

# Exploration of Obsidian Projectile Point Distribution in Relationship to Distance from Quarry

## Introduction

- **Question:** How were people likely to evaluate the transportation cost trade-offs between traveling to an obsidian quarry or using local materials, such as chert for projectile points?
- Theory predicts that individuals will be more likely to pay the costs of obtaining obsidian when the source is within their daily foraging range.<sup>1</sup>
- Obsidian is a preferred material for projectile points because it is easier to flake and can produce sharper tools. However, it also tends to be more fragile.<sup>2</sup>
- Individuals often flaked obsidian into preforms at a quarry site, removing the less desirable parts of an obsidian core for transport.<sup>3</sup>
- **Objective:** Here I evaluate these tradeoffs focused on the Wild Horse Canyon obsidian quarry in modern-day Beaver County, Utah.
- **Prediction:** Even with the high value of obsidian, the proportion of obsidian projectile will begin to decrease as distance from the quarry increases.

## Methods

- Data was collected from the Intermountain Antiquities Computer System (IMACS) forms. The sample includes 44 archaeological sites with projectile points, located in Beaver County, Utah.
- Information collected includes site location, number of obsidian and non-obsidian projectile points.
- Data was analyzed using a weighted generalized linear model (GLM) to determine the likelihood an obsidian projectile point will be present at any given distance from the Wild Horse Canyon quarry.

## As Distance from Wild Horse Canyon Increases, Obsidian Projectile Point Proportions Decrease



(1a) Obsidian Projectile Point



(1b) Chert Projectile Point

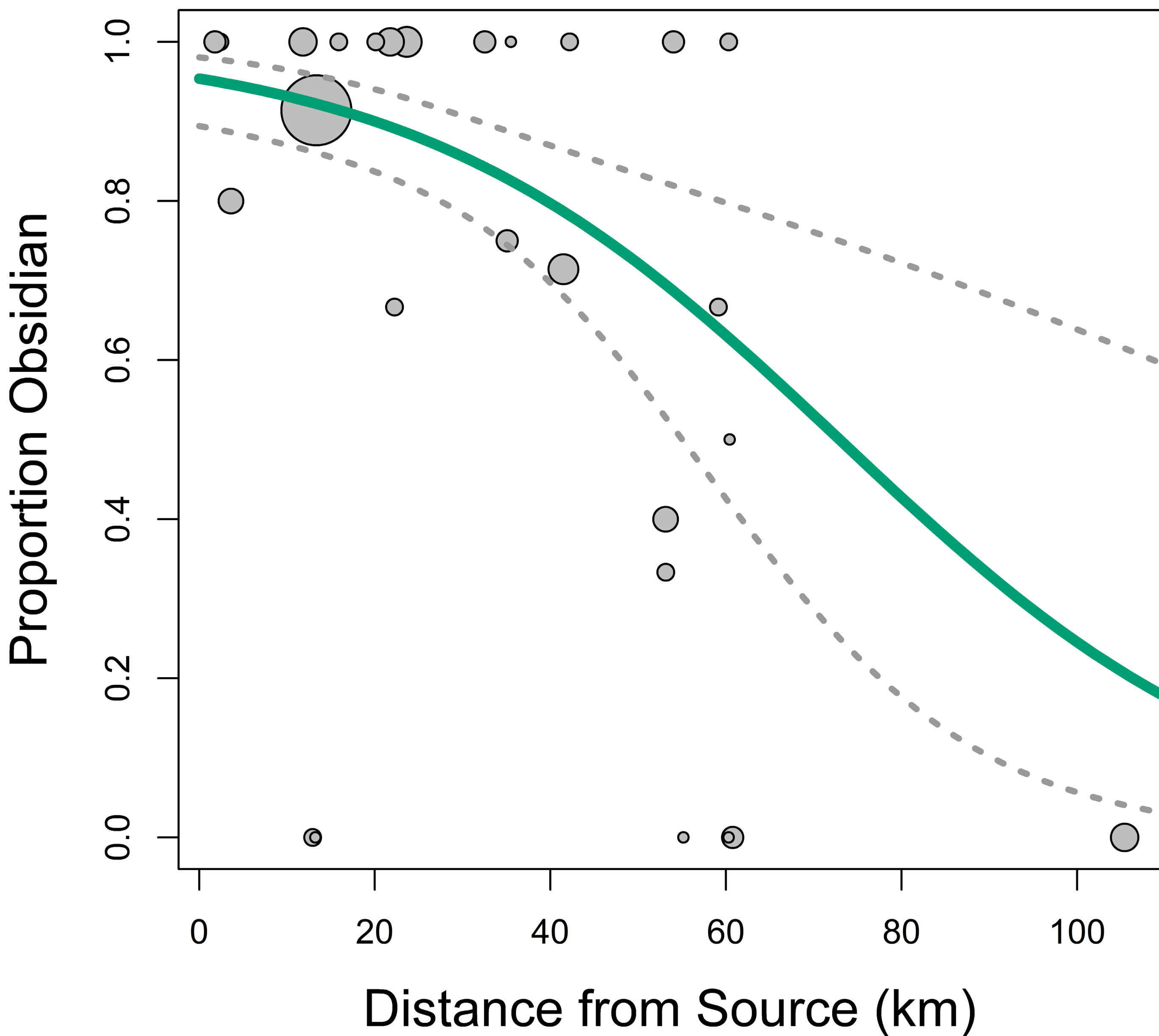


Figure 1. This figure shows an inverse relationship between the proportion of obsidian projectile points found at sites in Beaver County, Utah in relation to site distance from the obsidian quarry at Wild Horse Canyon in the Mineral Mountain range. Circle size represents the number of projectile points from each site in the sample. (1a) Obsidian Projectile Point w/ Sinew Hafting from Hogup Cave, Utah. Photo Credit: Erik Martin. (1b) Chert Projectile Point from northern Utah. Photo Credit: Jason Fisher / Northwestern Band of the Shoshone Nation Collection.

## Research Area

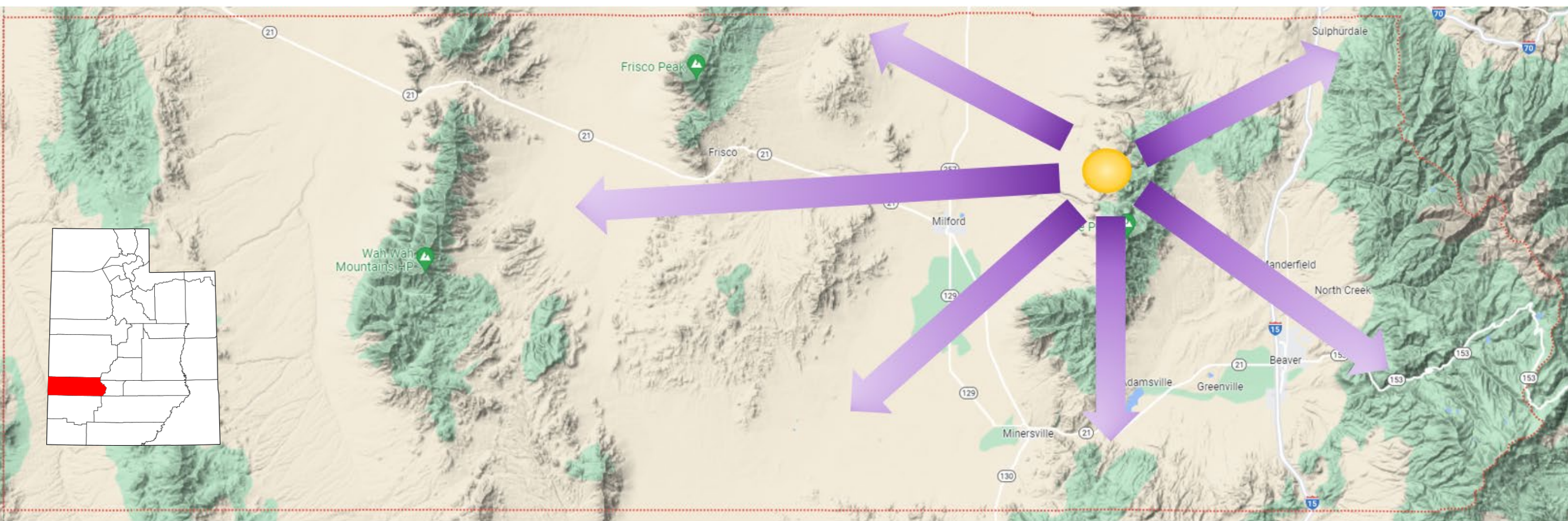


Figure 2. Map of Beaver County, Utah and the relative location of the Wild Horse Canyon obsidian quarry in the Mineral Mountains east of Milford, Utah.

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## Discussion & Conclusion

- The proportion of obsidian projectile points declines with distance from the quarry site.
- Obsidian is highly valued for crafting projectile points, however, tradeoffs often are made to favor local materials as people move away from quarry sites.
- X-ray fluorescence (XRF) testing can be used for further examination to determine if obsidian sources other than Wild Horse Canyon are contributing, exploring possible obsidian trade networks.

### References Cited:

- <sup>1</sup>James, L. B., Joyce, K., Magargal, K. E., & Coddling, B. F. (2022). A stone in the hand is worth how many in the bush? Applying the marginal value theorem to understand optimal toolstone transportation, processing, and discard decisions. *Journal of Archaeological Science*, 137, 105518.
- <sup>2</sup>Smith, G. M. (2015). Modeling the influences of raw material availability and functional efficiency on obsidian projectile point curation: A Great Basin example. *Journal of Archaeological Science: Reports*, 3, 112-121.
- <sup>3</sup>Intermountain Antiquities Computer Systems (IMACS) form for site 42BE52