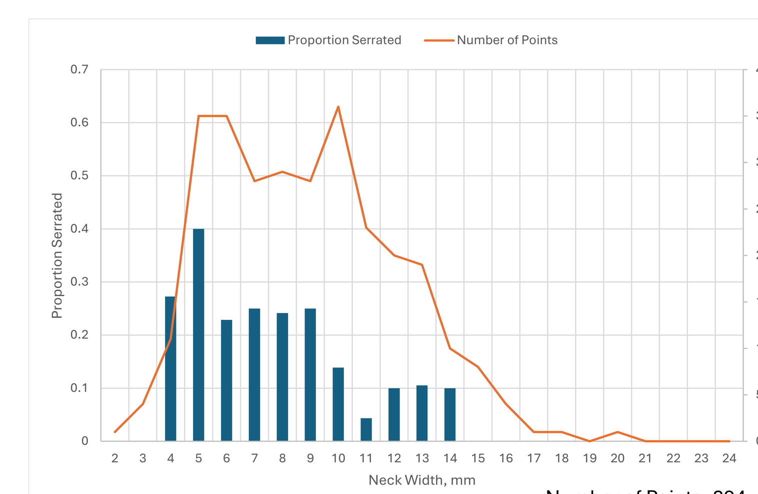

Fig. 8: Region 7

High Altitude Valley, 7000-8000 ft.

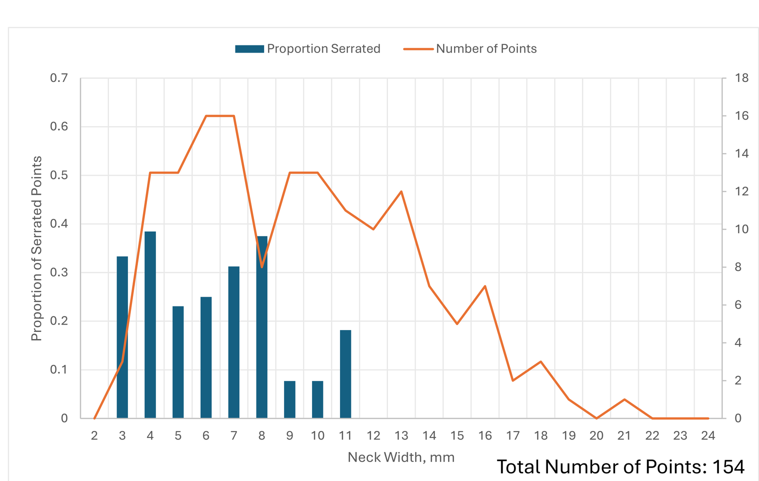

Fig. 3: Region 2

Dry Arid, 5500-6500 ft.

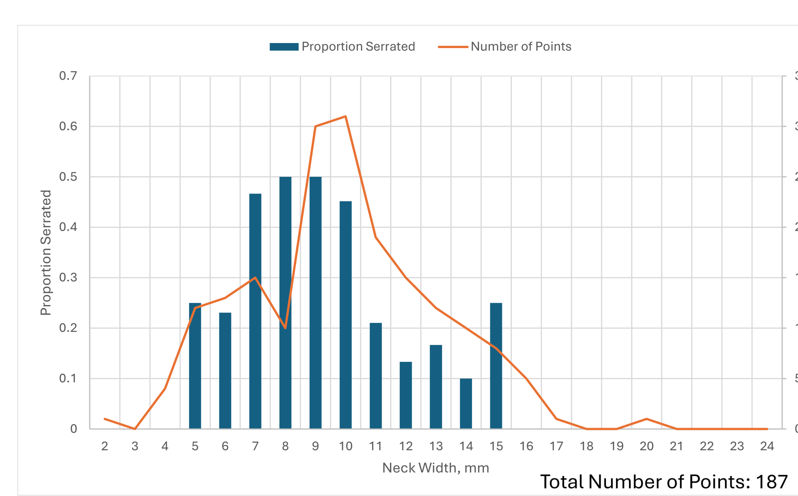

Fig. 6: Region 5

High plateau, 7500-10000 ft.

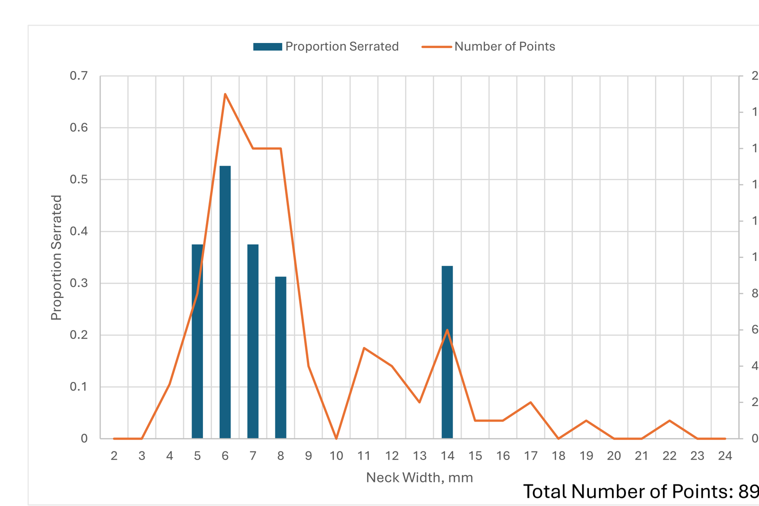

Fig. 9: Region 8

Piedmont, high plains 4000-5000 ft.

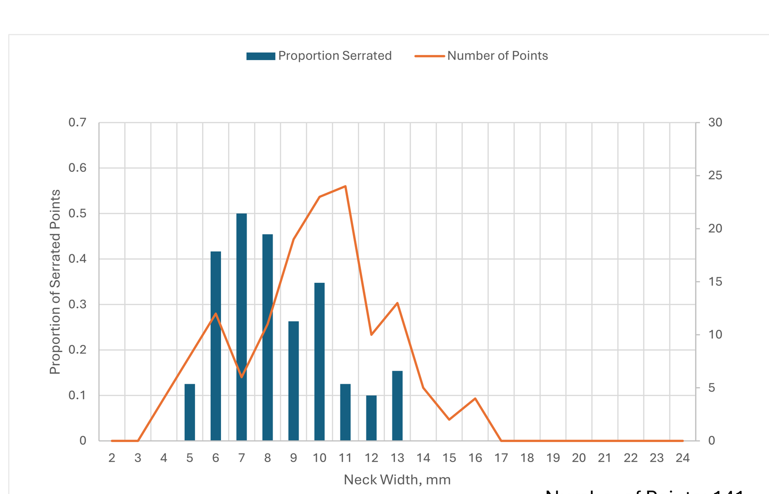

Fig. 4: Region 3

Moist mesa lands, 6000-7000 ft

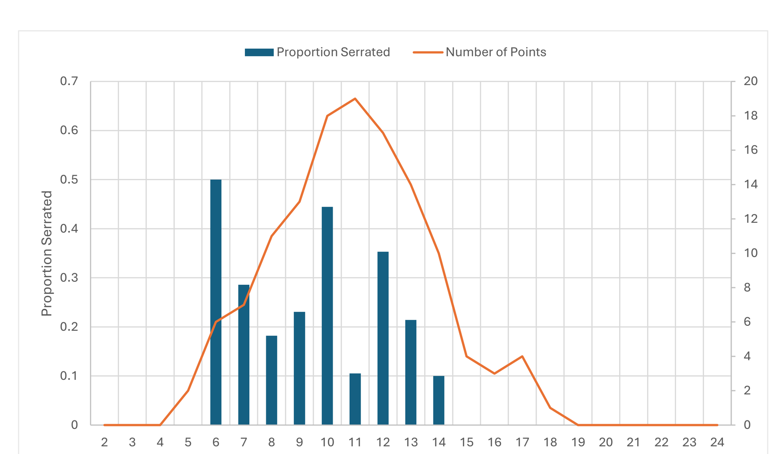

Fig. 7: Region 6

Mountains, 7000-8500 ft

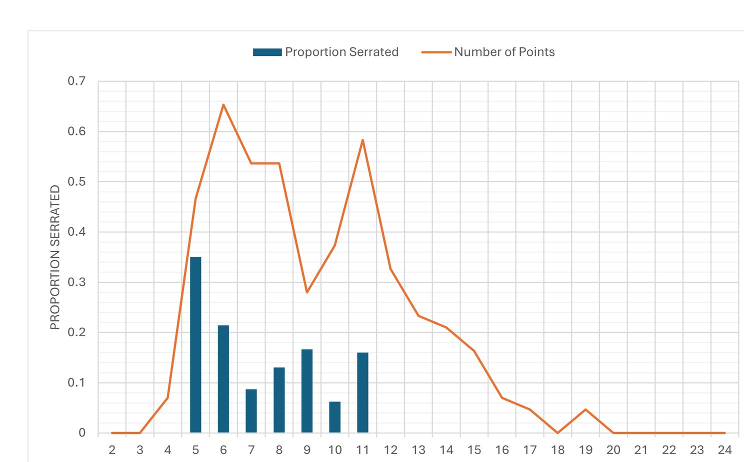

Fig 10: Region 9

Piedmont, high plains, 4000-5000 ft.

Methodology: The images and ancillary data, i.e., presence of serration and provenience, of corner notched points available from the Colorado Projectile Point Database (p3.coalcreekresearch.org) were used to investigate the question. Only points from surface collections were used. Neck width and maximum thickness have been used to separate arrows from darts (Hildebrandt and King, 2012). In this analysis only neck width was used since maximum thickness was not available for all the projectile points. The neck width was obtained by using tpsdig2.0 (Rohlf, 2010) on the images of each point.

Nine areas in Colorado (Fig. 1) were selected primarily based on the number of corner notched points available and secondarily to allow comparisons between different and similar climates.

The number of points within single millimeter bins (e.g. 5mm-5.99mm) of neck width were plotted for each region. The percentage of those points within each bin that were serrated were overlayed. These plots (Fig 2-10) provided the basis for comparison.

Discussion: Corner notched points were chosen in this analysis because they are the most common shape of point in Colorado. They comprise approximately 30% of the nearly 13,000 (as of 2.15.2025) points contained in the Colorado Projectile Point Database. Corner notched points have been part of the archaeological assemblage for at least the last 5000 years. Therefore, the range of neck widths in this analysis likely includes points that occurred over that period. While it is tempting to think of the neck width as a surrogate for time, that is true only in the very general case of small neck width arrows being younger than large neck width dart and spear points. Neck widths less than 8-9 mm are considered arrows, i.e., younger, and those with larger neck widths, darts (Blair and Windslow, 2006; Buck and Dubarton, 1994).

Serrated projectile points exist worldwide (Smallwood, et. al., 2018) but the reason for serration remains an open question. It has been posited that serration was primarily cultural (Loendorf et. al., 2015). It has also been posited that serration improved penetration and tissue damage, i.e., improved the probability of kill, as well as made the point easier to remove (Ferdianto, et. al., 2022). Serration as an idiosyncratic expression is also a posit.

From a functional perspective, if serration was used to procure a particular game or in a particular activity then the percentage of serrated points might reflect the level of dependence on that game or prevalence of activity. If, for instance, the use of a particular game was constant over time, therefore for all neck widths, then the percentage of serration would be expected to remain constant. Conversely, if the dependence on that game changed, then the expectation would be that the percentage of serration would also change accordingly.

From a cultural perspective, if a group of people indigenous to an area began using serration more than expected, the percentage of serration would increase while the number of points remain constant (assuming a constant creation of points per person or group). However, if a migrant group that used a higher percentage of serrated points came into an area then it would likely increase both the percentage of serration as well as the total number of points.

From an idiosyncratic perspective, in small populations use of serrated points by an individual or nuclear family would likely manifest itself as a nearly constant percentage and would likely decrease with increasing population or increasing number of points. In this analysis, all the comparisons between the percentage of serrated points and the total number of points per neck width bin indicated that in most regions the percentage of points that are serrated increased as the number of points in a bin increased. Also, the highest percentages of serration occurs for neck widths typically considered to be arrows. In some regions the percentage for some neck widths of 10 mm or less exceeds 50% of the total projectile point assemblage.

Conclusion: The analysis presented here indicates that generally serration increased during the use of arrows and doesn't occur for points with neck widths of 15 mm and greater. Generally, the percentage of serrated points also increased as the number of points increased. This is an interesting relationship that should be further investigated. Such relationships can add constraints that reduce the number of likely hypothesis for the purpose of serration and can facilitate the ability to test those hypotheses.

Future Work: Obtain more projectile points over more regions. This would improve confidence in the observed trends as well as facilitate adding more regions. More projectile points in each region would allow the bins to be further divided by style of corner notched points thus adding some temporal information.