

Contextual Information at Multiple Analytical Scales: Linking Social Organization and Land Use Models at Bugas-Holding, a Late Prehistoric Winter Camp, within the Greater Yellowstone Ecosystem (GYE), northwestern Wyoming

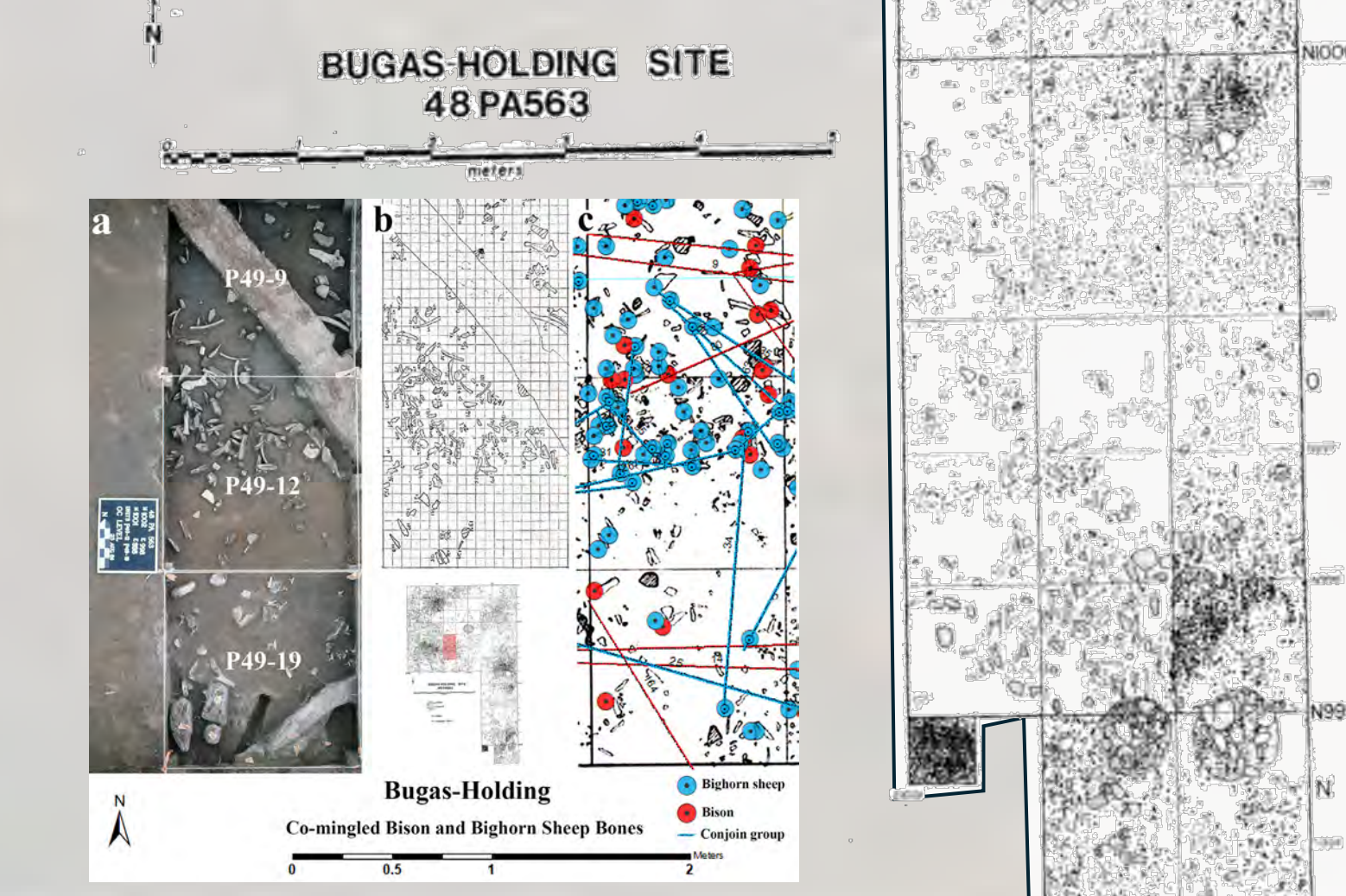
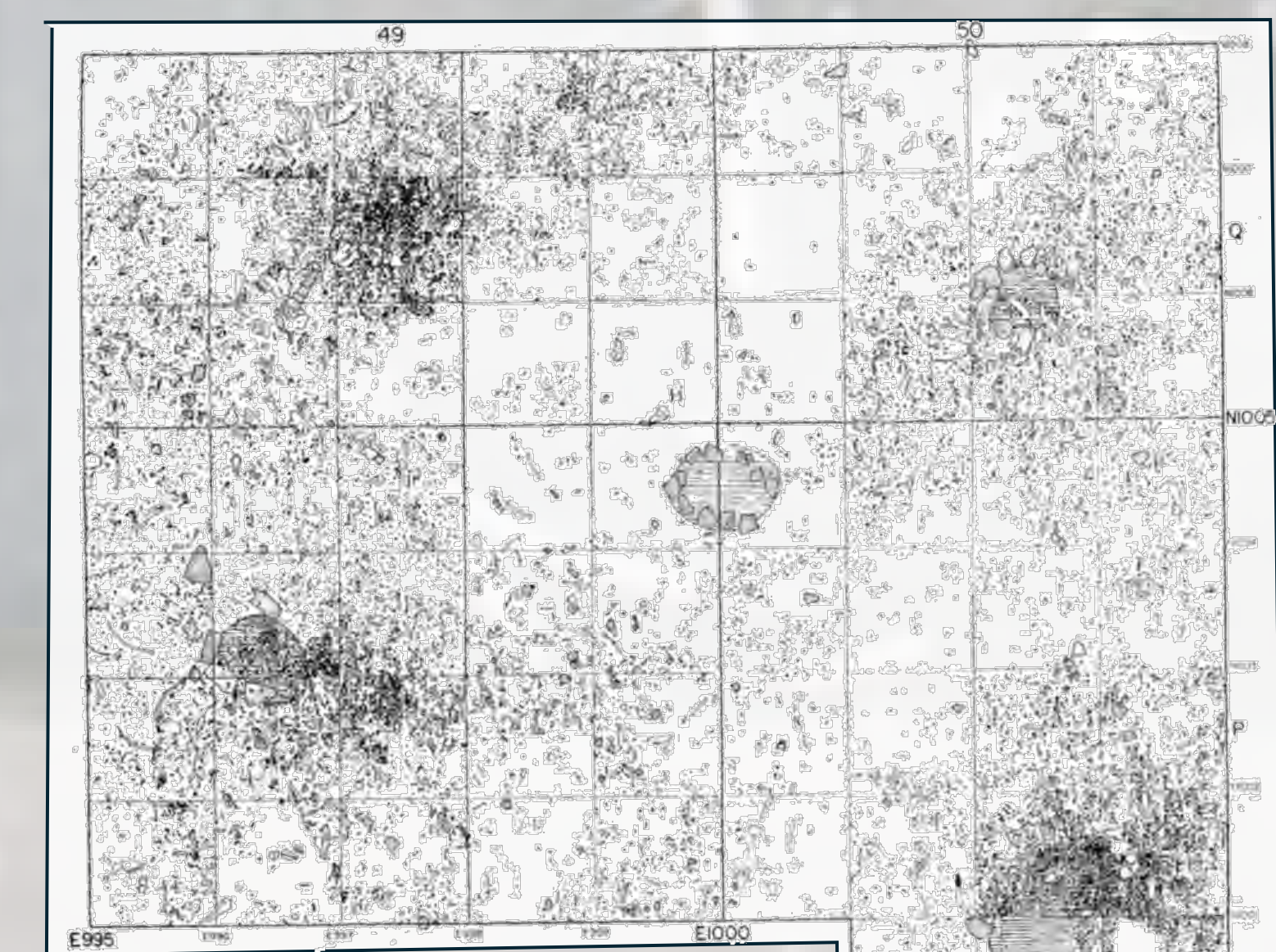
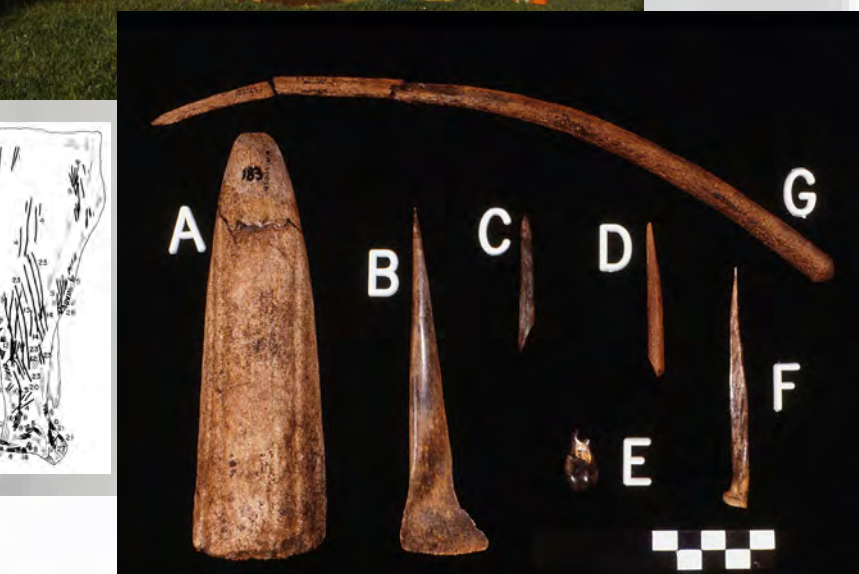
David Rapson (University of Wyoming), Lawrence Todd (GRSLE), Daniel Dalmás (University of Utah), Marcel Kornfeld (University of Wyoming), and Erick Robinson (Desert Research Institute)

ABSTRACT

Thirteen AMS bone dates based on MNI from 9 hearth and dump features at the Bugas-Holding site establish the contemporaneity of all deposits within the main block area (mean = A.D. 1658). This chronological framework provides an opportunity to evaluate high-resolution behavioral models of social organization and land use at multiple analytical scales, linking site-specific activities with aspects of regional ecological structure. The generalized application of current settlement models without contextual analysis can lead to misidentification—or complete oversight—of critical patterns in spatially and depositionally diverse contexts such as the Greater Yellowstone Ecosystem (GYE). Following Kuhn (1992:192), different forms of anticipatory organization among foragers have significant implications for archaeological patterning. At Bugas-Holding, emphasizing the linkage between technological and subsistence variables with specific behaviors allows us to identify the archaeological consequences of the behaviors responsible for observed patterning. For example, edXRF (energy dispersive X-ray fluorescence) analysis of known-source obsidians, alongside lithic assemblage analysis, reveals site-specific patterns of toolstone procurement, use, and discard within the broader context of social organization and regional land use. Additionally, data on stable isotopes from bison and bighorn sheep provide insights into site-specific hunting tactics, transport choices, and modes of storage, consumption, and discard.

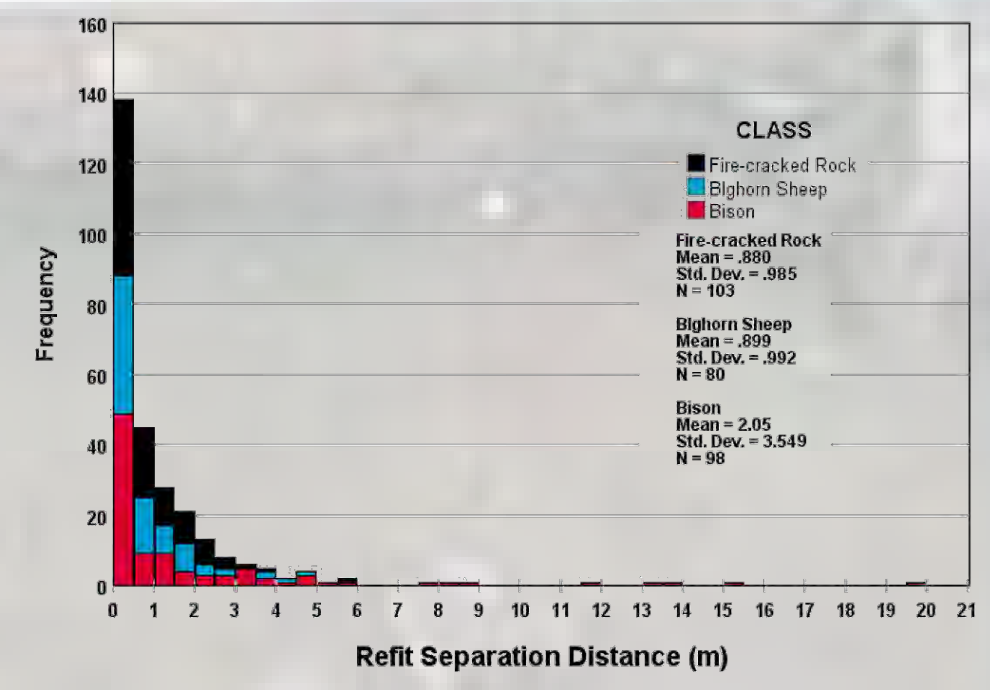
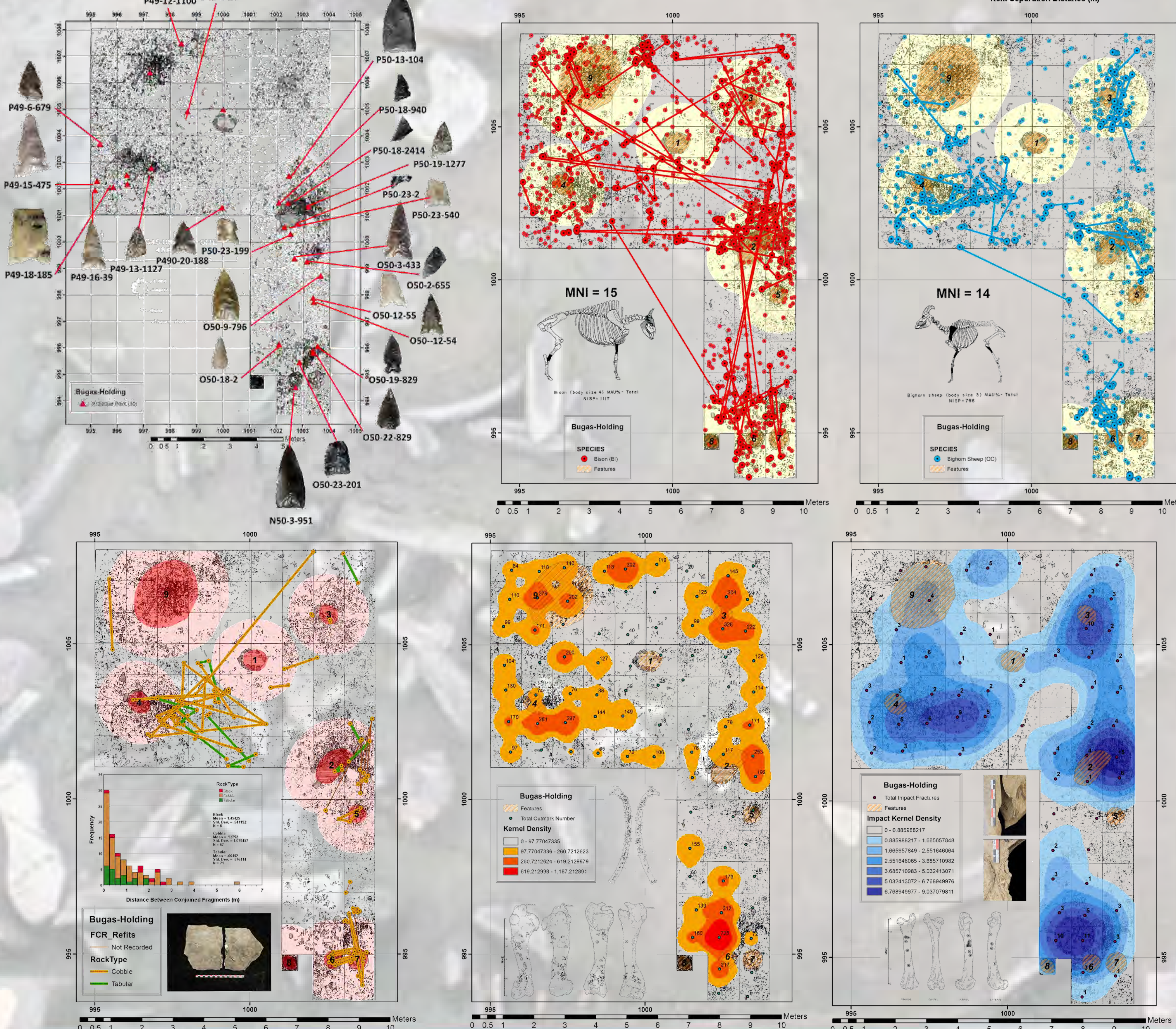
1983-1986 Excavations

The Bugas-Holding site was tested in 1983. NSF and other funded supported full-scale, piece-plot focused excavations by the University of Wyoming from 1984-1986. The single level, Late Prehistoric occupation with striking spatial patterning and exceptionally well preserved faunal remains in located in northwestern Wyoming's Sunlight Basin in the Greater Yellowstone Ecosystem at an elevation of 2065m. In the 1980-1990s, a program of attribute based analysis and site structural research on a total of over 51,000 piece-plotted items from this site was undertaken and focused on the central block excavation area (84.25m²).



Distributional Patterns and Inter-connections

Site data served as the basis for several research projects (references below) that emphasized spatial patterning. Recently, additional descriptive and analytical work on the spatial relationships between hearth features and mapped items has been undertaken. Examples of bone lithic and faunal distributional patterns and spatial inter-connections are shown here. Central to the recent work has been the conversion of the site databases and images for digital curation so that the information can be accessible for a range of additional research on this exceptional archaeological record.



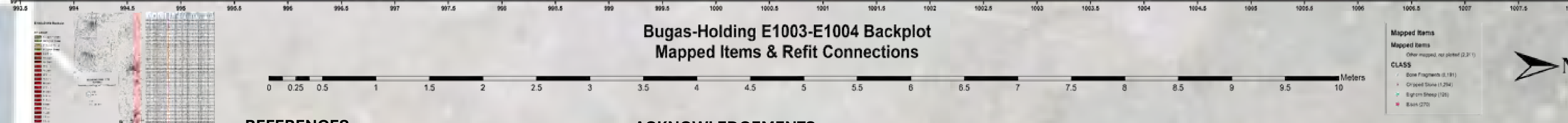
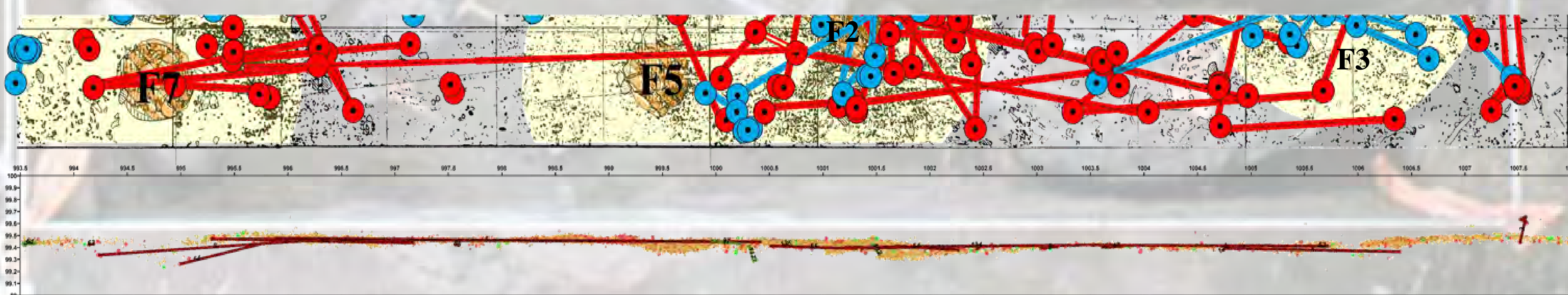
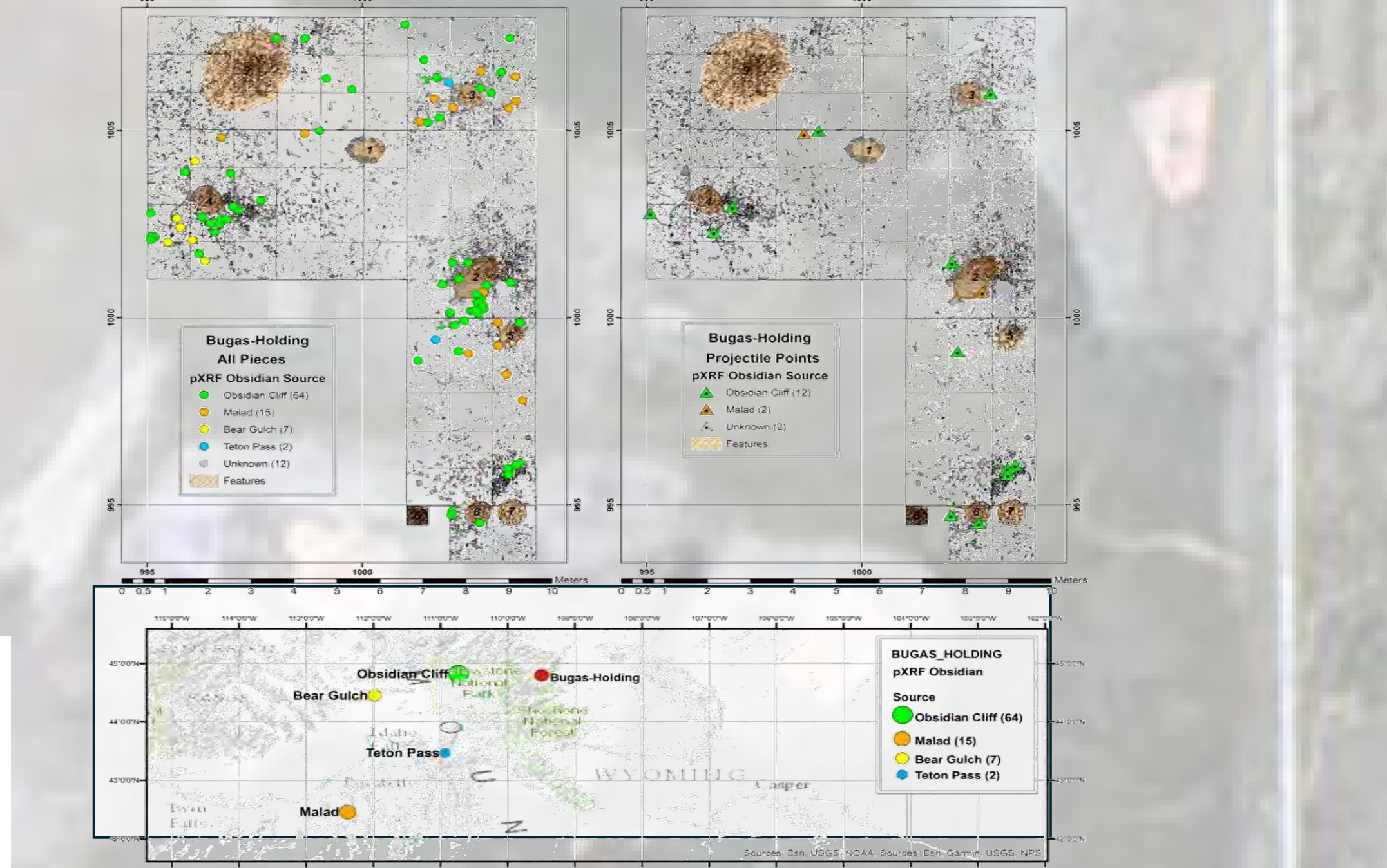
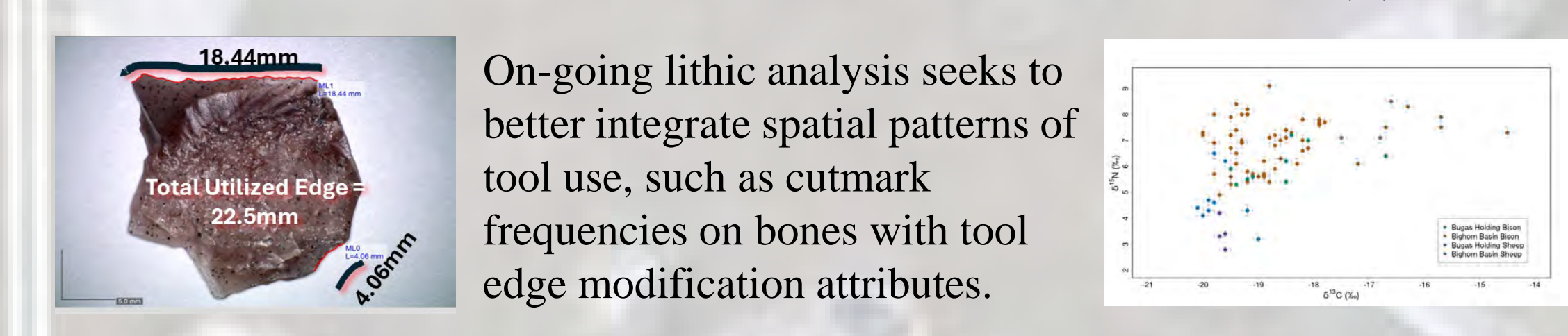
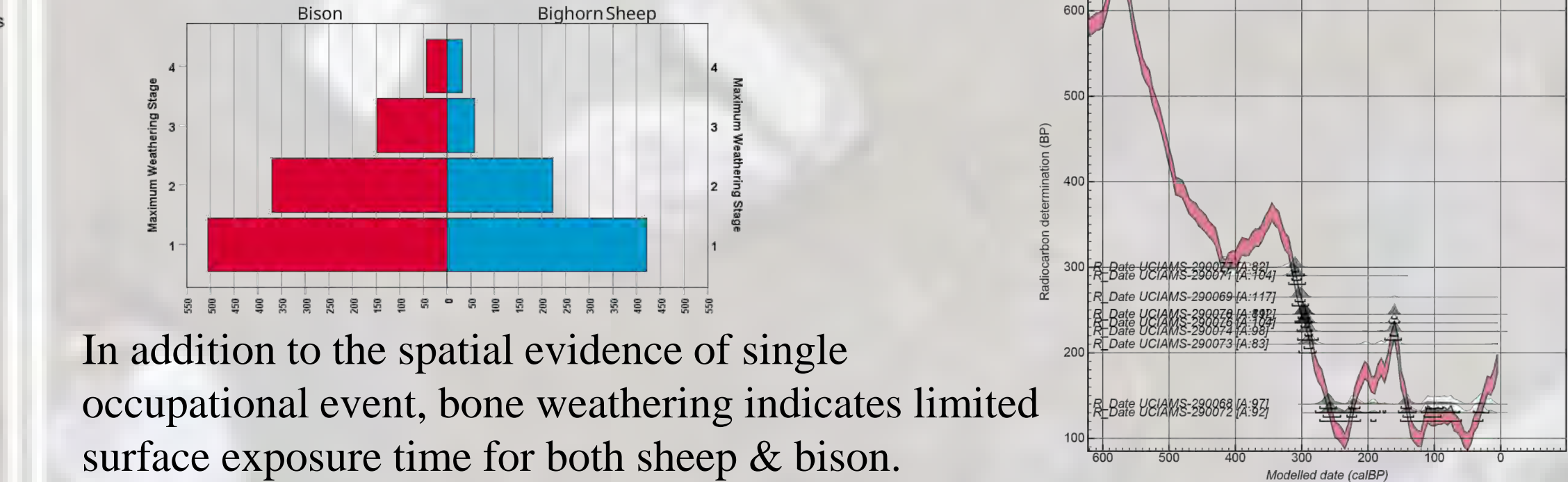
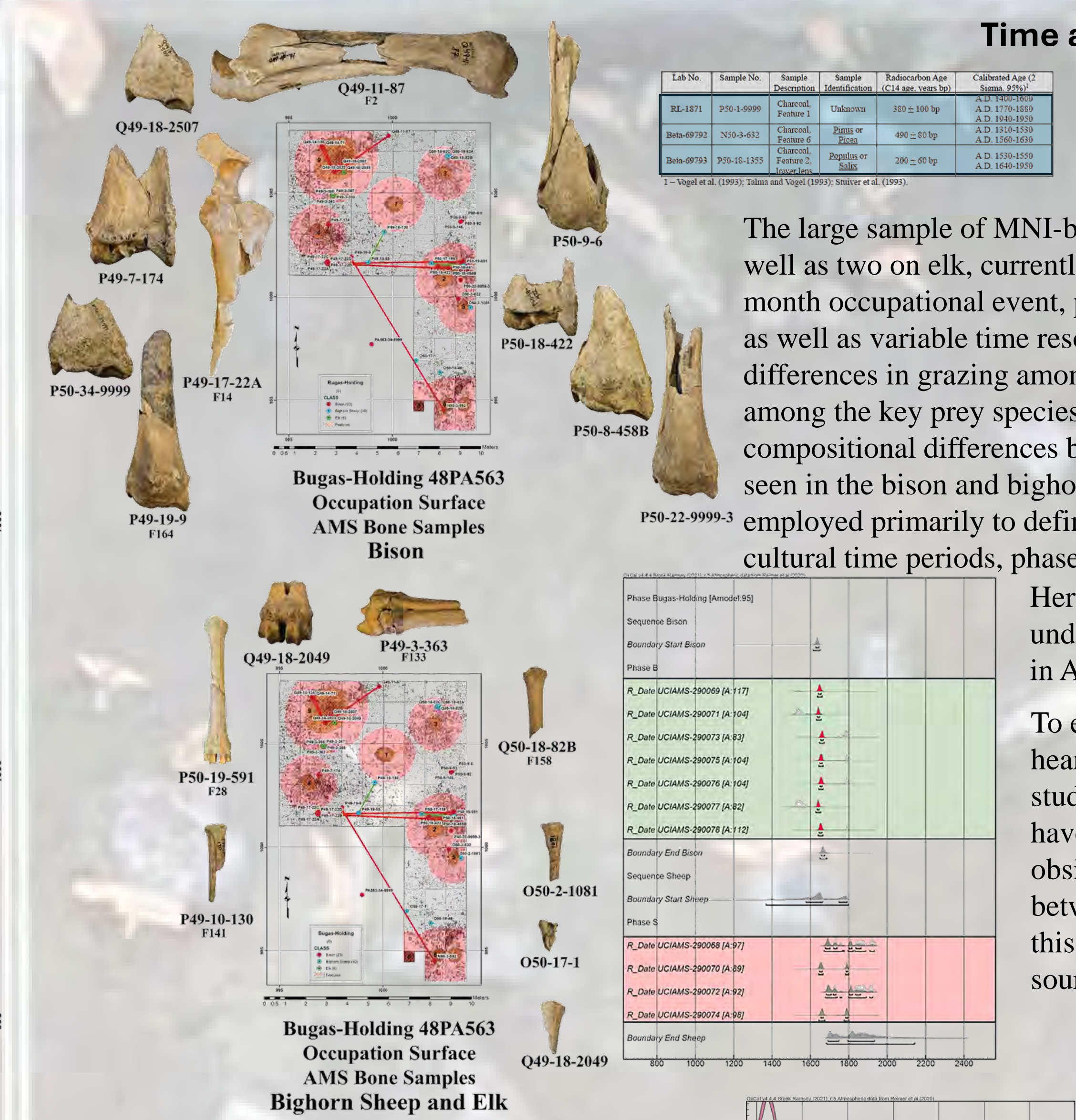
Time and Space

Although spatial patterns strongly suggest a single occupational event, radiocarbon dates on wood charcoal yield an almost 300 year range in ages. To gather better occupation-specific dates, we are in the process of exploring MNI-based bone dates for both bison and bighorn sheep.

The large sample of MNI-based bone dates, including additional dates on bison and bighorn sheep, (as well as two on elk, currently in process), from a depositional context argued to represent a single 4-5 month occupational event, provides an opportunity to investigate patterns in trace element composition as well as variable time resolution. One line of research involves examination of how elevational differences in grazing among these three species may relate to differences in isotopic composition among the key prey species at Bugas-Holding. Another involves the potential for such isotopic compositional differences between species to influence fine-grained variability in AMS bone dates, as seen in the bison and bighorn sheep data shown here. Traditionally, radiocarbon dates have been employed primarily to define mean age range estimates which in turn form the basis for establishing cultural time periods, phases, and temporal trends.

Here, multiple MNI-based bone dates allow insights on (currently poorly understood) potential sources of variability in fine-grained temporal resolution in AMS radiocarbon trace element assessments.

To expand our understanding of spatial patterning, especially relative to the hearth features, we have also undertaken a 100 piece geochemical sourcing study for obsidian tools and debitage. A combination of edXRF and pXRF have been used (see Dalmás et al. 2025). While it is common to examine obsidian source analysis in research to examine group movement/interaction between sites and regions, intra-site spatial studies of sourced obsidian such as this are not common. The initial results indicate differences in the mixture of source areas associated with distinct, faunal-refit connected hearth areas.



REFERENCES

Rapson, D.J. (1990). Pattern and process in intensive spatial analysis: Site structure and faunal research at the Bugas-Holding site. PhD Dissertation, University of New Mexico.

Rapson, D.J., and C. Todd. (1992). Context, contemporaneity, and site structure: Distributional analyses of the Bugas-Holding site. In *Working Together the Past: Applications of Refitting Studies in Archaeology*, edited by J.L. Hofman and J. Enloe, 238-263. BAR International Series 578, Oxford.

Rapson, D.R., and L.C. Todd. (1999). Linking Trajectories of Intra-site Faunal Use with Food Management Strategies at the Bugas-Holding site: Attribute based spatial analysis of a high altitude winter habitation, Wyoming, USA. In *Le Bison: Culture et Mémoire de Subsistance des Amérindiens du Pacifique Nord et Paléolithiques du Grand Nord*, edited by J.P. Brugal, F. David, J.G. Enloe, and J. Jaubert, pp. 455-478. Association pour la promotion et la diffusion des Comptes Rendus de l'Académie des Sciences, Paris, France.

Shanks, O. C., Kornfeld, M., & Hawk, D. D. (1999). Protein analysis of Bugas-Holding tools: new trends in isotope analysis. *Journal of Archaeological Science*, 26(9), 1183-1191.

Shanks, O. C., Hodges, L., Tilly, L., Kornfeld, M., Larson, M. L., & Ream, W. (2005). DNA from ancient stone tools and bones excavated at Bugas-Holding, Wyoming. *Journal of Archaeological Science*, 32(1), 27-38.

Todd, L.C., and D.J. Rapson. (1988). Long Bone Fragmentation and Interpretation of Faunal Assemblages: Approaches to Comparative Analysis. *Journal of Archaeological Science* 15:307-325.

Poster copy available at: http://grsie.org/Conferences/Rapson_et_al_2025_SAA_Bugas-Holding.pdf

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