A Growing Picture: The “Ghost Forests” of Jack Creek Wyoming
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Abstract
Integration of archaeological patterns with paleoecological data is often difficult. As part of the Greybull River Sustainable Ecology project (GRSLE) in northwestern Wyoming, we have begun documenting a series of stumps and fallen trees which seem to represent “ghost forests” providing evidence of Little Ice Age vegetation. Recording the lengths, diameters, and orientation of the trees and plotting them as GIS layers will assist in building a better picture of forest dynamics during the Late Prehistoric Period. Because many of these ghost forests overlay archaeological sites, understanding the relationships between past forest boundaries and prehistoric site placement is crucial. By collecting and dating charcoal from the trees, in conjunction with dendrochronological research, we can get an idea of the fire activity on the sites and how this activity may impact sites preservation. Environmental research of the ghost forest along the Jack Creek Drainage area contributes to regional archaeological research, promotes a dialogue with the local community, and provides a database from which to monitor future changes.

Introduction
As we interpret the archaeology of the Greybull River Sustainable Ecology project (GRSLE) in northwestern Wyoming, we also need to take into account the changing landscape of the surrounding area including obtaining an idea of what the paloecoscape looked like. In the Jack Creek drainage area, today and the 1700’s, we can conclude that current tree stands do not give us the appropriate environmental picture in which to evaluate site placement. Sites might be more intact in areas of the ghost forest where ghost trees might give us a better idea of what the paloecoscape looked like at the time these sites were created. We can start to put together an idea of when these forests died and how this prehistoric landscape may have impacted prehistoric peoples land-use patterns.

Methods
To capture as much data collection as possible we used a variety of methods. A non-systematic survey of the landscape was conducted to determine the location of possible ghost forests. After areas of documentation were selected, we used a Trimble GeoXT GPS unit to record their locations. In the Trimble GeoXT GPS the diameter and height of every tree stump was recorded if applicable (some stumps were rotted to where we were not able to get a diameter), and diameter and length of every downed tree was also recorded (only measured length of complete tree, did not record the shadow, or debris left by deteriorating tree trunks). We also noted if any trees had potential collectible charcoal samples.

Results
• From the charcoal sample taken from one of the ghost trees, we were able to determine that the time of burn was a conventional age of 330+/- 50 BP. A two-sigma calibration result with 95% probability, determined the trees were growing from AD 1450 to 1660.
• Results from the tree ring sample taken from the ghost forest indicate it lived for 250 years before its death, dying no later than the early 1700’s and sprouting several hundred years earlier.
• When looking at the GIS layers of the ghost trees and artifacts together we can see that in general there are few artifacts where ghost trees lie.
• Since we are able to see two different time periods of tree stands, today and the 1700’s, we can conclude that contemporary tree stand locations are not a constant on the landscape.
• Currently the tree stands and the sites are separate. According to the radiocarbon and dendrochronology dates of the charcoal, the ghost trees died in the 1700’s, therefore the tree stands in the 1700’s were separate as well.
• Forest erosion affects the taphonomic zone that the artifacts emerge in, therefore limiting site erosion around this area of ghost trees (Teeter et al).

Conclusions
After evaluating the results of the research conducted in the Greybull River Drainage area of the ghost forests, we have recognized the significance of including the study of non-archaeological landscape features into our project. When recording the radiocarbon date with the tree ring date we can see that the ghost forests provide evidence of Little Ice Age vegetation. Recording the lengths, diameters, and orientation of the trees and plotting them as GIS layers will assist in building a better picture of forest dynamics during the Late Prehistoric Period. Because many of these ghost forests overlay archaeological sites, understanding the relationships between past forest boundaries and prehistoric site placement is crucial. By collecting and dating charcoal from the trees, in conjunction with dendrochronological research, we can get an idea of the fire activity on the sites and how this activity may impact sites preservation. Environmental research of the ghost forest along the Jack Creek Drainage area contributes to regional archaeological research, promotes a dialogue with the local community, and provides a database from which to monitor future changes.

Future Research
More research is needed to gain a clearer view of what these ghost trees can tell us about the paloecoscape and how the sites relate to the forest. In the future, we may want to look at the forest in correlation to water sources to see if these forests are being eroded by water in any way. We may also want to get more research on the fire history at the ghost forest and how this may affect the archaeological record. We may also want to take core samples from a variety of other ghost trees in the area as well as cores from recently deceased trees to see if there is an overlap in time periods. A more extensive data record of the entire ghost forest area should be taken for monitoring recreational impacts as well as determining other tree to site relationships. Information of the ghost forest and its importance should be conveyed to the local community to prevent destruction or collection of the ghost trees. Clearly, we have only begun the research necessary to make the ghost forest an integral part of the archaeological record in the Greybull River Drainage.

References
Teeter, Sean, Zach Kool and Christian Birke
2005 Poster
63rd Plains Anthropological Conference

Figure 1: GIS layers recording the ghost forests in relation to the current forest boundary.

Legend
Artifacts
Downed Tree
Tree Stumps

Figure 2: Map of ghost forest in ArcPad with details of where the dendrochronology sample was taken, where the charcoal sample was taken, and where documented sites are. Note: The ghost forest plotted on these maps are not the extent of the ghost forest in the area.

Figure 3: Cross section taken from one of the ghost trees for dendrochronology dating.

Figure 4: Picture of charcoal sample from one of the ghost trees for radiocarbon dating.

Figure 5: Line = downed tree
Legend

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