

TITLE SLIDE: This is the first of two papers which will deal with the depopulation of Cedar Mesa in the thirteenth century and its temporal relationship to the depopulation of regions to the east such as Mesa Verde. This paper focuses on refining site chronology using a seriation based on Michelle Hegmon's 1992 design-element study.

SLIDE 2 MAP: Cedar Mesa is located ~150 km west of the Central Mesa Verde area.

SLIDE 3 MAP: Five drainage areas – Upper Grand Gulch, Bullet, North Road, Hardscrabble, and West Johns - and their associated canyons form the sampling universe for the project, which started in late 1960s and continues into the present.

SLIDE 4: Previous conclusions about the depopulation of the northern Southwest have tended initially to treat the entire region as a unit. Glowacki and Lipe both maintained that the process began earlier in the less-densely populated western areas such as Cedar Mesa. In the much more densely populated Central Mesa Verde region there was a shift from mesa-top settlements to canyons and canyon rims, but according to Varien et al, such a shift did not occur in the western areas.

What we attempted to find out through more closely refined seriation of ceramics and comparison of ceramic and tree-ring information is the timing of the construction peaks and abandonment of the western areas, whether depopulation did in fact begin earlier, and whether a shift to canyon settlements from the mesa-tops can be demonstrated, given the lack of tree-ring information from the mesa-tops.

SLIDE5: The problem in refining the site chronology and ascertaining when the area was abandoned is that almost all Redhouse tree-ring dates are from canyon sites and there are few if any absolute dates from mesa top sites to compare with them. Another problem is that the ceramic seriation developed for Cedar Mesa becomes insensitive in the thirteenth century. The classification system does not distinguish between McElmo Black-on-white and Mesa Verde Black-on-white. These two varieties of the Mesa Verde Black-on-white type are lumped together as Mesa Verde Black-on-white. This follows Rohn (1971) but also reflects Lipe's experience on the Glen Canyon Project, which was that "classic" Mesa Verde Black-on-white was rare in the western part of the Mesa Verde area, even in sites dating to the middle and late 1200s. Studies done since the 1970s do show that the distinctions between McElmo and Mesa Verde varieties are useful, but until now were never applied to the Cedar Mesa Collections.

Here we apply multiple lines of evidence: the original ceramic type seriation; a seriation based on Hegmon's design element method for Central Mesa Verde using a sample of rim sherds from mesa top and canyon sites from the Cedar Mesa Project; and then in the next paper, Bill Lipe will compare the tree-ring records from several different localities in southeastern Utah and southwestern Colorado.

SLIDE 6: Ceramic seriation using decorated types and tree-ring dates from Canyon sites with architecture resulted in the following chronology. Focusing on the Pueblo III occupation, the Woodenshoe Phase is characterized by Mancos and then Mesa Verde

ceramics. From 1210/1220-1270 during the Redhouse phase, Mancos vessels are rare and Mesa Verde ceramics dominate the assemblages.

SLIDE 7: The Cedar Mesa ceramic seriation, developed by Matson, uses decorated pottery types and categories recorded during the analysis of Cedar Mesa Project collections using a typology developed by Lipe. Dimension 1 is time, dimension 2 measures how close sites are to each other in terms of the distribution of pottery types in the assemblages. Clay Hills, which is actually later in time than Windgate, appears lower on Dimension 1 because of the influence of Kayenta rather than Mesa Verde types.

SLIDE 8: When site location on a mesa top or canyon is added as a variable for Redhouse Group sites, the median of the Redhouse Group canyon sites plots slightly later than the median of the Redhouse mesa top sites.

SLIDE 9: But the seriation based on types really doesn't help us as the Redhouse sites go to 100 percent Mesa Verde Black-on-white with organic pigment before the mesa is abandoned. The dot outlined in red represents five sites in four canyons, that have relatively small collections in which the decorated sherds are all Mesa Verde Black-on-white with organic pigment and undoubtedly do not all date to exactly the same time. Type seriation becomes insensitive in late Pueblo III on Cedar Mesa.

SLIDE 10: In this diagram showing the total ceramic composition of Redhouse sites, you can see that the only decorated type with any abundance is Mesa Verde Black-on-white with organic pigment.

SLIDE 11: To address the issue of when depopulation started and how it progressed within the Redhouse Phase at Cedar Mesa, I needed to tie the existing ceramic chronology to the existing tree-ring chronology. Michelle Hegmon did just that in the early 1990s when she analyzed design elements and compared the distribution of design elements with the tree-ring dates from sites in the central Mesa Verde area. My objective was to apply Hegmon's design element criteria to a sample of sherds from Woodenshoe sites and Redhouse sites (located both on mesa tops and in canyons) and then see whether the chronology resulting from the design element seriation can provide the missing temporal discrimination among late Redhouse sites.

SLIDE 12: We expected that using Hegmon's design elements in a seriation would probably work at Cedar Mesa because R.G. and Scott Ortman had found that it worked for the Crown Canyon sites, as this 1997 analysis by R. G. shows here.

These are some of the sites that Hegmon used in her analysis of sherds from the Central Mesa Verde area. R.G. inserted measurements he made on Galisteo Black-on-white sherds from Burnt Corn, a Coalition (or Pueblo III) Period site in the Galisteo Basin of New Mexico. Note that if Galisteo Black-on-white was an evolutionary development from Mesa Verde Black-on-white, it would be at the top of the diagram and not at the bottom.

SLIDE 13: The Cedar Mesa ceramic sample for this analysis consisted of 467 rim sherds, each with at least one complete framing line and/or part of a design. The sherds came from 16 Woodenshoe or Redhouse Phase sites each of which had relatively few Cortez Black-on-white or Kayenta sherds and larger numbers of Mancos Black-on-white and generic “Mesa Verde White Ware” sherds. I used sherds with either mineral or organic painted designs.

SLIDE 14: These are the attributes that proved to be time-sensitive for sites in the Central Mesa Verde area. What Hegmon found is that each of these attributes-- Thickness; hatching and solid designs in the same motif; exterior designs on bowls; the presence of a framing line; thick followed by thin framing lines; square rims; and the presence of rim ticks-- increases over time.

SLIDE 15: hatch/solid; exterior designs on bowls; any framing line

SLIDE 16: thick and thin lines; square rims; rim ticks

SLIDE 17: I applied Hegmon’s attributes, with some modifications. I used the same vessel types that Hegmon did, included only those sherds with an exterior design OR a design below the rim (other than a single line) OR at least two parallel framing lines. But whereas Hegmon analyzed design elements on all body sherds and rim sherds from single vessels in the assemblage, I used only rim sherds and any that were from the same vessel were counted as a single case. I measured thickness and assigned sherds to one of 25 design attribute categories. I indicated whether there was an exterior design, whether there was a motif containing both hatching and solid fill, whether there were both thick

and thin framing lines, whether the rim was square, round, or in-between, and whether there were ticks on the rim.

SLIDE 18: We then scaled the Cedar Mesa sites in their relative temporal positions using six of Hegmon's variables, only eliminating rim ticks. R.G. calculated a distance matrix using unstandardized Euclidean distance which weights the individual coded sherds equally. This means that the more common design elements contribute more to the total distance. The matrix was then scaled using Metric Multidimensional Scaling, preserving the Euclidean distances and providing unique solutions. The first two dimensions display 77 percent of the variance of the distance matrix, which is a very good solution.

Remember that Dimension 1 is time and Dimension 2 measures how close sites are to each other in terms of the distribution of pottery types in each assemblage.

The three Woodenshoe sites (the early Pueblo III phase) are shown at the bottom end of the plot. The Redhouse mesa top and canyon sites are intermixed, which indicates they date to the same time period, with Moon House appearing quite a bit later. This agrees with the tree-ring dates for this canyon site. This indicated to us that (in general) Hegmon's design elements produced a valid seriation at Cedar Mesa.

SLIDE 19: We produced this next plot after coding some additional sites, eliminating sites with samples smaller than 15 cases, adding rim ticks back in as a variable, and including some of the Central Mesa Verde sites. The first two dimensions account for 83% of the variance.

What we seem to have are parallel seriations, one for Crow Canyon sites and one for Cedar Mesa sites. The dates shown on the left are approximate dates for the Crow Canyon sites, and if we rotated that scale slightly to the left, it would also agree with the tree-ring dated Cedar Mesa canyon sites, with the mid-point of the Moon House occupation at A.D. 1260-1263 and the Redhouse sites at about A.D. 1245. Some of the latest Canyon Redhouse sites did not meet the 15-sherd criteria and so were dropped from this analysis.

The parallel seriation might be explained in a number of ways. First, there are certain aspects of the way Hegmon coded her database that we don't necessarily understand, so that there are systematic differences in the way the Cedar Mesa sherds were coded. Second, the pattern of increasing abundance of each of the seven elements over time is the same in both areas, but absolute abundances at any time can be very different. For instance, rim ticks are much less common on Cedar Mesa even though they do increase over time. What this indicates is that both areas participated in the same evolving design system, but the popularity of any particular design element was variable.

SLIDE 20: This takes us back to the question of the insensitivity of the seriation in the late thirteenth century, and here the distinction between the earlier McElmo and the later Mesa Verde varieties of the Mesa Verde Black-on-white type becomes useful.

For instance, in McElmo, the motifs are simple, the lines are USUALLY of uniform width. McElmo Black-on-white was not present in Lipe's Cedar Mesa ceramic typology. Codes 12 and 13 shown here are complex designs without framing lines; one goes up to

the rim, the other is below the rim. These design elements are generally found on McElmo sherds. But note the band of thin lines, almost like hatching, on the left-hand example.

SLIDE 21: All three of these design elements – Hegmon’s codes 2, 3, and 28 - have thick and thin framing lines and hatching, generally found on Mesa Verde Black-on-white.

SLIDE 22: When Mancos, McElmo and Mesa Verde were tabulated, it showed that the frequency of sherds identified as McElmo is probably higher at Cedar Mesa sites during late Pueblo III than at Central Mesa Verde sites.

Redhouse Canyon sites (including Moon House) show up having a higher frequency of Mesa Verde variety than the Redhouse Mesa top or Woodenshoe sites, which supports the slightly later relative date for Redhouse canyon sites.

This helps to illustrate that comparing seriations across large geographic extent, such as the 150 km between Cedar Mesa and Mesa Verde needs to take into account at least three dimensions:

First, spatial drift of design elements; second, the chronological change in design elements over time in one area, and third, social signaling through ceramic designs, which has been shown to differ depending on population density.

SLIDES 23: Each of three different ceramic analysis methods lead to a similar conclusion – the original Cedar Mesa type seriation, the seriation conducted using

Hegmon's design-element method, and a refinement of Mesa Verde Black-on-white type into earlier McElmo and later Mesa Verde varieties. Hegmon's design elements produced valid seriations during Pueblo III both at Crow Canyon/Central Mesa Verde and Cedar Mesa. The seriations are parallel but temporally offset because of stylistic spatial drift and the effect of population density on social signaling, among other possible factors.

SLIDE 24: In conclusion, while it appears that the abandonment of Cedar Mesa preceded abandonment of the central Mesa Verde region to some extent, Cedar Mesa was not abandoned as a unit around A.D. 1250. The occupation of mesa-top and canyon sites lasted until at least 1260, with the exception of Moon House, which probably lasted until about 1270.

SLIDE 25: We'd like to thank these various organizations for their support in this project.