Rotting Bison, Grazing Cattle, Modified-Whittaker Sampling Plots, and Foraging Harvester Ants

Wait a minute, that’s not archaeology ... is it?

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11 year program to develop research, training, and public education facility in NW Nebraska

• much of the research seems closer to vertebrate paleontology rather than archaeology.
• opportunities to talk about the process of science rather than results
• pressure to come up with field research topics for 10-15 undergraduate students per year (manageable yet meaningful)
• once the building was completed, needed to find a way to still work outdoors

Wyoming Archaeological Society Cody, Wyoming

Hudson-Meng Bison Bonebed -- Oglala Grassland Research

Understanding archaeological fossil and subfossil bone assemblages requires an understanding of the multiple processes that relate to preservation, deterioration, burial, disarticulation, breakage and scattering

Why am I fascinated by rotting bison?
Contemporary archaeology often involves creative collaborative investigations that cross a variety of boundaries. For example, if we are interested in prehistoric diet and cooking practices, we often need to consult specialists….
What is the feasibility of revisiting a carcass to pick up some last minute bit’s o'bison that you might not have thought of the first time…..

Study of bacterial content of decaying bison flesh.

Rotting bison are not just photogenic and aesthetically pleasing, they also are very important research sites. The preliminary results have been so encouraging that we’ve designed a T-shirt to publicize an important ‘take-home-message’:

If it’s green, it’s OK
If it’s got maggots, let it lay
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If it’s got maggots, let it lay

Human garbage

A longer-term perspective
A large bison kill could leave 50,000-100,000 lbs of food behind for other carnivores.

Robert Foley, 1981

Artifacts share many properties with plants, in having small unit size in relation to a very large spatial context, and also by having a patchy distribution.

Robert Foley, 1981
The Revised Modified-Whittaker Nested Sampling Plot

Subplot | Area | Dimensions
---|---|---
1 – 10 | 1m² | .50 x 2m
A & B | 10m² | 2 x 5m
C | 100m² | 5 x 20m
K | 1000m² | 20 x 50m

(see Stohlgren et al. 1997, 1998)

Walking Survey

Crawling Survey

After items are found during survey they can be mapped and collected or mapped and left... students using GPS to map stone tools and doing in-field documentation.

...but still need to know what we missed.
• species richness
• vegetation height
• above ground biomass (gm/m2)
• % ground cover

Sub-Surface Test
To a depth of 10cm…

1. Walking survey at 70 cm spacing found a total of 65 artifacts in shaded sample units.
2. Crawling survey found a total of 244 items in the same areas.
3. Subsurface tests in only the smaller sample units recovered 2268 items

What do we record on a survey plot?

Bundled Datasets
- Yucca
- Fauxbitage
- Artifacts
- Rodent Mounds

And…
- sage trees
- cow pies (5 attributes)
- ant mounds (32 attributes)
- trails

Plus…
- isotope samples
- plant species richness
- invasive species
- soil chemistry
- thermal landscape
- historic artifacts (29 attributes)
- etc…
- soil depth
An Archaeological Grazing Study

An example of bundled research to understand coupled processes.
**Fauxbitage**

Individually Numbered Aluminum Clasts

(Not to scale)

**A Proxy Measure for Grazing Intensity**

VLDV

Laboratory Setting

GIP

Natural Environment

**That's not archaeology......is it?**

In one year, six escape discovery

**No Grazing**

In one year, seven escape discovery

**Moderate Grazing**
Intense Grazing

Results: Cows Kick Things Around

Fauxbitage Movement and Grazing Intensity

What about other herbivores that move parts of the archaeological record?

John McPhee quoting geologist David Love’s mother on her son’s childhood encounters with harvester ants on a central Wyoming ranch:

When David was five or six we began hunting arrowheads and chippings. While the rest of us labored along scanning gulches and anthills, David rushed by chattering and picking up arrowheads right and left. He told me once, “There’s a god of chippings that sends us anthills.”

McPhee 1986
**Pogonomyrmex occidentalis**

The disc of harvester ant nest is an area cleared of vegetation around the conical mound.

Amy Frederick lays a 10 cm wide band of 6400 colored beads 2.5 m from the center of Mound 1.
So how do we put all of this together?

Only need to know three things...........

Yes, this approach takes more time, and costs more money up front, but has a much greater “data payoff” and allows for more complete interpretations.

Doing this sort of Archaeology in the Big Horn Basin

Greybull River Sustainable Landscape Ecology
GRSLE
Taking the grasslands show on the road to the high county, the land of horses, guns, and grizzly bears.

Upper Greybull and the Western Bighorn Basin, Wyoming
- 90 mile long drainage system with elevations ranging from 13,000 ft to 4500 ft
- Annual precipitation >25 inches to <10 inches
- Washakie wilderness to intensive irrigation agriculture
- Current human population of <1000
- >10,000 cattle, horses, and sheep
- Several thousand pronghorn, mountain sheep, wapiti, moose, mule deer, native cutthroat trout, as well as coyotes, fox, mountain lions, grizzly and brown bear, and several wolf packs.
The changing face of land use
And documenting how it is changing
Invasive behaviors
the first documented infestation of yoga on
the Washakie Wilderness

High elevation land use
both historic and prehistoric

Recreational Use Intensity

- Trailhead questionnaires
- Archaeological documentation
- A type of applied archaeology

> 600 square miles
- BLM
- National Forest
- GRSLE 2002-2004
- 88 on National Forest
- 60 on Washakie Wilderness

Before our work started in 2002, the central Absaroka mountains were a large
Blank Spot on the map of Prehistoric North America
We left all of these where we found them—catch and release.
Unlike the ‘arrowheads’, we collected all of these and brought back to CSU.

Triple S Archaeology: Focus on the Future rather than the Past

Archaeology: a multidisciplinary approach for the development and evaluation of integrated, multi-scale datasets for interpreting human ecological and social interactions.
Thank you!
Questions, Comments, Discussion?