

Research Questions

1. Is the Elko long-chronology hypothesis supported in the northern Great Basin?
2. Are we able to classify the pre-Mazama corner-notched projectile points from each of these three sites in the northern Great Basin?
3. Are these early corner-notched points morphologically distinguishable from late Holocene corner-notched points?

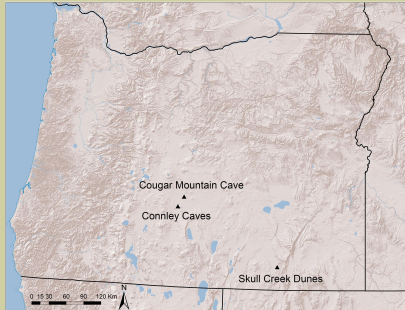


Figure 1. Map of sites used in the northern Great Basin

Site Backgrounds

Connley Caves

- Located in the Fort Rock Basin of central Oregon
- Evidence of intermittent human occupation over the past 12,700 years¹
- Expediently excavated by Stephen Bedwell in the 1960s
- The University of Oregon field school returned to the caves to conduct further excavations of the site (2000, 2001, 2014-2019)
- All projectile points measured for this project are from Cave 5

Skull Creek Dunes Locality

- Located in the Catlow Valley of Harney County, Oregon²
- Excavated by the Steens Mountain Prehistory Project in 1979
- Active sand dune with evidence of human occupation spanning over 7,000 years²
- Corner-notched points found in and below Mazama ash layer (~7600 cal BP)

Cougar Mountain Cave

- Located in the Fort Rock Basin of central Oregon 20 km north of the Connley Caves³
- Unsystematically excavated by amateur, John Cowles in 1958
- Human occupations of the site from the Terminal Pleistocene into the late Holocene³

Methods

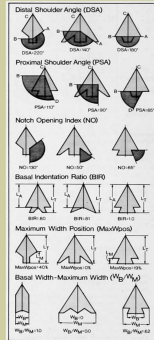


Figure 2. Projectile point attributes taken from Thomas (1981)⁴

• We took metrics of both the pre-Mazama and post-Mazama corner-notched from the three study sites.

• The next step was to use multiple Great Basin projectile point typological schemes to classify each point. This includes the Monitor Valley Key (Thomas 1981)⁴, Basgall and Hall (2000)⁵, and Vaughn and Warren (1987)⁶.

• To confirm the antiquity of some of the pre-Mazama corner-notched points found at the Connley Caves, we obtained three radiocarbon dates on charcoal from an associated hearth feature.

Table 1. Metric classifications for the Thomas (1981, top), Basgall and Hall (2000, middle) and Vaughn and Warren (1987, bottom).

Point Type	Metric Criteria
Large Side-notched	PSA >130° and weight >1.5 g
Elko Corner-notched	110° < PSA < 150°, basal width >10 mm, and BIR >0.93
Elko Eared	110° < PSA < 150°, basal width >10 mm, and BIR >0.93
Gatecliff Contracting Stem	PSA ≤ 100° or NO < 60°, BIR > 0.97, and weight > 1 g
Gatecliff Split Stem	PSA ≤ 100° or NO < 60°, BIR > 0.97, and weight > 1 g
Point Type	Metric Criteria
Pinto Series	PSA ≤ 100° or NO > 80°, and basal width > 10 mm
Elko Series	110° < PSA < 150° or NO < 80°, and basal width > 10 mm
Point Type	Metric Criteria
Pinto Series	MTH ≥ 6.4 mm
Elko/Gatecliff Series	MTH < 6.4 mm

Chronology

Four corner-notched points in direct association with hearth feature 15AHF/1 are dated to ~8,500 cal BP. The Cougar Mountain Caves points are similar in age to those found in pre-Mazama deposits at the Connley Caves based on estimates using Layton's (1972) obsidian hydration measurements and our own from Connley Caves.⁷ Corner-notched points come from above Mazama tephra and below Mazama tephra at Skull Creek Dunes. The former are <7600 cal BP and the latter >7600 cal BP.

Table 2. Radiocarbon ages from Connley Cave 5, hearth feature 15AHF/1.

Elev. (masl)	¹⁴ C Date	2 σ range ¹	Lab #	Feature & Material
1356.42	7770±45	8630-8335	D-AMS24522	15AHF/1 hearth charcoal (<i>Artemisia</i>)
1356.42	7635±30	8407-8447	PSUAMS7101	15AHF/1 hearth charcoal (<i>Artemisia</i>)
1356.38	7685±30	8437-8517	PSUAMS7102	15AHF/1 hearth charcoal (<i>Artemisia</i>)

¹Dates calibrated using OxCal v4.2 (Bronk Ramsey, 2009) using IntCal13 curve (Reimer et al. 2013)⁸

Classification Results

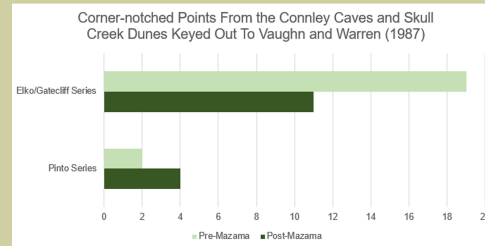
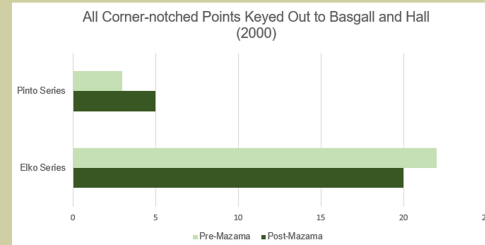
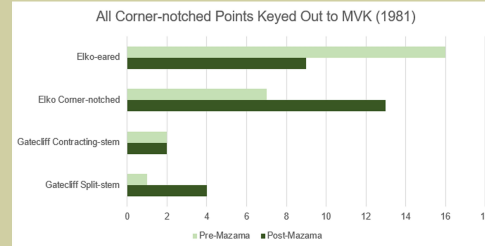


Figure 3. Corner-notched points from the Connley Caves, Skull Creek Dunes, and Cougar Mountain classified using the three keys. The Cougar Mountain points were not able to be keyed out using Vaughn and Warren because we were not able to measure thickness of the points.

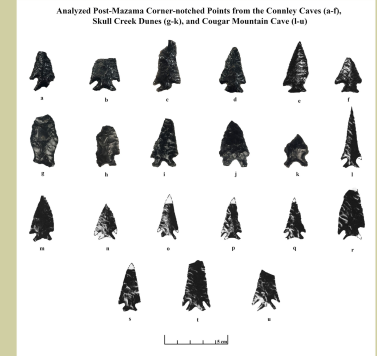
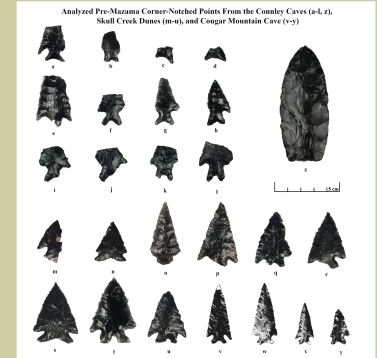
• The majority of pre-Mazama points keyed out to Elko Eared and Elko Series

• 21 out of the 26 pre-Mazama corner-notched points were consistently classified as Elko Series using all three keys. 3 points keyed out to multiple typologies, making them inconclusive.

• 2 of the pre-Mazama corner-notched points conclusively keyed out to Pinto

Morphological Results

We found that there are three notable morphological differences between Pre- and Post-Mazama corner-notched points: Distal Shoulder Angle, Length-to-Width Ratio, and Basal Width Maximum. In general, the average measurements for pre- and post-Mazama corner-notched points are similar.



Conclusions

- Pre-Mazama corner-notched points from the northern Great Basin key out as Elko Series based on established keys.
- Pre- and post-Mazama corner-notched points are morphologically similar, though there are some metric differences.
- Based on the radiocarbon dates, we know that corner-notched points date to ~8400 years old in the northern Great Basin, which supports a long-chronology.
- The application of new methods and the re-examination of typological schemes in the northern Great Basin may be necessary to truly determine the typology of these points.

Acknowledgments

We would like to thank the Museum of Natural and Cultural History for permitting access to their collections. We would also like to acknowledge the Undergraduate Research Opportunity Program and the Office of the Vice President for Research and Innovation for their financial assistance. Thank you to the Klamath and Paiute tribes whose traditional lands these sites reside on.

References

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