3. Methods

Our “visibility” estimate was developed using the viewshed analysis function in ArcGIS 9.2 in conjunction with 2 m resolution DEMs. Viewshed analysis identifies which cells of the DEM are visible from the cell in which the granary is located in the following way: I defined the valley floor as a 100 m wide strip centered on Range Creek (see image in section 4). For each storage site, I calculated the maximum linear overlap between the viewshed and this 100 m corridor. I assumed that if the cells identified in the viewshed could be seen from the granary, then someone standing in the viewshed could look back and see the cell on which the granary was located.

Viewsheds were calculated for 54 granaries located in the main canyon. All of the granary locations had viewsheds that overlapped the corridor; 48 granary locations are visible from other prehistoric sites. Viewsheds varied in size from 120 meters to over 4000 meters with a mean distance of 1040 meters (see graph at right).

This preliminary study demonstrates that Fremont granaries in the main canyon were not purposely hidden from view. To the contrary, granary locations likely allowed their owners to easily identify potential thieves approaching or attempting to access stored food. In addition, thieves were effectively defenseless from projectile weapons while attempting to reach these granaries set on cliff faces and in other difficult to reach but visible locations.

4. Preliminary results

4.1 Setting and background

Range Creek Canyon is located in central Utah. The University of Utah has been conducting surveys in the Canyon since 2002 and has recorded over 300 prehistoric archaeological sites. Ten of the twelve dated archaeological samples from Range Creek Canyon have statistically identical calibrated intercept dates, about 1050 C.E., suggesting an intense Fremont occupation at that time.

5. Refining the scale of “visibility”

This summer, climbers will reach at least 30 granaries. Using radios and a ground crew, visibility of the valley floor from the granaries will be directly determined and plotted using GPS receivers. These actual viewsheds will be compared to calculated viewsheds based on the 2 m DEMs, and any systematic discrepancies identified and accounted for. Once we have confidence in our quantitative scale of “visibility,” we can begin to develop another for “accessibility.”

Acknowledgements I would like to thank Duncan Metcalfe, Joan Cottrain, James O’Connell, Joel Boomgarden, and Rachelle Green for helpful comments and suggestions. Thanks to all the students, staff and volunteers working in Range Creek Canyon.